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Submitted by: Salma Mohamed

Application: 9156-00018B - Digital sundhed og data - bedre sundhedsuddannelser
gennem upgrade af undervisere på tværs af universitet og professionshøjskole
Grantee: Københavns Universitet
Administrator: Københavns Universitet
Grant holder: UFS/UFS
Grant giver: Uddannelses- og Forskningsstyrelsen
Instrument: Digitaliseringspulje/Digitaliseringspulje
Granted amount: 4500000.00 kr.
Project period: 2020-01-01 - 2024-01-31
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Funding body: Uddannelses- og Forskningsstyrelsen
Instrument: Digitaliseringspulje/Digitaliseringspulje
Case number: 9156-00018B

Table of contents

Bevilling

Materiale

Supplerende materiale

Supplerende materiale

1. Bevilling

Indsend blanket

1. Materiale

Projektets titel	Digital sundhed og data - bedre sundhedsuddannelser gennem upgrade af undervisere på tværs af universitet og professionshøjskole
Projektnummer	9156-00018B
Projektets kontaktperson (projektleder)	Morten Misfeldt <misfeldt@ind.ku.dk>
Administrator	Salma Mohamed <samo@di.ku.dk>
Projektets varighed, inkl. evt. forlængelser	01.01.2020-31.01.2024 (forlænget med 1 år og 1 måned)
Øvrige institutioner i projektet	Københavns Professionshøjskole, Københavns Universitet (SUND), Københavns Universitet (SCIENCE)
Evt. hjemmeside for projektet	https://di.ku.dk/uddannelse/digital-sundhed-og-data/
Total budget	4,5 mio. kr.
Bevillingsbeløb	4,5 mio. kr.

A. Resultater og bidrag

- 1) Beskriv de væsentligste resultater i projektet, herunder de 5 vigtigste aktiviteter/ erfaringer i projektet
 - a. Særligt hvilken impact har det (haft) på undervisernes kompetencer/praksis, og hvordan kan erfaringerne bredes ud til andre undervisere?

Projektet Digital Sundhed og Data har designet og implementeret et kompetenceudviklingsforløb for undervisere (efterfølgende kaldes disse kursister i rapporten) fra både Københavns Universitet (KU) og Københavns Professionshøjskole (KP) i løbet af 2021 og 2022. I alt har 61 deltagere fra begge uddannelsesinstitutioner gennemført dette forløb. Formålet med forløbet har været at styrke undervisernes digitale kompetencer ved at integrere moderne datadrevne metoder og teknologier i deres undervisningspraksis. Både vores erfaringer som projektledelse, kursisterne input gennem de løbende evalueringer og den følgeforskning der har været tilknyttet, peger på at projektet har bidraget til dette formål. Ydermere har kurset bidraget til at understøtte kernefaglig digitalisering på sundhedsuddannelserne på tværs af KP og KU, samt skabt viden om vanskeligheder og muligheder ved en tværfaglig og tværinstitutionel tilgang til digitalisering.

Fem centrale resultater fra projektet Digital Sundhed og Data:

- Udvikling af et anderledes efteruddannelsesforløb med fokus på både et fagligt og didaktisk koncept.
- To gennemførelser af kursusforløbet, hvor vi havde 36 tilmeldte kursister i september 2021 til første gennemførelse og 34 tilmeldte kursister i maj 2022 til anden gennemførelse (i alt 61 deltagere).
- Tæt samarbejde og vidensdeling blandt aktører på tværs af uddannelsesinstitutionerne.
- Konstruktive og positive evalueringer som har skabt viden om efteruddannelse af undervisere på videregående uddannelser.
- Kursusforløbet er omsat til digitale læringsressourcer og et koncept for AI designsprint, som kan bruges i videre kompetenceudvikling på KU og KP

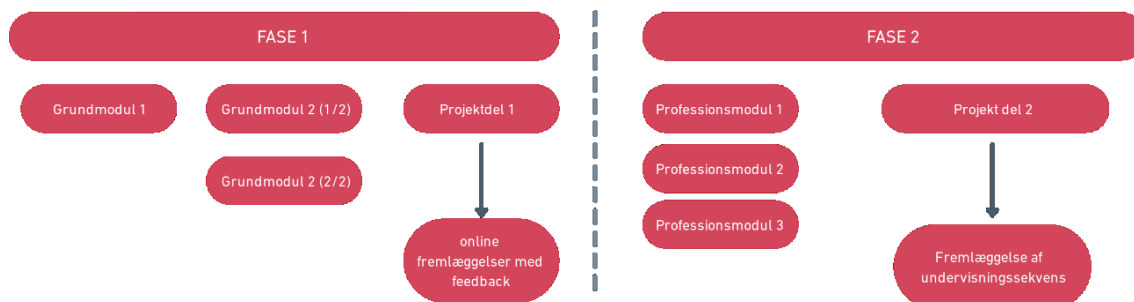
Nedenfor i rapporten vil de fem centrale resultater blive uddybet.

Udvikling af efteruddannelsesforløb

Udviklingen af kurset i Digital Sundhed og Data muliggjorde et samarbejde mellem aktører, der normalt ikke samarbejder, idet kurset blev udviklet på tværs af forskellige faglige baggrunde og uddannelsesinstitutioner. Der blev oprettet i alt otte arbejdsgrupper (se figur 2), hvor repræsentanter fra både Københavns Universitet (KU) og Københavns Professionshøjskole (KP) deltog. En unik karakteristik ved dette efteruddannelsesforløb var, at kursisterne (undervisere) blev undervist af deres egne kolleger, måske ansat på andre institutter. Dette var også et emne, der blev drøftet i de indledende møder i arbejdsgrupperne, hvor indholdet til fagmodulerne blev udviklet.

En didaktisk arbejdsgruppe blev nedsat med ansvar for at udvikle kursets didaktiske design. Figur 1 illustrerer forløbets design, der fokuserede på at sikre, at kursisterne kunne implementere deres nye kompetencer i egen undervisningspraksis. Dette skulle gavne deres studerende og forberede dem til det højteknologiske arbejdsmarked. For at fastholde dette fokus hos kursisterne blev efteruddannelsesforløbet struktureret således, at der var et online møde mellem grundmodulerne og professionsmodulerne, hvor kursisterne skulle præsentere en projektbeskrivelse (Projekt 1) om et valgfrit emne inden for kursets område, som de kunne anvende i undervisningssammenhæng. Efter afslutningen af efteruddannelsesforløbet blev kursisterne bedt om at gennemføre en undervisningssekvens (Projekt 2), som de skulle præsentere for deres medkursister, der agerede som deres studerende. Dette trænede kursisterne i at anvende deres ny erhvervede viden fra kurset i undervisningssammenhæng.

Det endelige design af kompetenceforløbet omfattede således, at alle kursister skulle igennem 50 timer kursusaktivitet, som fordelte sig over fire hele kursusdage samt andre aktiviteter:



Figur 1: Faseplan for afvikling af Digital Sundhed og Data i 2022. Vær opmærksom på, at kursisterne vælger imellem Professionsmodul A, B eller C.

Gennemførelse af efteruddannelsesforløb

Kursusforløbet i Digital Sundhed og Data blev gennemført to gange. Første kursusdag var i september 2021, hvor pilotudgaven af forløbet blev skudt i gang med 36 tilmeldte kursister. Det var i denne udgave alt blev afprøvet for første gang, hvorfor det var meget vigtigt med løbende feedback fra kursisterne. Efter hver kursusdag (og generel aktivitet) blev der udsendt et spørgeskema, der spurgte ind til kursisternes oplevelse af det faglige niveau, tema relevans og udbytte for dagen. Dette gjorde også at kursusforløbet løbende kunne tilrettes og forbedres baseret på feedbacken fra kursisterne. Derudover blev det også løbende italesat på kursusdagene, at vi ønskede løbende feedback mhp. at skabe det bedst mulige forløb for dem. Anden udgave af kurset forløb var i maj 2022 med 34 tilmeldte. Forløbet foregik denne gang mere gnidningsfrit og feedbacken var også bedre, da vi implementerede den feedback vi fik fra første afholdelse af kurset.

Vidensdeling blandt aktører på tværs af uddannelsesinstitutioner

Et stort udbytte af projektet Digital Sundhed og Data har været det tværinstitutionelle samarbejde. Det har været et gunstigt samarbejde med meget læring i alle arbejdsgrupper og i styregruppen. I starten var samarbejdet udfordrende, da det krævede at opbygge indsigt i hinandens fagligheder, og på et organisatorisk plan, arbejdsgange. Feedbacken fra kursisterne har også været på positiv, da flere oplevede læring fra andre fagligheder og uddannelsesorganisationer.

Evaluerings

Evaluerings og vidensskabelse har været et væsentligt fokus i hele processen. Det var også derfor der blev nedsat en arbejdsgruppe omhandlede evaluering bestående af to forskere fra hhv. KU og KP. Som tidligere nævnt, blev der løbende gennemført spørgeskemaundersøgelser i kursusforløbet (disse er medsendt de årlige rapporter). Til sidst blev der også udsendt et spørgeskema, da kursusforløbet var afsluttet, der evaluerede kursusforløbet som en helhed. Generelt var evalueringerne positive, og vi forsøgte at tilpasse efter den konstruktive feedback. Det har været vigtigt for projektet at få en indikation af, om niveauet var tilpas, da de datalogiske aspekter for mange kursister repræsenterede en ny faglighed, som de blev udfordret på både teoretisk og med praktiske øvelser.

Der blev gennemført følgende evalueringer i projektet:

- Survey evaluering efter hvert undervisningsmodul (både i første og anden afvikling)
- Survey evaluering af kursusforløbet som helhed (både i første og anden afvikling)
- Kvalitativ evaluering fra KP "Transfer fra Digital Sundhed og Data" (se bilag)
- Kvalitativ og kvantitativ evaluering fra KU "Digital Health and Data Evaluation" (se bilag)

Evaluerings viser en generel stigning i tilfredsheden fra første til anden afvikling af kurset. For eksempel angav 88% af kursisterne ved første afvikling, at det faglige niveau var passende. Dette tal steg til 93% ved anden afvikling, efter at vi havde justeret niveauet baseret på feedback fra den første afvikling. Især grundmodul 2,

som omhandlede datalogi og var en ny faglig udfordring for mange kursister, blev bedre evalueret under andenrunde. Ved første afvikling oplevede 24% af kursisterne, at niveauet på dette modul var for højt i forhold til deres faglige forudsætninger. I anden afvikling havde ingen denne oplevelse, hvilket skyldtes implementeringen af feedback fra kursisterne. Det var afgørende for projektets succes at finde det rette faglige niveau, da kursisterne havde meget forskellige baggrunde, og dette bidrog til at sikre, at de fik maksimalt udbytte af forløbet. Evalueringen ved anden afvikling er en stærk indikator på, at dette lykkedes.

Vidensbidrag

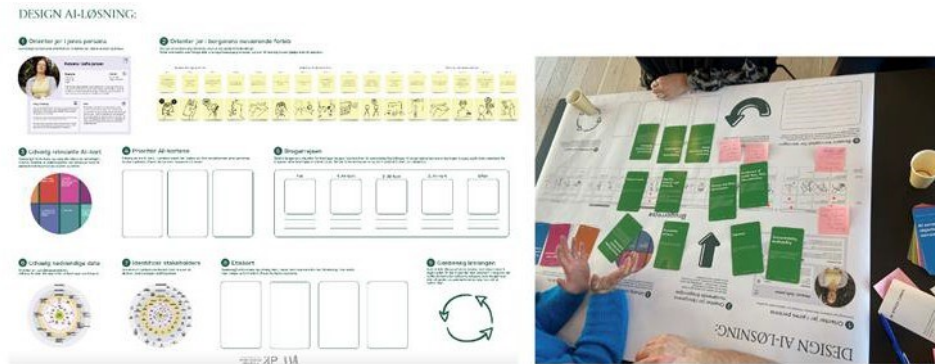
Rapporten fra Københavns Professionshøjskole (se bilag, *Transfer fra Digital Sundhed og Data*) viser, at inklusionen af praksisnære og "hands-on" undervisningseksempler under kursusforløbet (som fx ved arbejde med programmet "Orange" og "Computational thinking"), samt det at have en læringspartner under forløbet, var vigtige faktorer for facilitering af transfer. Uklarhed omkring formål og struktur for forløbet fungerede som barrierer for transfer, og udfordringer med strukturelle barrierer var også et af hovedtemaerne for barrierer for transfer hos underviserne. Rapporten identificerer et behov for mere interaktive undervisningsformer og bedre organisatorisk støtte for at optimere transferprocessen. Artiklen behandler de unikke forhold og designprincipper, der er forbundet med kompetenceudvikling i relation til digital transformation af sundhedsvæsenet. Tre centrale designprincipper fremhæves:

1) Samfundsoverblik, tekniske kompetencer og faglig viden er alle tre vigtige for digital transformation; 2) Undervisning af eksperter for eksperter, "vidensdagene" er fokuserede, forskellige mennesker fremmøder (til både samfundsfaglige, tekniske og professionelle moduler), og der er frihed for instruktørerne; 3) Læring gennem praktiske opgaver, at lære om undervisning fra undervisningen, og projektet er et undervisningsprojekt ikke et forskningsprojekt. Studiet fandt at sværhedsgraden af kurset for det meste blev vurderet til at være passende for underviserne, men for svært for deres studerende. Et modul (Grundmodul 2) blev specifikt vurderet til at være for svært, særligt med henblik på førsteårsstuderende. Derudover sås det også, at kurset var en succes for deltagerne, men ikke dem, der underviste kurset.

Rapporten fra Københavns Universitet (*Digital Health and Data Course Evaluation, se bilag*) kombinerer survey-interview- og observationsdata. Ændringerne i Grundmodul 1 fra 2021 til 2022 førte til en bedre evaluering til trods af at kursisterne opfattede teorien som udfordrende. Kursisterne fremhævede, at de praksisnære og praktiske elementer i Grundmodul 2 faciliterede deres læring. Professionsmodulerne varierede i sværhedsgrad, hvilket antyder et behov for klarere kommunikation om deres tekniske natur. Læringsmål som computational thinking og anvendelse af sundhedsdata i sundhed blev opnået, men klarhed i sammenkoblingen af kursussemner kunne forbedres. Kursisterne pegede på, at strukturelle forbedringer og bedre integration af emner kunne yderligere forbedre læringsudbyttet. Kursisternes evaluering fremhævede desuden kontekstuelle faktorer som uddannelsesstrategi og curriculum design som afgørende for effektivt at implementere deres nye kompetencer i deres respektive undervisningsmiljøer.

Afslutningsworkshop

I januar 2024 blev alle tidligere kursister, undervisere og relevante aktører inviteret til en afslutningsworkshop mhp. skabe opmærksomhed om vigtigheden af at arbejde med digital kernefaglighed og kompetenceudvikling i de involverede uddannelsesinstitutioner og samtidig synliggøre, hvad der er af konkrete muligheder for videre kompetenceudvikling på området. På den afsluttende workshop testede kursisterne bl.a. et nyt AI design sprint, der er blevet udviklet som læremiddel i forbindelse med projektet og kan bruges af begge parter i videreførelse af projektets erfaringer.



Udviklingen af kunstig intelligens er en oplagt case for arbejdet med teknologiforståelse. I regi af projektet Digital sundhed og data, har KP og KU i samarbejde med virksomheden 33A udviklet et AI-design-sprint til de sundhedsfaglige uddannelser, som giver alle – uanset faglig baggrund – mulighed for at bidrage aktivt til udvikling af nye løsninger med kunstig intelligens og vurdere, hvordan løsningen påvirker arbejdsopgaver og borgere.

2) Beskriv eventuelle udfordringer/overvejelser, som har haft betydning for projektets fremdrift eller formålet med projektet. Gerne perspektivet i forhold til eventuelle lignende projekter i fremtiden.

Forskellige fagligheder

De forskellige fagligheder som var bragt sammen under kurset var både en udfordring og et positivt aspekt ved kurset. Det gælder både de mange forskellige sundhedsfaglige professioner og videnskabsfag som kurset retter sig imod men det gælder i høj grad også de forskellige kulturer der fandtes på tværs af de to uddannelsesinstitutioner. På KP var selvforståelsen langt hen ad vejen en underviserfaglighed, hvorimod forståelsen på KU i lige så høj grad var som forsker og vidensperson. Dette gav nogle vanskeligheder især i første forløb af kurset. Vanskelighederne gik på at holde fokus entydigt på undervisning og ikke forfaldet til at afprøve de nye digitale metoder i egen forskningspraksis.

Rekruttering af kursister

Projektet havde en ambition om at få rekrutteret 40 kursister i pilotudgaven af kursusforløbet og 80 kursister i anden omgang. Det blev dog hurtigt evident at opskaleringen ikke ville kunne lade sig gøre, da det var en udfordring at få rekrutteret de første 40 kursister. På trods af at kurset blev anset som relevant og fik gode evalueringer (første omgang) var det ikke nemt at få nok kursister til at melde sig til kurset. Trods en fokuseret og ihærdig indsats fra alle involverede uddannelsesinstitutioner. Kursusforløbet var normeret til 50 timer, hvilket er et relativt krævende forløb i tid og i indsats for en i forvejen travl målgruppe.

3) Beskriv kort eventuelle væsentlige ændringer i projektets forudsætninger, der har givet/giver anledning til ændringer i projektet

Som forventeligt har forløbet generelt og processen af projektet været nemmere anden gang. Vi har haft erfaringer vi har kunne trække på fra første afvikling, og justeret på de områder vi har fået konstruktiv feedback på. Feedbacken både fra undervisere der har udviklet forløbet i *Digital Sundhed og Data* samt fra deltagere i kurset har været mere positiv anden gang.

En anden udfordring, rent organisatorisk i projektet, var frafald af nøglepersoner – i første runde oplevede frafald af nøglepersoner, der skulle undervise. Senere oplevede projektet at projektejer fik nyt job.

B. Erfaringsopsamling og videndeling

1) Hvorledes har projektet været fulgt i forhold til opsamling af erfaringer og resultater frem til projektets afslutning?

Der kan læses mere specifikt omkring evaluering og vidensdeling tidligere i rapporten (jf. afsnit omkring evaluering s. 3-4).

2) Hvordan er der blevet vidensdelt om projektet og med hvem – her tænkes både internt på projektdeltagernes institutioner og eksternt med andre institutioner eller aktører?

Udover evalueringsrapporter og publikationer har medlemmer af styregruppen m.fl. præsenteret *Digital Sundhed og Data* ved interne eller eksterne møder:

- Oplæg af postdoc Danielle Hagood i sessionen "Digitale kernefaglige kompetencer" ved KU Stormøde "Digitale spring i uddannelsessektoren" (maj 2023)
- Oplæg af styregruppemedlem prof. Nicole Schmitt med titlen "Erfaringer fra 'Digital Health & Data' kompetenceudviklingsforløb" af i sessionen "Erfaringer fra undervisere" ved KU Stormøde "Digitale spring i uddannelsessektoren" (maj 2023)
- Oplæg af styregruppemedlem prof. Nicole Schmitt ved SDUs Sundhedsvidenskabelige Fakultet ved ifm. Temadag om "Digital og teknologisk robusthed for fremtidens sundhedsprofessionelle" (maj 2023)

Eksempler på intern videndeling – KU

- Intern vidensdeling i KU-SUNDS "Digital Core Curriculum" arbejdsgruppe, hvor DSD styregruppemedlem prof. Nicole Schmitt er forperson
- Intern vidensdeling i KUs projektstyregruppe "Digitalisering af uddannelser" (KU strategiprojekt), hvor DSD styregruppemedlem prof. Nicole Schmitt også er styregruppemedlem
- *Digital Sundhed og Data* indgår som case i KUs rapport om kernefaglig digitalisering
- Nogle af kursisterne har (videre)udviklet, implementeret og formidlet deres konkrete projekter, fx. digital transformation af fysiologiundervisning (digital escape room i stedet for en laboratorieøvelse) eller implementering af jupiter notebooks i farmaceutiske uddannelser ved KU Stormøde "Digitale spring i uddannelsessektoren" (maj 2023)

Eksempler på intern videndeling – KP

Centrale resultater fra rapporten Transfer fra Digital Sundhed og Data (jf. s. 4) blev delt på NERA konferencen i Island, Reykjavik i juni 2022. Derudover blev resultaterne delt ved E-sundhedsobservatoriet konferencen i oktober 2022. Præsentationen fra Reykjavik indgik i samarbejde med KU om følgeforskning. De deltagende forskere på konferencen var fra KP: Marianne Ellegaard, docent, Sofie Kobayashi, docent og Ulla Gars, lektor. Centrale resultater fra projektet er præsenteret ved NERA konferencen 1-3/6 2022 i Reykjavik, og ved E-sundhedsobservatoriet konferencen i oktober 2022.

3) Hvordan kan viden og erfaring fra projektet bruges i institutionernes (og evt. andres) fremadrettede arbejde?

Der er blevet udviklet et *blended learning*-koncept for at videreføre kompetenceudviklingen baseret på erfaringer i projektet. Her indgår digitale læringsressourcer med faglige oplæg (video) og hands-on øvelser, der kan bruges i det videre arbejde. Som en ekstra værdi i projektet er der blevet udviklet et AI design sprint, som faciliterer at deltagere (undervisere eller studerende) aktivt kan designe og reflektere over AI-løsninger til den sundhedsfaglige praksis. I den forbindelse er der også udarbejdet 10 aktuelle cases med fokus på digitale

sundhedsdata, som kan bruges både til videre kompetenceudvikling og i undervisningen.

Derudover er erfaringer og evalueringer afsat til andre kompetenceudviklingsforløb for undervisere, fx. har KU-SUND udviklet kurset "Foundations of Health Data Science" i et samarbejde mellem KU-SUNDS Health Data Science Center (HeaDS), fakultets "Digital Core Curriculum" arbejdsgruppe og SUNDS Centre for Online and Blended Learning og med støtte fra KUs strategiprojekt. Her er der især blevet taget højde for, at mange kursister evaluerede, at niveauet i DSD Grundmodul var udfordrende.

Slutligt, er der opstået et netværk og tværinstitutionelt samarbejde mellem SUNDS HeaDS og KPs tek-eksperter, som kan danne basis for fremtidige projekter indenfor professional udvikling af sundhedsfaglige personer.

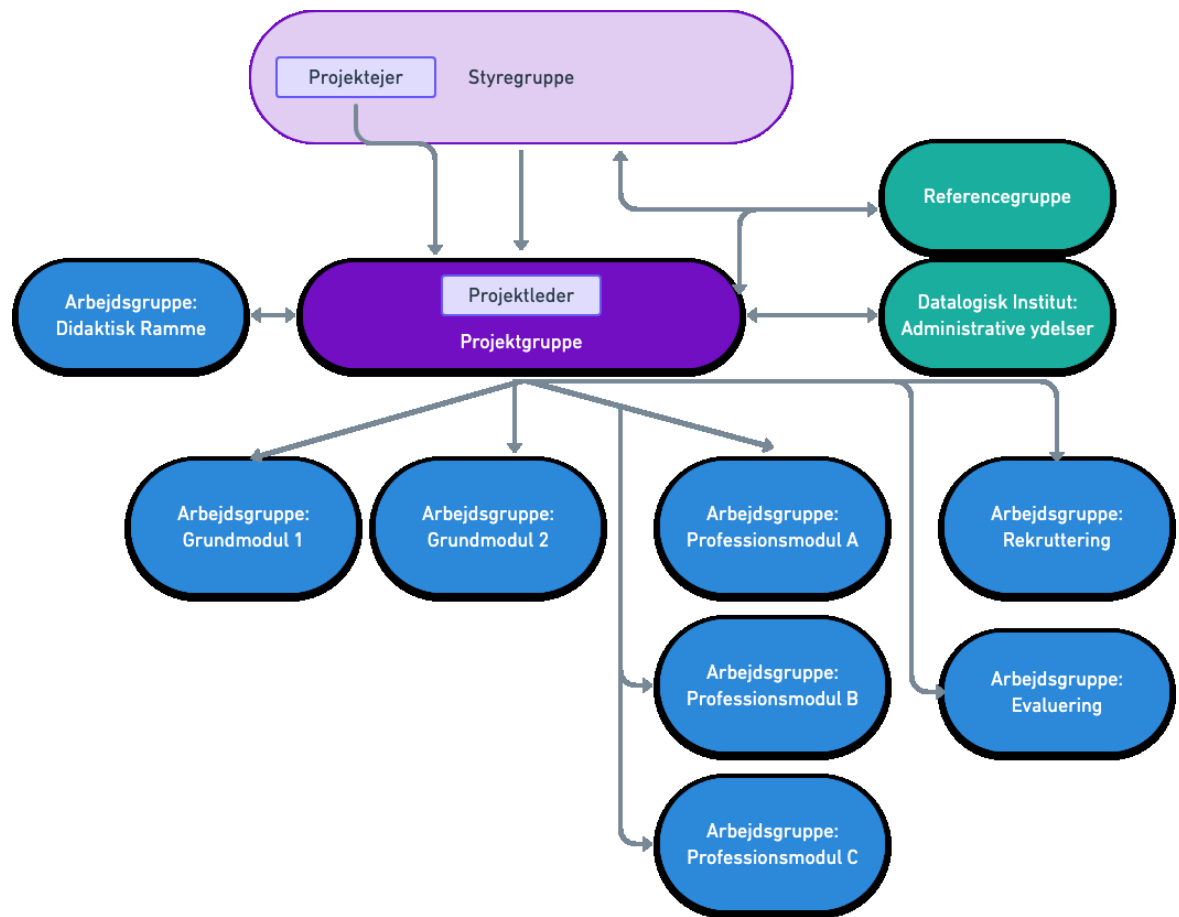
C. Ledelse og samarbejde i projektet

1) Hvorledes vurderes samspillet og samarbejdet mellem parterne/institutionerne i projektet, herunder i hvilket omfang, og på hvilken måde samarbejdet har bidraget til øget værdi for de involverede institutioner? Er der forhold i projektets rammer, der vil kunne have gjort samarbejdet bedre/nemmere?

Både på Københavns Universitet og Københavns Professionshøjskole har der været et stort fokus på digitalisering og teknologi forståelse, hvorfor et kompetenceforløb med fokus på digitale værktøjer og data-drevne metoder gav mening at udvikle på daværende tidspunkt. Generelt har samarbejdet i styregruppen og de forskellige arbejdsgrupper fungeret godt. I starten skulle, alle, som tidligere nævnt, lære hinanden at kende – både når det kom til faglighed, men i lige så høj grad forskelligheden på uddannelsesinstitutionerne.

Undervejs i projektet (marts 2022) lavede vi en midtvejsevaluering i form af et seminar for alle involverede undervisere i projektet, hvor styregruppen også var til stede. Her er blev det gjort klart at det for flere af dem var svært undervise kollegaer og at de havde svært ved at navigere i at der var lav grad af styring fra styregruppens side. Midtvejsevalueringen gav plads til at lufte eventuelle frustrationer og udfordringer, og drøftelserne og erfaringsudvekslingen mellem de forskellige arbejdsgrupper gjorde også at projektet og forløbet blev mere strømlinet. Som tidligere nævnt, oplevede vi ikke udfordringer i samme grad i anden gennemførsel af kursusforløbet, da underviserne nu havde udviklet forløbet og undervist på kursusforløbet en gang før.

Figur 2



Bilag

- Transfer fra DSD - Følgeforskning, efteruddannelsesforløbet Digital Sundhed og Data 2021-2022 af Ulla Gars Jensen, Sofie Kobayashi og Marianne Ellegaard.
- Evaluation of Digital Health and Data - Professional Development Course af Danielle Hagood

2. Supplerende materiale



Evaluation of *Digital Health and Data* Professional Development Course

2021–2022

Author

Danielle Hagood

Contents

INTRODUCTION.....	3
COURSE DESCRIPTION	3
Course structure.....	4
Course Participants.....	5
EVALUATION METHODS	7
Surveys.....	7
Interviews.....	8
Observations and course documents	8
EVALUATION RESULTS	9
Grundsmodule 1.....	9
Grundsmodule 2.....	11
Professionalmoduler.....	13
Overall course experience	16
Course Participation in Context	20
Existing expertise	22
Development time	25
Institutional planning.....	25
Evaluation Summary	31
INSIGHTS FOR FUTURE WORK.....	33
REFERENCES.....	38

Introduction

Digital Health and Data (*Digital Sundhed og Data*, in Danish) was a competence development course for university teachers at both Københavns Universitet (KU) and Københavns Professions Højskole (KP) that was offered in 2021 and 2022. The purpose of the course was to “give lecturers within the [health sciences] a competence boost that enables them to incorporate modern data-driven methods and technology in their teaching” (Lillholm, 2020–2022). The development of this course was supported by funding from the Danish Agency for Research and Education—*Styrelsen for Forskning og Uddannelsen*—which granted 4.5 million kroner to develop continuing education courses for faculty members in higher education.

This report provides an evaluation of this Digital Health and Data (DSD) course and offers insights for future digital, computational, and data science competence development efforts in health science based on the analysis of this case. While the course was offered to teachers from both KU and KP, the analysis primarily focuses on KU teachers and exclusively considers applications at KU.

Course Description

Digital transformation is a trend impacting both education as well as medicine and health. Given this, there are many aspects of digitalisation in both domains. Given this, this project focused on teacher competence development for teachers which aimed to “not to retrain the core subject teachers to become data science specialists, but to develop a broad methodological readiness and competencies to consider the ongoing technological development and how it affects and develops professions and disciplines and thus ensure relevant involvement in education” (Lillholm, 2020–2022). The competence level this course offered participants was not aimed at becoming a specialist, but rather on understanding enough so participants could introduce their students to important developments related to digital transformation.

At its core, this course developed competence in two intertwined areas: first, teaching with technology and second, data and computational literacies. As Lillholm (2020–2022) observed, “Today, technology focus is already a part of the curriculum, but there are clear challenges in translating the learning objectives into concrete learning experiences about the possibilities of technology in the broad core subject teaching. This is partly due to a competence development need of the teachers.” This perspective indicates that before teachers can teach about concepts like data

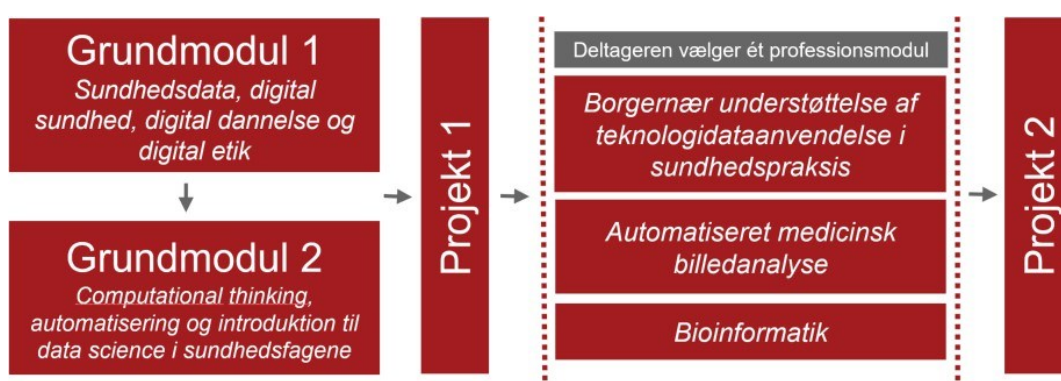
and technology, the first need to develop skills in this area. This will involve developing knowledge about these topics as well as knowledge about how to teach these topics. This focus was advertised to perspective course participants by the Datalogisk Institut (n.d.) as follows:

The course covers both knowledge, overview and hands-on experience with subject-specific opportunities and challenges within applied data science, such as data collection, analysis, and applications. Throughout the course, the teachers will therefore build a technological as well as an educational and ethical foundation, and they will gain insight into how they can work with these conditions in a didactic context—developing competences that they can use to give health students the necessary technological tools for analysis, interpretation, critical thinking, and the inclusion of data in their subject.

In summary, this course exists to develop the competences necessary so teachers can provide instruction on data-driven methods using relevant technologies in health science education.

Course structure

The course included four days of instruction in person with additional parallel online activities. The course began two modules spanning three instructional days. The first module (*grundmodul 1*) comprised one day of instruction introducing domain-specific topics including health data, digital health, digital education, and digital ethics. The second module (*grundmodul 2*) comprised two days of instruction and introduced both conceptual and technical hands-on topics including computational thinking, automation, and data science in the health professions. After participating in these general instructional modules, participants could next choose a professional module related to their research and teaching interests. Various specialisations were offered, such as bioinformatics and automated medical image analysis. The figure below illustrates the course structure, including instructional modules as well as two projects (Datalogisk Institut, n.d.).



In this also included projects to participants an opportunity to try out what they were learning. These projects were an important part of the course because a goal of the course was to include “hands-on experience with subject / domain-specific opportunities and challenges within applied data science, such as data collection, analysis and applications” (Lillholm, 2020–2022). The first project included writing a brief project description in which the course participants described a topic and data they would use in a project. This project descriptions were presented online and given feedback by course participants and module teachers. The second project built on the first, in the second project, participants completed a teaching project and data collection and presented a 20-minutes teaching sequence.

Course Participants

The audience for this course included “instructors in either academic or practice-related health science, health professions, and adjacent natural sciences” at either KU or KP (Datalogisk Institut, n.d.). In total, 61 faculty members participated in the course over two years. There were 30 participants in 2021 and 31 in 2022. More of participants came from KU (36) than KP (25).

Participants by year and institution.

	2021	2022
Københavns Universitet	18	18
Københavns Professions Højskole	12	13

The participants represented 14 distinct departments (also schools, center, or institutes), with three from KP and 11 from KU (including one center operated by Region H based at Rigshospital).

Thirty-eight participants taught in departments in applied or research oriented medical fields. Clinical training includes general clinical roles such as nursing and general medicine as well as specialisations such as physiotherapy or midwifery. Research training includes biological and chemical fields applied in medicine such immunology or pharmacology. Additionally, six participants taught in dental fields including dental hygiene and odontology. Four participants also taught in veterinary departments including clinical veterinary medicine and animal sciences.

Finally, 10 participants worked in departments or centres for using educational technology in health (e.g., simulation). Two participants did not report their affiliation. The subsequent table lists the

number course participants by department subject area, providing the department's name (which are mostly in Danish) and its institutional affiliation.

Course participants department subject area, name, and institutional affiliation.

Participants	Department Subject Area / Name	Affiliation
10	nursing and nutrition <i>Institut for Sygeplejerske og Ernæringsuddannelser</i>	KP
9	instructional technology <i>Institut for Teknologiske Uddannelser</i>	KP
7	clinical medicine <i>Institut for Klinisk Medicin</i>	KU
7	drug design and pharmacology <i>Institute for Lægemiddeldesign og Farmakologi</i>	KU
5	midwifery, occupational therapy, and physiotherapy <i>Institut for Jordemoderkundskab, Ergoterapi og Fysioterapi</i>	KP
5	odontology <i>Odontologisk Institut</i>	KU
3	biomedicine <i>Biomedicinsk Institut</i>	KU
3	cellular and molecular medicine <i>Institut for Cellulær og Molekylær Medicin</i>	KU
3	veterinary medicine <i>Institut for Klinisk Veterinærmedicin</i>	KU
2	pharmacy <i>Institut for Farma</i>	KU
1	immunology and microbiology <i>Institut for Immunologi og Mikrobiologi</i>	KU
1	medical education and simulation <i>Copenhagen Academy for Medical Education and Simulation</i>	KU, Rigshospital
1	dental hygiene <i>Skolen for Klinikassistenter og Tandplejere</i>	KU
1	vetrinary and animal science <i>Institut for Veterinær og Husdyrvidenskab</i>	KU

Evaluation Methods

The evaluation of this course is based on several forms of data: surveys of course participants after each module, interviews with course participants, and observations of the course and analysis of course documents. Together, the analysis of these data informs this evaluation of the course in relation to student learning experience, course content and pedagogy, and implementation logistics. Subsequently, each of these data sources and how they were collected are describe.

Surveys

In both the first and second iteration of this course (2021 and 2022, respectively) the participants were sent a survey after each module. As such, all participant was sent three main surveys after *grundmodul 1*, *grundmodul 2*, and a final overall course evaluation. Three surveys were also sent out after the three elective *professionsmodul* only to those that participated in that module. For 2021, 15 to 17 participants (50 % to 57%) completed the three main surveys and between two and seven participants completed each of the three elective surveys. In 2022, 12 to 15 participants (39% to 48%) completed each of the three main surveys and three to six participants each of the three elective surveys. These response rates are consistent with online course evaluations (Ahmed, 2018), which often report lower response rates and raise questions of non-response bias. Further, recent empirical research has shown that low response rates for course evaluations do not lead to response bias (Hendra and Hill, 2018). These surveys are tentatively interpreted as the general experience of participants in the course.

These surveys were collected in Danish but translated to English for this report. Questions on the survey included both open and closed form responses. On the first two surveys relating to the main instructional days (*grundmodul 1* and *grundmodul 2*), open ended questions covered topic relevance and the participants experiences. Related to topic relevance, participants described which topics were relevant to their teaching, what aspects of the course that were personally interesting, and how course topics could be used in their own teaching. Related to course experience the participants described their learning experience and responded to closed-ended questions about content difficulty. For the final, overall survey participant descried what were the main theme, highlights, and benefits of the course. In each the surveys, participants were also asked for constructive feedback on the course. This feedback was used to redesign some aspects of the course between 2021 and 2021.

Interviews

To elicit a more in-depth perspective on participants' learning experiences and how this course would inform teaching in the future, participants in the 2022 course were invited to participate in a 30-minute, post-course interview. Overall, seven course participants affiliated with KU indicated they were willing to be contacted for further input and were invited to a short interview. Of these, three agreed to an interview. Given the low number of course participants that were interviewed (three of the 18 participants affiliated with KU), these participants' experiences are interpreted as cases and not general experiences.

These were semi-structured interviews (Kallio et al., 2016), which asked questions around three main themes: motivations and expectations for taking the course, experiences during the course, and applying things from the course in future teaching. To understand why participants took the course, participants were asked questions such as: "Did you have interest and/or experience with these topics before taking the course?" and "What were your expectations for taking the course?" These questions added context to the expectations reported in the surveys. Respondents were also asked if they were supported by "receiving professional development time or compensation for taking the course." Regarding experience during the course, questions asked about what was relevant for their teaching as well as what was relevant for research. Questions such as, "What was your experience of the 'how to teach' aspects of the course? What will you use in practice?", consider the pedagogical training in this course. Questions also looked at learning design aspects such as the combined institutional, peer collaboration, and project-based aspects of the course. Finally, looking at implementing aspects of this course, participants described general plans: "What are the current plans to implement topics from the course? What are the barriers and supports to these efforts?". They also went beyond what the surveys could cover and reflected on more detailed aspects of transfer to teaching, including individual and department plans, their specific role, and time-constraints, and other barriers. These interviews were conducted in English.

Observations and course documents

Observations of teaching days were conducted on both days of *grundmodul 2*, one of the *professionsmodul*, and the final course presentations during the 2022 course. Additionally, the course materials from all modules in 2021 and 2022 were reviewed. These course materials are primarily in Danish and the course days were in both English and Danish, so the observations were conducted in both English and Danish. Often, course observations include a systematic rating.

However, there is debate on the utility of approaching course observations in an evaluative manner (Cohen & Goldhaber, 2016). Given this, the observations for this course were limited and used to provide context to the input from the participants' survey and interview input. Additionally, reviewing the course documents informed the course description as well as the contextualising the suggestions below for improving the course.

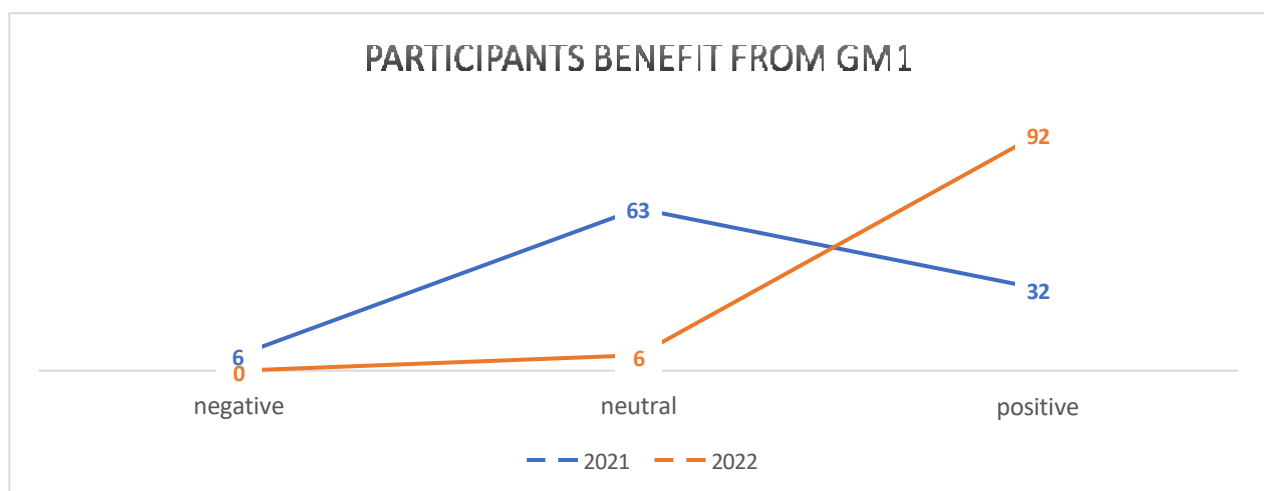
Evaluation Results

This evaluation combines the survey, interview, and observation data to give an overview of the outcome of the various elements of the course. For each course module, the student experiences are summarised. Since the course was developed between 2021 and 2022, challenges and changes are also highlighted. This approach identifies what worked well and identifies aspects of this course that can be used in the future. After this element-by-element course evaluation, overall trends and outcomes for the courses are presented.

Grundsmodule 1

In 2021, the participants reported neutral (63%) and negative (6%) experiences in the first module. In 2022, based on several design changes, participants reported primarily positive experiences (92%). This section summarises some of the experiences and reviews of the participants in the first module in both 2021 and 2022 and discuss what worked better the second time. The figure illustrates this improvement based on how participants rated their overall benefit from this module. Note the strong change to a positive experience in 2022 compared to 2021.

Participants rating of the benefit from *grundmodul 1*.



In both 2021 and 2022, the participants found the course to be at the right level of difficulty for themselves. Regarding how the participants thought their students would experience the difficulty of the topics and activities, they were less certain. In both years 18% and 25% stated they “didn’t know” how the students would experience the difficulty of the material. The participants rated difficulty for students consistently higher, which unsurprisingly reflects the participants expertise compared to their students. However in 2021, participants the difficulty as too high for their students by 18%. These patterns are illustrated in the figures below.

Rating of the difficulty of the module 1 for participants and their students (percentages).



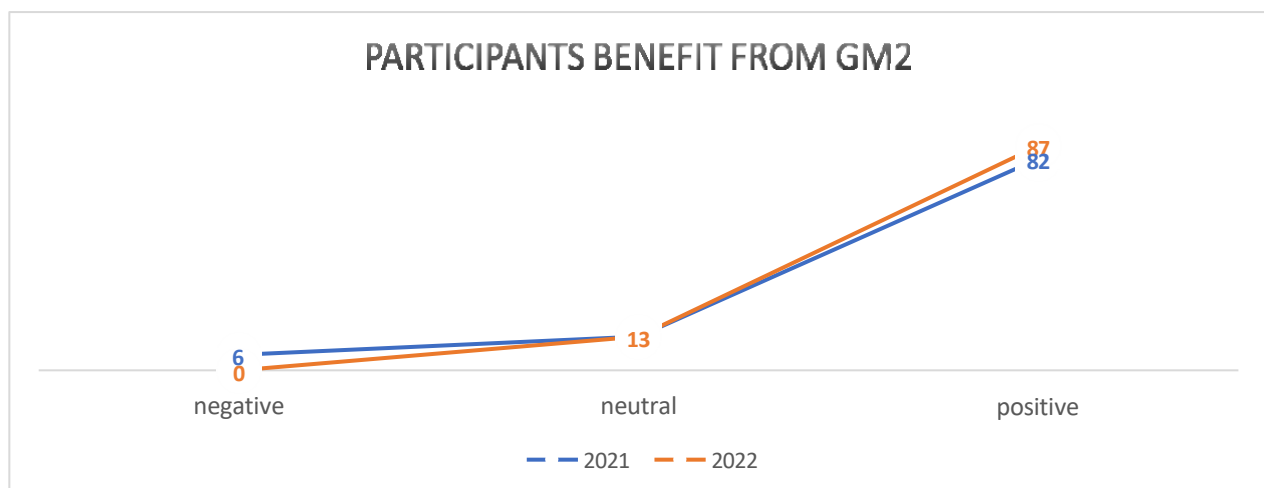
The open-ended survey responses give some insights into what content and organisational changes impacted how the participants experienced the overall benefit and difficulty for their students in module 1. In 2021, the participants had difficulty identifying what topics were relevant for their teaching. For instance, one participant stated “an interesting day, but I still have a hard time seeing my teaching in this” and “I find it hard to say what I find most relevant [for my own teaching].” There are several plausible and related reasons for these responses. First, a notable number of the participants do not know if the material is at the right difficulty for their students. However, this remains true in both 2021 and 2022. So, a second reason is that the first module was too confusing and disorganised. While most of the participants still found the course interesting and benefited from it. In the positive comments there was a notable number of critiques, such as “it was scattered in Teams” and “it seemed vary unprepared and haphazard.” Much of these negative comments were related specifically to how the participants were prepared for the upcoming technological aspects of the course. In response to this feedback, this aspect was completely redesigned. Note that the redesign of these “learning islands” (*læringsø*) has been summarised a previous report—see Datalogisk Institut (2021)—so it is not a topic of focus here.

In both 2021 and 2022 the participants connected with a variety of the topics presented. This is a strength of this module, that participants can find something relevant given the range of their research and teaching. As mentioned, in 2022 the participants made clearer connections to their teaching and were less likely to report confusion. Additionally, in 2022, the TEKU and KU models were a consistent topic mentioned as beneficial. For example, one participant noted that the “TEKU and KU models can both be used in relation to analysing [...] by my students.” One of the changes improving the clarity of the first module was a clearer connection of the various topics to overall models and frameworks.

Grundmodul 2

Overall participants reported a strong positive experience in *grundmodul 2* in both 2021 and 2022—as shown in the figure below. Like the first module, there were still aspects of the course that were improved between 2021 and 2022. Most of the improvements related to communication and preparation for the project. The participants’ preparation for project work improved from year 1 (70% considered it adequate or good) to year 2 (93% considered it adequate or good). Further, the number of participants that felt they were not prepared or did not know if they were prepared by prior communication went from 5 people in 2021 to 1 person in 2022. Though there was feedback and improvement, these issues did not change the students’ positive appraisal of the module between 2021 and 2022, as the course was module received both years.

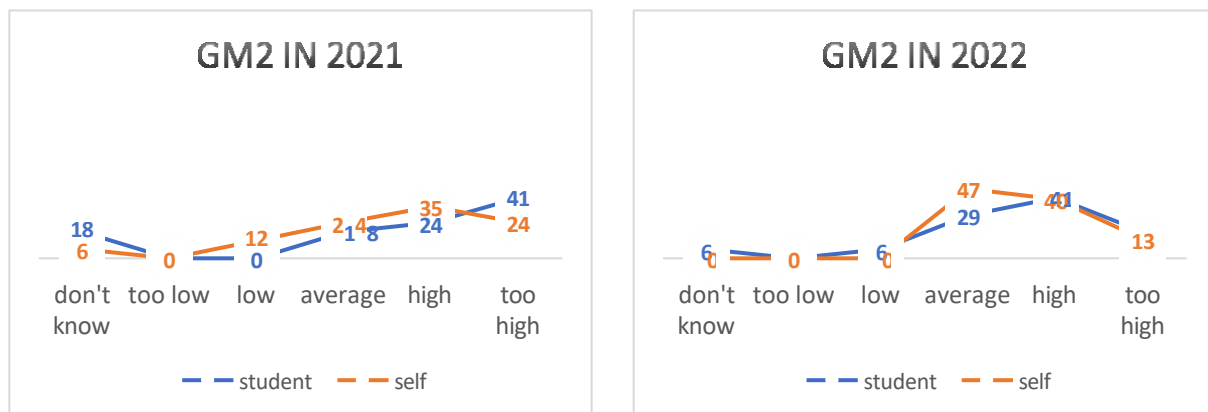
Participants rating of the benefit from *grundmodul 2*.



Unlike the first module, which was more theoretical, *grundmodul 2* included hands-on technical activities. Teaching data processing and analysis to students with variety of backgrounds is

challenging. The student rating of the module difficulty reflects this challenge, as shown in the figures below. In the first iteration (2021), 24% of the participants reported that the module was too difficult for them. The next year, only 13% found the module too challenging. As the figures below show, the second iteration was challenging but attainable. This is considered in the zone of proximal development and is likely due to the support participants received from the course instructors and technical support. As one student noted about their experience working hands-on with data, it was “good, because there were assistant teachers present who could help you when you got stuck.” This also changed the participants perspective on whether the material was too hard for their students, in 2022 the participants had more clarity on how the difficulty of these topics would relate to their students’ abilities (6% were uncertain in 2021 compared to 18% in 2022).

Rating of the difficulty of the module 2 for participants and their students (percentages).



Overall topics for this module, including Orange and computational thinking were strongly reviewed in both 2021 and 2022. Further, the participants made connections to how they could use these topics with their students. For instance, in 2021 a participant noted “the introduction to programming [was] very relevant. [1] would like to be able to pass it on to our students.” In 2022, a participant noted that “computational thinking gave me a way to think about some students challenges and I got an insight into coding [...] this knowledge is relevant in relation to my teaching.” Overall computational thinking and working with Orange were highlighted, but as many topics were covered there are comments related to every topic since the participants differentiated in their interests.

However, consistently, this module was described as useful for its hands-on nature. But there were challenges as well with the active learning. In the first year, the hands-on exercises had some

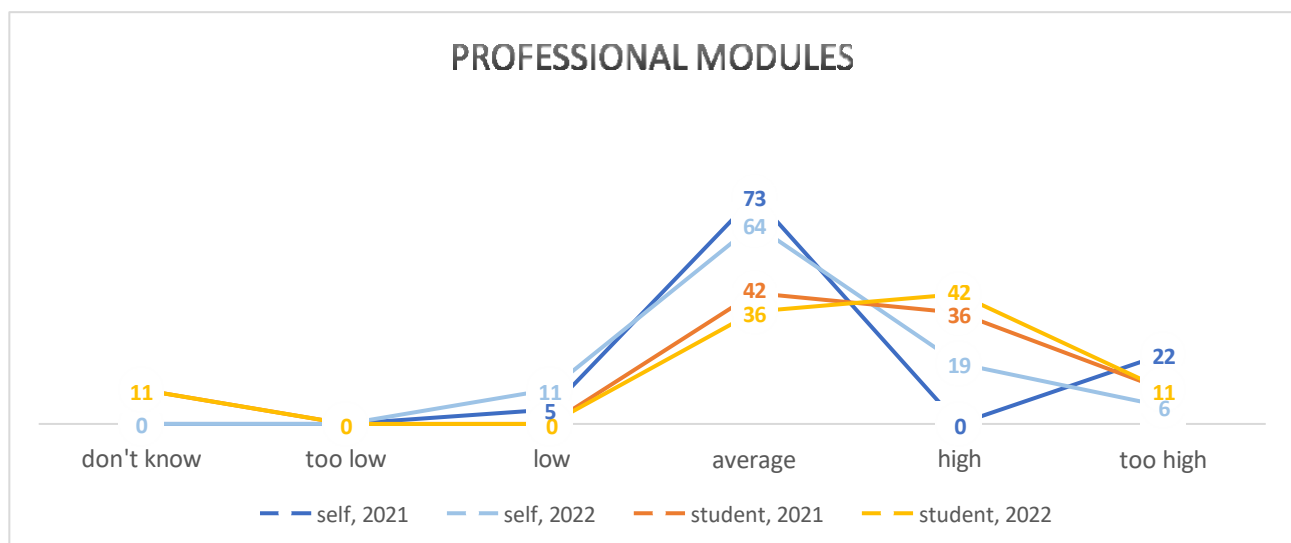
challenges (described more fully in Datalogisk Institut, 2022). The level of difficulty was too hard and frustrating for a lot of participants which was exacerbated by soft structuring and logistics like hearing instructions and being prepared with technology. Especially in the first iteration, the participation in hands-on work may depend on whether the participants already know how to code or not, as one participant noted, the hands-on portions are “probably fine for those who sit quite concretely and code, but [with] no time to discuss and reflect than it is a bit of a waste of time.” While the hands-on learning was generally a positive, there was remained feedback to “show, don’t tell” in the second iteration, suggesting that more hands-on learning that is well structured is desired.

Professionalmodule

The professional modules included three different specialisations: bioinformatics, citizen-facing digital health platforms (*borgnær teknologi*), and image analysis. In these workshops the participants could select which module to attend and learned about data and analysis techniques unique in that areas. This section reviews which topics were relevant to participants from various fields and evaluates the difficulty of these three modules.

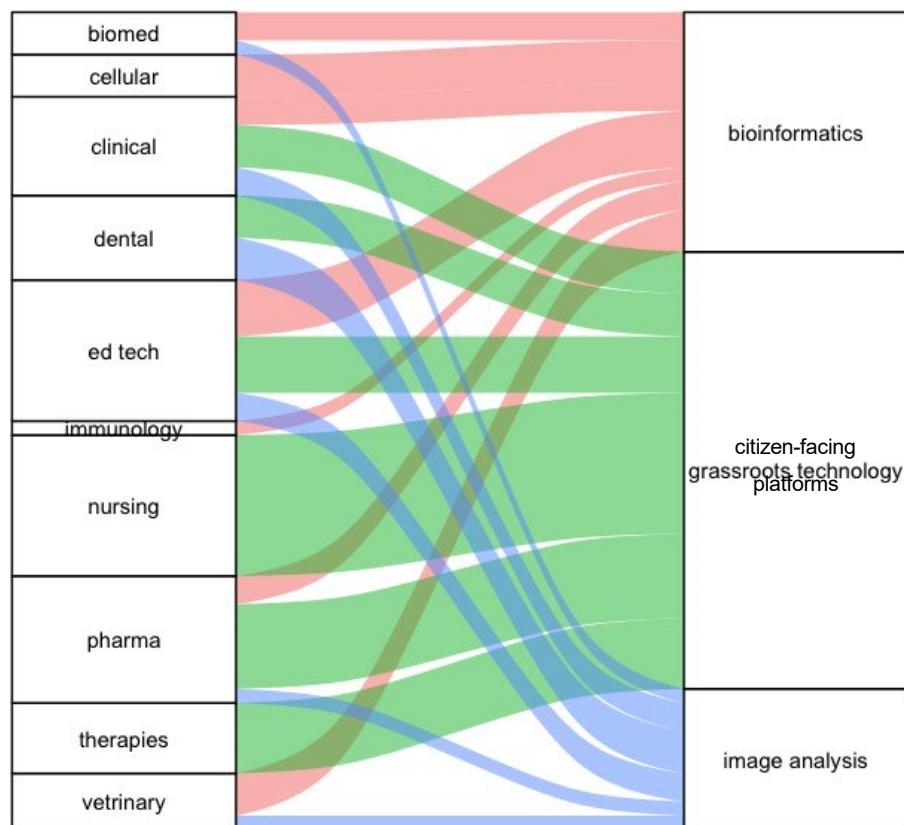
Regarding module difficulty, the figure below shows how the participants rated the difficulty of the professional modules for themselves and their students. Overall, the modules were at a manageable level of difficulty for the participants and a high level of difficulty for their students. This suggests the participants may find it challenging to translating the topics of these modules into their teaching.

Average difficulty of all modules for participants and their students (percentages).



Regarding the match between participants research background and the relevance of each elective module, the figure below maps the teaching area of participants on to the elective module they selected. The participants with variety of backgrounds and split into the three modules. First, this figure shows that each elective module was attended by an interdisciplinary set of participants. Looking at the right column, which contains the three modules, one can see that each module included attendees from several disciplines. Second, looking at the left column, which contains the participants teaching or research area, one can see that the connection between topic area and module.

Proportion of participants from each field in each professional module.



This figure illustrates the proportion of participants from each topic area selecting the various modules. It also gives some insights into the motivations participants had in selecting a specific course. Looking at bioinformatics it was strongly attended by individuals that use bioinformatics in their work, especially course participants in biomedical and biological sciences. Looking at the workshop on using data from citizen-facing digital health platforms (*borgnær teknologi*), note that all the participants from nursing and therapies selected the citizen-facing platforms module. Course

instructors reported that participants that were practitioners, especially those with math hesitancy, selected into citizen-facing digital health platforms because it was perceived as more accessible. This contrasts with image analysis. Looking at image analysis it was attended by individuals from several disciplines but with fewer attendees than the other modules. Course leaders reported that participants perceived image analysis as more difficult and technical. As image analysis is an advanced technique used by multiple fields but not a stand-alone field it drew participants from a variety of backgrounds.

Adding to the above figure, the table below simplifies the information presented in this figure to highlight topic relevance within each discipline. The table summarises in a row which modules were attended by individuals in that field. This table and the previous figure inform how teaching topics align closely with the elective modules.

Attendance of the three professional modules by field.

	bioinformatics	citizen-facing platforms	image analysis
biomedicine	x		x
cellular	x		
clinical medicine	x	x	x
dental		x	x
educational technology	x	x	x
immunology	x		
nursing		x	
pharmacy	x	x	x
therapies		x	
veterinary	x		x

One interpretation of the above table is that it is good to offer multiple elective options, since a single specialised topic cannot be relevant to all participants. Participants from most fields did not distribute into all three modules, some modules were more relevant or accessible for fields—the exceptions to this trend were though educational technology and pharmacy. And participants from the educational technology department, at least, intentionally divided into the three modules to see what each one was discussed and presented.

Overall course experience

This section summarises how participants responded to the whole course. This analysis combines survey responses rating the overall benefit of the course, survey responses rating the difficulty of the various modules of the course, open-ended replies highlighting important course themes and experiences, as well as interviews to provide more detailed cases of course experiences. These analyses also give insight into how the course developed between the first and second year.

Starting with how course participants experienced the course overall, the figures below compare the first and second year in terms of the overall benefit (in grey) for comparison, the ratings for each of the two modules are shown for comparison. These figures show the percent of the survey respondents that rated the benefit from poor to very good. Ideally, more participants would rate the course's benefit as good or very good. As these figures show, in both 2021 and 2022 most of the respondents rated the course as the course positively (either good or very good)—100% in 2021 and 85% in 2022. Though it is interesting to note that no participants rated the course as neutral or poor in 2021, but 25% did in 2022. So, while each course module was rated more positively in 2022, the overall course rating was more mixed.

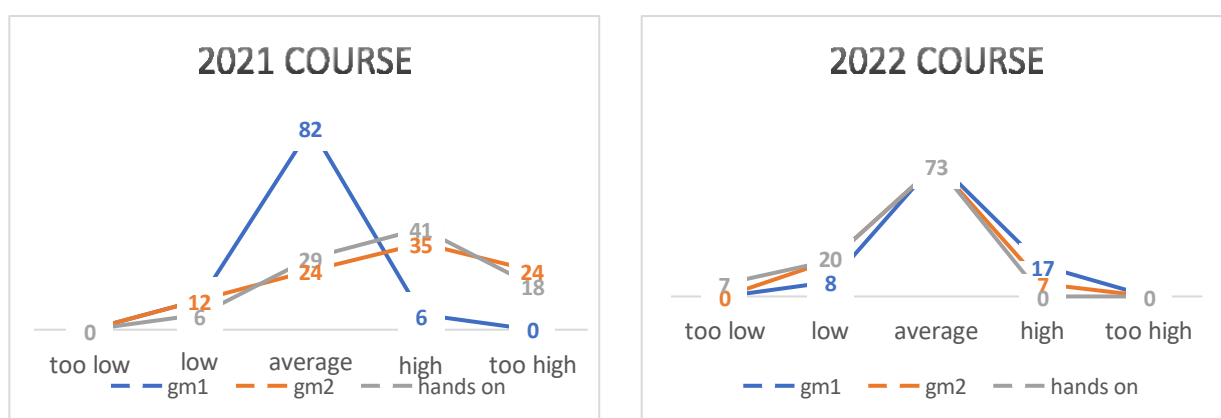
Attendees' ratings of the benefit of participating.



One notable change between the 2021 course and the 2022 course was how the participants rated *grundmodul* 1. In 2021 participants felt neutral (63%) about the benefit of *grundmodul* 1 than they in 2022 (8%). This change is also reflected in open-ended feedback in which the participants expressed that in 2021 first module instruction “haphazard” or left them “not quite sure how to use it concretely.” The course designers addressed this concern by changing how the module was structured in the second year. This change corresponds with the students rating the first module much better in 2022.

Regarding how participants perceived the difficulty level of the courses, this was assessed separately for different aspects of the course because the content and participant required was quite different. The figures below show the how participants rated the difficulty of the main instruction days, *grundmodul 1* and *grundmodul 2* as well as the hands-on aspect of *grundmodul 2*. The goal is for participants to rate the course difficulty neither too low nor too low. As you can see, in the 2021 course some students experienced the course as too challenging in the *grundmodul 2* and its hands-on component. However, by 2022 the course difficulty of all the modules was rated primarily as ‘average’ with no participants rating the course as too challenging.

Attendees’ rating of the difficulty of different course modules.



Beyond the overall benefit and difficulty of the course, the participants were also surveyed about the topic relevance and learning experiences of the course. These themes are a summary of open-ended survey responses in which participants were asked “What were the red thread(s) through the course for you?” to elicit their main takeaways from the course. In 2021 participants emphasized the core concepts as data (quality, prevalence, impact, and ethics), computational thinking (related to student competencies), and AI in health. In 2022 participants emphasized the main themes of data (particularly its uses in healthcare), applications to their teaching, and computational thinking. Note that AI was a core theme in 2021 and not in 2022; alternately, teaching was a theme in 2022 but not in 2021. The participants core take aways from the course are closely aligned with the course description, suggesting that the course successfully introduced the topics described in the course description. The subsequent table summarises these themes—data, computational thinking, AI, and teaching—in the participants’ own words (in Danish).

Themes among the core topics of the course as identified by the participants.

	2021	2022
data	Data. Det konkrete arbejde med data og bearbejdningen af data for os til at snakke om de mere filosofiske og sociologisk betragtninger ift data. Så mere data og mere om datas betydning for mennesket.	Sundhedsdata var det naturlige omdrejningspunkt. Data og sundhed og opmærksomheden på betydningen af teknologiforståelse i forhold til brug af data i sundhedsvæsenet idag og i fremtiden. Digital data og sundhed. Sundhedsdata og dets betydning for det borgernære arbejde herunder relationsdannelse mv.
computational thinking	Jeg så computational thinking som billede på de væsentligste kompetencer, jeg kan bruge ved implementering i undervisning.	Det digitale aspekt af sundheden og læren om computational thinking (samt hvordan det kan bruges i undervisningen af studerende)
AI	At se eksempler på begreber i anvendelse - AI/machine learning/python/Colab etc. AI og sundhed.	—
teaching	—	Voksenden digitalisering i sundhedsvæsenet og hvordan dette skal afspejles i undervisning Inspiration til undervisning af mine egne studerende. Anvende og formidle den digitale dannelse. At der var fokus på at få sig selv videnskæssigt styrket/opkvalificeret til i egen undervisning at øge fokus på betydningen af Digitale Data i Sundhed.

The themes outlined in the table above are also interconnected, as some of the course respondents highlighted. For instance, a course participant described the core topic of the course as the “the flow in data processing based on computational thinking [and the] use of digital technologies, devices for health technology, and data.” This description highlights the various processes and thinking associated with digitalisation in health. This participant also added that that the red thread of the course was “a need for insight into machine learning and big data uses and [an] understanding of the importance of setting a framework for [data] otherwise [one is in an] open minefield!” Likewise, a 2022 course participant took away how data and teaching are connected, stating that their red thread was how “the enormous amounts of data combined with some tools (especially online

databases) make it possible to exploit data. This with the angle that we must teach our students to use data and understand the possibilities and limitations [of data].” The participants building connections between the themes of the course also suggests deeper understanding of the course topics.

Additionally described their experiences in the course in several ways, responding to questions about course highlights, areas of improvement, benefits, and disadvantages of having multi-institutional participants, and how this course would inform their teaching going forward. The table below summarises the main trends among participant responses in terms of the participants’ perspectives on the strengths and weaknesses of the course. In the first year the course introduced computational thinking as well as important ideas and allowed participants to meet and network. However, the course struggled with organisation and did not always achieve the right level of difficulty and personalisation for the participants. In the second year, the course continued the successes of the first year and improved the technical presentations and applications to teaching practice. The course organisation also improved but still struggled with having sufficient time and going deep enough into the topics, as many were covered.

Strengths and challenges in the course based on participant responses.

	2021	2022
strengths	Computational thinking was a theme as a highlight and something that would serve as a framework going forward	Technical course elements were useful and presented in an understandable way.
	Exciting to meet others (from KP and KU institutions) and explore current big topics	Exposure to new perspectives due to KP and KU both participating Useful insights into applications for teaching
challenges	Confusion over the course and a desire for more structure and framing	Not enough time
	The course was not always personalised enough despite being perceived as high quality	Desire for less rush of presentation or covering fewer topics so teaching could go more in-depth
	Sometimes the combination of KP and KU participants meant the discussion was too research focused for KP participants.	Some participants were too experienced or inexperienced (making working together challenging)

This table also highlights how the multi-institutional approach of the course was both a strength but also presented challenges. The course participants gave mixed reviews of the multi-institutional approach in both years. Strengths of this approach included providing the participants with new perspectives as well as interesting discussions. However, some participant found it challenging when conversation was dominated by research if they were primarily teachers or clinicians. Additionally, given the varied backgrounds of the participants, some participants had much more prior experience with the topics in the course. For participants who were completely new to the course topics and skills there was some intimidation and a sense that the course was not at their level of ability and knowledge. This was the case if the more advanced participants dominated the conversation. Overall, these challenges are common in courses with a wide range of participant abilities and knowledge.

Course Participation in Context

The previous sections summarised course participants' experiences in each module as well as the course overall. Since participation in the course takes place alongside professors' other research and teaching responsibilities, it is helpful to understand how participation in this course was influenced by the wider university context. So, to understand participants' learning outcomes and course experiences more deeply, three cases introduced extend the themes already identified across the participants experiences. The purpose of these cases is to provide nuance to the themes identified above and to locate participants learning experiences in their real-world teaching and research contexts. These three cases are related to 2022, as no case studies were conducted in 2021.

The table below introduces three cases at a high-level introduction to each of the cases. For each participant their discipline and home department are given, giving insight into three different research background and work contexts. Next, the participants' role in the digital transformation, existing expertise, and motivation for taking the course contextualise why each participant chose to take this course and how it relates to what they already know. Next the participants professional module choice and useful part of the course highlight what each participant found useful and relevant in the course. This identifies what parts of the course were useful to professors from different background and why. Finally, the application to teaching and future implementation illustrate how the course may benefit future teaching or research that the participants do.

Case-studies of three 2022 participant experiences.

	Participant 1	Participant 2	Participant 3
Discipline	pharmacology	pharmacy	cellular medicine
Affiliation	Institut for Lægemedeldesign og Farmakologi	Institute for Farmaci	Institut for Cellulær og Molekylær Medicin
Role in digital transformation	study board member	Digital Core Curriculum project member	no formal role
Reason for taking the course	“coincidence [and also] I have some interest in the topic and there is a process in my institute towards more digital knowledge [...] and I'm also in the study board”	“we have this DCC [Digital Core Curriculum] project at our department”	“my initial motivation was that we have an increasing need for teaching digital science in different ways”
Prior expertise	moderate	extensive	little to none
Professional module choice	bioinformatics	image analysis	bioinformatics
Useful parts of the course	“the most useful thing was the project where we actually made this notebook and did some programming”	“the web browser programming was really nice we are also thinking about updating our course so instead of having people download Python [...] a web browser would hopefully have all the packages already there and nobody should suddenly have real issues”	“[It was not directly relevant, but] I have already done a lot of thinking about how to teach and develop our course. I [now] that this is going to be challenging in the sense that if you want give them hands big data and how to use them [...] one of the take home messages [...] of the course was very much about the data quality and how this is how a lot of the data, what we are working with are actually collected by doctors”
Application to teaching	teaching a course using simulation and changing it to python	teaching in an elective course, transitioning to using python	contextualising and updating medical instruction
Future implementation	“We have an ongoing discussion internally at the department about the extent to which we can use available big data and input from [grundmodul I] was very useful. I got a lot of good points and references to sources I can transfer and make use of in my own teaching of digital education and competence.”	“Many of the lectures were of course new knowledge to me, and that's of course interesting, but perhaps not, uh, something I would have to be concerned about directly in teaching and research.”	“Somewhere halfway through we looked at each other saying, ‘Okay, this is fine, this is interesting, but we are not going to use it for our teaching. But then we slowly, we actually developed through the project something concrete that we could use in teaching.”

In addition to the summary in the previous table, there are several themes that can be compared across these three cases. Since the interviews focused on expectation and experiences in the course as well as how participating in the course would relate to teaching and research, these themes

pertain to how the participants learned from and planned to implement their learning from the course. The first theme relates to existing expertise and how the participants with more prior experience had described greater benefit from the course. The next theme describes how limited professional development time was a barrier to achieving the goals of the course. The last theme describes how institutional planning support can enhance participants' learning outcomes and lead to transfer from the course into practice. These themes—existing expertise, development time, and institutional planning—are subsequently discussed and illustrated with quotes from the participants.

Existing expertise

Effective instruction begins the present ability level of learners and then provides challenge that are within reach of participants, if they are given support. If the material and tasks are too challenging for learners, then they are in an inefficient learning experience. As previously summarised, the course difficulty was rated as about right by most participants, especially in 2022 when no one described the course as too challenging. (See how the participants experienced of the course difficulty in the “Overall Course Experience” section.) In addition to this, these three participant cases add additional insight into how the course could be beneficial especially for participants with prior experience.

Participant 1 from pharmacology described how they had existing experience in programming and statistics, stating:

I have some digital knowledge and some interest in it. I find it important. I have a basic interest in mathematics and statistics and programming [though] not that I'm working with it professionally.

Later when discussing the type of research that Participant 1 does in pharmacology, they added:

[I do] data processing and so on. I use a lot of statistics and of course a lot of computer analytics and to a small extent. I also use programming. So I have some, some basic experience with it.

Participant 1's level illustrates one type of course participants that arrived at the course with an existing interest in the digitalisation related to their field. Such individuals would not characterise themselves as experts, but they have some competencies in scripting and data.

Participant 2 from pharmacy described a similar experience to participant 1 but identified more as an expert with much more experience. As Participant 2 put it:

I've been programming for some years, maybe for 10 years [in Matlab, Python, doing multivariate data analysis]. I thought it would be good if I would recommend [this course] to colleagues [to] try it out, that I tried it out myself.

Participant 2 had more experience in the technical aspects of the course but not necessarily in teaching. As they pointed out, part of their motivation for taking the course was an upcoming teaching change in which programming would be integrated in into a course:

We changed all the course content last semester—back in April. [...] So I was already updating the slides when we [signed up for the course]. So [I signed up for the course because I am] both interested in programming and then of course this change at the faculty level.

Participant 2 illustrates a type of course participant that saw the course as extending knowledge they already had rather than introducing them to something completely new.

In contrast to the first two participants, **Participant 3** from cellular medicine, did not come to the course with prior knowledge and skills in digitalisation. Participant 3 described their level of experience as none, but found the course still accessible:

[I do not have prior programming experience] in programming or coding that could have been really complicated. But [the course] was done in a way where, where you got that feeling, 'Okay, I can still follow you.' But also, I realized that if I'm going to teach this, I would need to sit down and, and get a better knowledge of how it's done.

The reason Participant 3 joined the course to learn something they hadn't done before was motivated by their research. Participant 3 described how they were involved in a project using bioinformatics tools and would need to collaborate with people doing coding programming and data science.

I work with medical genetics and I'm involved now in a project where we will be doing a full genome sequencing on a number of patients. For that we would need to handle all those sequence data that we get, and we'll need some bioinformatics tools to analyse them. And a lot of that we know that we cannot do the two of us in the collaboration, but we have then teamed up with someone who can. But it's still good to know, to an idea even though you're not going to do it yourself, then to have an idea [of] what bioinformatic tools are there and just to understand what they're saying when they're talking about it.

As Participant 3 notes, one barrier to entry in digital health is a limited awareness of terms and tools. By learning about these topics, Participant 3 would be more able to collaborate and work with

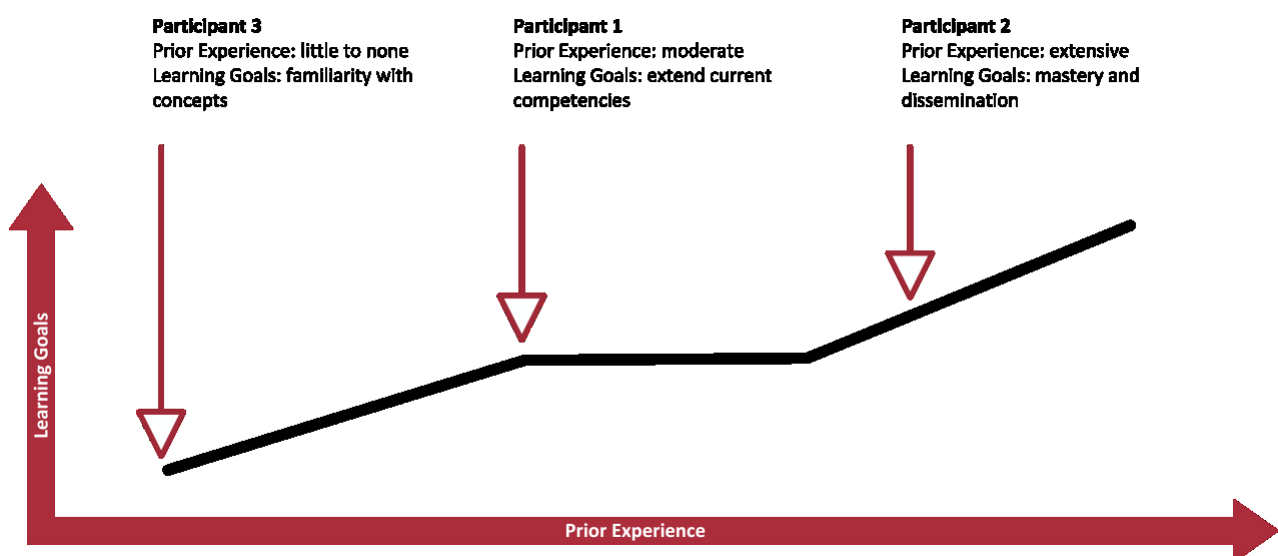
people that had deeper knowledge and skills in digital health. However, participating in the course was not enough, according to Participant 3:

We know in our work that, there's an increasing amount of data out there and it's available. Um, and we know that this is going to be reality for our students also, so we need to prepare them for that. I also needed some tools for how to access the data and how to work with it. But [learning that] is not realistic for this course. You know, maybe I would need a full education in data's management or something like that to the bottom of it. But [I am] just [taking the DSD course] to get that overview of what there and what is what is possible.

Given this observation, it seems participant 3 achieved their learning outcomes of familiarity but recognises a need for more learning before they can implement the topics of this course into teaching.

The figure below summarises the relationship between prior and learning goals across these three cases. Depending on what level of prior experience a participant brought to the course, they could set different learning goals for themselves. In general, course participants like Participant 3 with little prior experience set learning goals about gaining familiarity with course concepts and terminology. In contrast, course participants with prior experience such as Participant 1 and Participant 2 set learning goals focusing on more in-depth ability development and learning of new skills. At the highest level, course participants may be interested in skills related to digital health such as dissemination or teaching and working with colleagues.

Illustrating the relationship between prior experience and learning goals.



Development time

Professors at the University of Copenhagen are in positions which divide their time between research and teaching; the exact policies vary by faculty and department. In general, Associate Professors are expected to spend around 50% of their time on research and 50% of their time on teaching. However, in practice, the simple accounting of time allocated to research and teaching is more complex. Each faculty and individual departments may have policies that inform whether how work time can be used for professional development. Courses such as the DSD course could potentially apply to both research time (learning advanced quantitative methods at the cutting edge of one's research field) and teaching time (learning how best practices for teaching students about the digital transformation in health. As the DSD course was offered for a limited run, participants may not have had allocated time for attending compared participating existing professional teaching development courses such as those offered at IND, see Department of Science Education, n.d.). Since time was listed as a barrier to success in the surveys, the interview participants were asked if they had work time officially allocated to taking the course.

All three participants in these cases reported that they participated in this course in addition to all their existing teaching and research responsibilities. Regarding whether work time had been allocated to participating in the DSD course, **Participant 1** stated no but that despite this the course was prioritised and encouraged by their head of studies because it was unlikely to recur:

No, [I did not receive professional development time or compensation to take this course].

The head of studies sent out a mail suggesting to different teachers [that] they could take this course and maybe it would not be repeated. So if we wanted to take it, we might have to do it now.

Similarly, **Participant 2** noted they did not have designated time to participate in the course and in fact missed some of the instruction because of other responsibilities:

Yeah [this course was something extra on top of existing work]. So [...] the issue was I missed some of the lectures because [another] elective course was running simultaneously.

Lack of time is the main barrier: I guess the only barrier, but that's for every task. It's finding the time.

Participant 3 echoed the need to fit in this course as something additional because they were interested in it, observing: "Basically, I [decided this course] is something that I find interesting and

that I'm going spend some hours [to take the course]." Across all three participants there was no recognition of their time, only, as Participant 2 put it "a diploma at the end."

Of course, the time burden raised by participating in the course is not limited to the course itself. What about implementing the course concepts beyond this course? Participant 3 reflected on the limited time available for taking the course into teaching, observing:

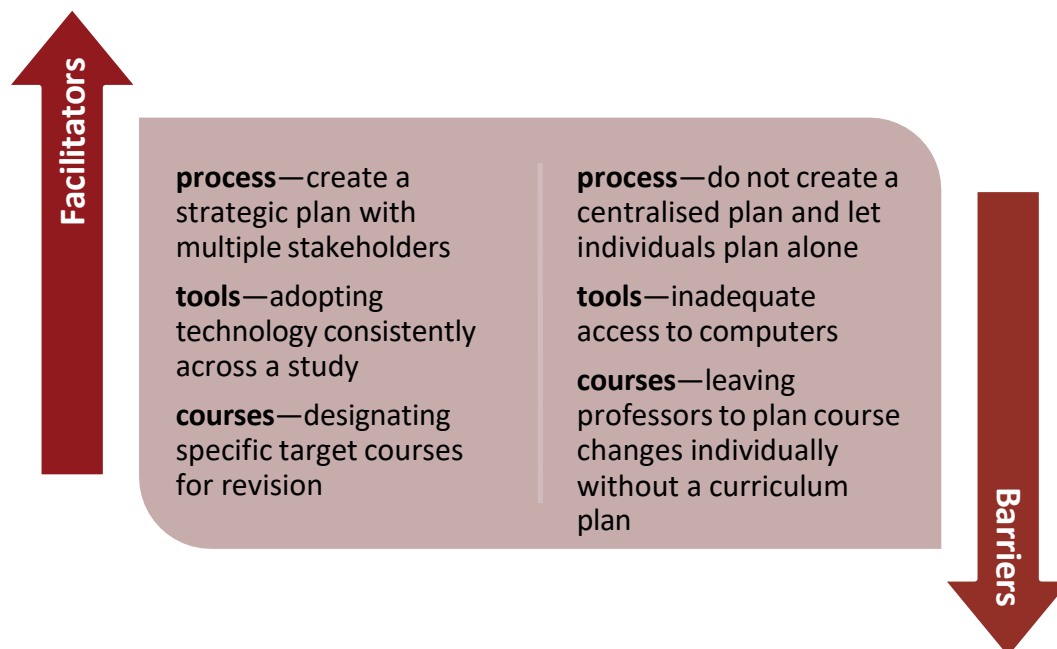
[Teaching is] organised with a number of classroom sessions and subjects that are assigned to each of these, so [to add a topic from the DSD course] you would have to make room for it, a new thing. Uh, that's one thing. But then the time would be an issue every time you have to make something new. It takes time for the teachers to plan and get to know and learn a little bit more and try things out. So that's why it's important that we figure out if this is going be a part of a new course and then with that, there will be some hours for planning that course that are assigned to some teachers. Then it will be acknowledged to the teachers because sometimes you tend to do a lot in organizing and revising your course and it kind of bit disappears.

This excerpt highlights a potential barrier to transfer of learning from this course. If university teachers are not given sufficient time to implement what they have learned in this course into their teaching, then the overall impact of this course will limited. Participant 3's reflection is consistent with a barriers and facilitators to transfer identified in the report of KP participants from 2021 (Jensen et al., 2022).

Institutional planning

In the interviews these participants described varying levels of support and coordination in their respective departments. Participant 1 and Participant 2 are in departments with more centralised and structured plans for digitalisation in teaching while Participant 3 is in a department with less structured support. Plans to implement experiences in the courses appear to be enhanced when there is a central plan in the departments. The figure below summarises some of the facilitating and limiting factors that the participants described related to implementing digital health topics in their teaching. After that, the participants experiences related to having an implementation plan from leadership is discussed in terms of adopting tools and course designs. Finally, there are the participants' observations for how department leaderships can take proactive roles in institutional planning that supports implementation in teaching.

Facilitators and barriers to implementation in teaching.



Process. The participants varied on whether there was a process or plan regarding digital education in their home institutions that contextualized and motivated their participation in the course. Participant 1 was a member of their department's study board and described an ongoing process developing a plan. Several individuals participating in this planning attended the DSD course together and used the experience to inform the planning. As Participant 1 put it:

We had a lot of discussions among the course participants. The discussions were about how are we going to manage this [implementation into teaching]? How, how are we going to get support for this? How are we going to get time to do this? I think perhaps in our School of Pharmaceutical Science, we are better off because we have decided that there's going to be this process and we have several people involved in it.

In this excerpt, Participant 1 observes how the ongoing preparation and planning that their study board was doing helped focus the collaboration that they were doing with peers also taking the course. How this planning supports implementation in relation to tool adoption and course selection is elaborated related to Participant 1's experience. But first, participant 2's experience is introduced as it is quite similar.

Participant 2 described being involved in the Digital Core Curriculum project at their department. This project is broader than a single department, unlike the study board process Participant 1 described. Below they introduce the project and how it was being used to plan courses for digital health education:

We started out two years ago where I was in this DC committee and we started to map out what to do and then over the last year then the group has gotten bigger. So both departments working [together] for the courses. We're trying to nail down what [the students] should learn first year and then do a progression. Initially it will be something like plotting data, visualizing data, and then later on it will be multivariate data analysis. So it's been us trying to map it out and now we are in the implementation phase, and then we'll see what to do.

But we've had a lot of meetings over the time and then we try to align as well as we can with the people we are here that has these interests.

As this excerpt describes, Participant 2 was in a department engaged in curriculum development in which they were planning what courses to develop and adapt. This was being sequenced along the course of study to ensure that participants were learning the right breadth and depth of material. This planning proceeded any implementation into teaching, which would come after the DSD course ended. These coordinated approaches described by Participant 1 and Participant 2 contrasted with the some of the experiences of other participants, such as Participant 3. Commenting on this, Participant 1 noted,

I had the impression that some of the other course participants felt quite alone about this. That it was perhaps them together with another one, and now they had the responsibility to do this [alone] and they didn't feel that they were qualified and how to get support.

In this way those with leadership support like Participant 1 and Participant 2 achieved more in the course and planned more specific implementation of course materials.

Tools. The participants commented on two ways that transfer into teaching was supported by central planning related to selecting tools (e.g., starting with a consistent platform, or not adopting a tool but a broader framework) and designing courses (e.g., selecting target courses and aligning them with broader courses of study). Regarding selecting tools, participant 1 was already independently learning Python for their own research and this corresponded with the tool adoption into teaching proposed by their department:

The time was come that I should learn a new programming language [related to my research]. And that, that was in parallel with that in our institute, The School of Pharmaceutical Sciences—we decided that this should be the future tool for teaching.

Participant 2 was also prepared to learn python because the Digital Core Curriculum project was planning to adopt python, as they noted “the DCC project [plans] to introduce python in first year.” In contrast to these two experiences, Participant 3 was not planning to adopt a programming language, noting that it would not be relevant to their students “[my students are] medical students, [so they] are not going to need python / programming.” This was a thoughtful choice to not adopt a tool, but in contrast to Participants 1 and 2, Participant 3 was making this choice independently based on their own teaching experience.

Participant 3 also highlighted a need for non-digital tools, in their teaching. Noting this as a barrier to implementing what they learned in the course. Stating:

There will be some practical challenges because it's going to be computer working on computers and we don't really have access to computers from the universities. So it will be the students working on their own [devices].

In this reflection, Participant 3 anticipates difficulty teaching their students topics from the course because there is a lack of resources in terms of computers or computer labs. In order to teach the topics in their courses, Participant 3 will need the students to use their own computers but does not think that this will be sufficient. Notably the DSD course focuses on technologies such as Python and Jupyter notebooks that are designed to work in individual computers. However, as the excerpt above illustrates, Participant 3 anticipates difficulties implementing this in their own teaching.

Courses. In addition to selecting a platform (Python) for an entire program of study, the planning in Participant 1 and Participant 2’s departments also helped pick which courses or newly developed course would implement the data science topics. In Participant 1’s case, several courses were picked to re-design, as they put it:

The study board has pre-picked some courses that could be especially relevant to into this process. [...] One problem is that we have decided to use this system [Python, Anaconda, Jupyter notebooks], but how can we get the teachers to engage in it? We need to upgrade their knowledge. So, we need to teach the teachers something before they can use it to teach the students. Because we're not all experts. So, we have real experts, and then we have somebody like me who knows something and is interested [but isn't an expert].

In this perspective, Participant 1 describes how the central planning allowed for prioritising which courses would be redesigned. But they also highlight how this raises questions around the continued professional development of those teachers. Participant one is not only planning how to transfer into teaching, but also engaging in the process of professional development planning that would support this change. Interestingly, the Participant 1 took the DSD course, the courses they teach were not going to be the first one's revised:

See my course was for some reason not selected as one of the important courses to use [python]. But since I'm already using some simulation, I think in a couple of years when they get to my course, I will try to give them the chance to do the simulations in Jupiter and Python instead of using the dedicated program that I [currently use].

In this excerpt, Participant 1 can prioritise what aspects of their course can be developed based both on what they learned in the DSD course as well as based on the strategic timeline of the implementation plan in their department.

Participant 2 was also teaching courses that had not been selected to be revised in their department's strategy. Participant 2 described how this still helped them prioritise when and how to make changes, stating:

So I haven't started adding anything to my course yet because I want to see how it goes on the first and second years [in the other courses] because I'm not really sure what level I can expect [from my students].

Because in Participant 2's department there was an order in which courses would be developed in alignment with the Digital Core Curriculum, Participant 2 was able to prioritise modifying their courses later, when they would better understand what level of ability their students had and could better set appropriate learning outcomes for their students. This is a student-cantered approach to instruction facilitated by their being a general plan in place.

These two experiences contrast with that of Participant 3, who expressed uncertainty on how to implement the course into their teaching. Participant 3 reflected on a prospective course, but was not certain if they would be involved

How is data collected in the hospitals? How are these huge amounts of data being processed and how can you access them and how can you use them? So we, we hope that it's going to be the whole spectrum in the [future, in-development] course, but we don't know if we are going to be involved in it.

This uncertainty led to waiting because the amount of time invested in course redesign is significant to do for something that may not be needed or desired. As Participant 3 described their status:

Right now, we are kind of waiting for how that course in data science will be implemented. [...] But I guess what we would need to do is to do it as a pilot with some real students and, and before we go ahead and do it in a big scale.

Participant 3 describes waiting for a course to be developed and hoping that it will be piloted so they can better understand how digital health instruction is working for their students. This would inform instructional design that Participant 3 does, however Participant 3 did not know what was going on in relation to these efforts and was not responsible for implementing such courses or pilot projects themselves.

An essential role for leaderships in implementation in teaching. The above discussions of selecting tools and courses highlight some of the essential ways that leadership can support implementation into teaching. Reflecting on this role Participant 1 said:

We [me and my colleagues from Pharmacy] worked well together because I got to learn who these people are in the School of Pharmaceutical Sciences, and one was two of them were [even] in my institute. Okay. And [together] we had this goal of doing something that was actually going to be used for something.

These reflections from the participants suggest that a course like the DSD course is not sufficient for making wide-spread changes to students learning about digital health and data. As the participants with more institutional planning and support had more concrete plans for implementation into their teaching, this is one way that leaders can support the digital transformation in education. Further suggestions for such leadership support are discussed in the ‘Insights for Future Work’ section below.

Evaluation Summary

The preceding sections present the evaluation results for each of the modules of the course (i.e., *grundmodul 1*, *grundmodul 2*, and professional modules) as well as the course overall and the context of learning based on three cases. The list below summarises the key findings.

⇒ **Grundsmodule 1.** Regarding the first module (*grundmodul 1*, GM1), the participants’ reported benefiting more in 2022 than in 2021. But in both years the overall benefit was rated positively. Additionally, the difficulty for GM1 was at an acceptable level for the participants both 2022

and 2021. However, the professors rated the material as too challenging for their students.

- ⇒ **Grundsmødul 2.** Regarding the second module (*grundsmødul 2*, GM2), the participants' reported benefiting equally in 2021 and 2022. The benefit of this module was rated more positively than GM1, potentially because GM2 was more practical, hands-on, and related to teaching. The difficulty for GM2 was at an acceptable level for the participants in both 2021 and 2022, but the difficulty may still be too high for students.
- ⇒ **Professional modules.** The range of topics in the professional modules—bioinformatics, image analysis, and *borgnær teknologi*—were well suited to the range disciplinary backgrounds of the participants. The difficulty of the professional modules varied highly and they could be standardised or the difficulty and technical nature better communicated to learners.
- ⇒ **Overall reviews.** Overall the course was well received in both years. The course overall was reviewed higher in 2021 than in 2022. This is surprising given that the individual course modules and their difficulty had more positive reviews in 2022. Additionally, in the first year there were more complaints about clarity and organisation, which the course designers improved in the second year.
- ⇒ **Key learning takeaways.** The participants achieved the learning outcomes, highlighting that they were taking away computational thinking and uses of data in health. Other takeaways like AI and connecting the topics to teaching varied somewhat between 2021 and 2022. The participants need to be presented a clear conceptual framework that units topics and those with less experience need clearer introduction to terms. Clarity and consistency of the key takeaways may be achieved by more cohesion across speakers.
- ⇒ **Course limitations.** The primary limitation that *is changeable* was the structure and planning of the course. Providing more clarification on how topics relate and connecting things to an overall framework can improve learning outcomes. The primary limitation that *may not be changeable* is time. Both in terms of having too much content for the allotted course time, but also the participants reported not having sufficient time to fully achieve their learning outcomes and not receiving compensation for the time spent on the course.

- ⇒ **Combination KP and KU.** The combination of both KP and KU had strengths and weaknesses. One strength often highlighted was that participants received multiple perspectives. But most participants wanted to collaborate with people from their research departments or centers. Additionally, research-oriented participants could take discussions in the direction of research rather than teaching. Overall, refining the course for specific learners' institutional needs, experience, and teaching obligations may improve its relevance.
- ⇒ **Learning in context.** For this course to be successfully transferred into teaching there are contextual and institutional factors to be addressed that are beyond this course. In particular, developing strategic plans for instructional and course design as well as curriculum review and development can empower professors to implement what they learned in the DSD course.

Insights for future work

Based on this case evaluation of the Digital Health and Data (DSD) course, what are insights for future digital, computational, and data science competence development efforts in health science at the University of Copenhagen? Since the DSD course was a pilot run in 2021 and 2022, these suggestions for future work will be general and not specific to the DSD course structure. These suggestions for future work will be divided into two sections, one for future competence-development courses and another for continuing the benefit of the course after the course for those that participated. Finally, this section concludes with a summary of ongoing and future research related to the DSD course.

Competence development initiatives

The purpose of the DSD course, in terms of competence development, was to “give lecturers within the [health sciences] a competence boost that enables them to incorporate modern data-driven methods and technology in their teaching” (Lillholm, 2020–2022). This evaluation suggests that some participants achieved this goal, however not everyone left the course feeling prepared to incorporate data-driven methods and technology into their teaching. The suggestions here focus on how to achieve this goal and support transfer into teaching. These suggestions provide that future competence development courses may achieve this goal.

⇒ **Make explicit connections to teaching. Design instructional activities where participants establish these connections themselves.**

This competence development course had a double learning outcome for participants. First participants must learn about digital health and data. Second, participants must understand how to teach these topics in their respective disciplines. The dual nature of this learning objective makes it significantly more challenging to achieve, especially for participants that are not already familiar with the topics mentioned in the course. To address this issue, future competence development efforts should carefully evaluate the learning outcomes and how they relate to the instructional activities in the course. Simply presenting talks on new and interesting topics is likely not sufficient for participants to make connections between topics and their teaching.

In the DSD course the project was designed to give participants an opportunity to relate what they were learning to their teaching. However, future development courses should consider providing more direct instruction and feedback on the instructional aspects of teaching digital health and data. In particular, it is important to realise that the instructional approaches and connections may vary by field, so a one-size-fits all approach to instruction will be less impactful than discipline and program specific analysis and feedback.

⇒ **Identify participants different experience levels and provide scaffolding to accommodate the various backgrounds of learners.**

Participants in competence development course will come in with different levels of experience. Those with more familiarity and experience are likely to succeed, even if the course provides little support and scaffolding. However, to promote student success even for those that are new to digital health and data, courses need to identify the level of expertise of participants and provide appropriate scaffolding. Getting to know the ability level of participants may be done in various ways. For example, surveying the participants prior to the course and then giving this information to course presenters is a non-intensive way of tailoring content. Another option is to group participants by expertise, research or teaching topic, or whether the focus on research or teaching. By placing participants in relevant groups their discussion can be tailored to their needs and ability levels. Finally, provide ample support for understanding the basics and logistics of new technologies. This final suggestion worked well in the DSD course as several teaching assistants were available to support the learners.

Additionally, digital health and data includes many complex topics. Often, presenting an overview of a complex topic becomes an info dump. Participants did experience this type of overwhelm in this course. While introducing many topics can be well received by participants—it is interesting after all—this usually does not result in transfer because the participants have not actively worked with the material and reflected on it. To better ensure that the material covered is an introduction that will boost teaching, think of the initial presentation of information as creating a framework that the participants can begin with and add on to independently. Essentially, if content is too complex, take some out.

⇒ **Support participants to identify concrete implementation opportunities in their teaching.**

This course had double learning goal for participants. First, participants are learning about digital health topics. Second, they are learning about teaching these topics to their students. It is important to note that learning about a topic does not equip someone to teach that topic. In fact teaching a topic separate skill from expertise in that topic area. In this course, it was clear that participants need further support in developing their teaching competence. One way to see this is the uncertainty the participants expressed in estimating how difficult the material would be for their students. A notable proportion for participants were uncertain if their students could master the material presented in the DSD course. This was especially true for the professional modules dealing with more specialised topics. Additionally, note how the participants rated the topics as too complex for their students much more than themselves. Special attention needs to be given on how to decompose and introduce these complex topics for students, if the skills are currently ‘too complex’ for the learners that these professors will teach.

In the DSD course, the participants gave feedback that the framework of computational thinking was a useful way to understand how to introduce these topics to their students, but further concrete teaching practices would be helpful. So in addition to introducing an overarching framework that supports teaching, participants need guidance on how to implement things into their teaching. To clarify, introducing tools such as Python and Jupyter notebooks are concrete and helpful, but these alone are not teaching practices. Participants should be given further instruction and opportunity to work with implementing these tools in their teaching practice. For example, Participant 3 was in a department where there was not a structured approach to implementing digital health into the curriculum. It can be overwhelming to know where to start in that context. Course participants like Participant 3 would benefit from guidance on how to select aspects of existing courses to revise,

how to revise things in a design process, and ultimately how to relate these changes to the rest of their programs of studies to avoid duplication or confusing students.

Supporting participants after the DSD course

In addition to insights for how to improve similar professional development courses in the future, this evaluation offers some suggestions for how to support the 61 course graduates into the future and support their implementation efforts. These suggestions require collaboration beyond the

⇒ Give DSD graduates time and resources to implement what they learned.

The case studies highlight that none of the course participants were receiving recognition of their professional development in the form of allocated work time. This creates a problematic situation in which, to achieve the digitalisation goals of the university, professors are asked to take on additional work in addition to their full workloads. Thus, to support university teachers as they participate in the digital transformation in the health professions, it is essential that department leaders budget teaching time towards planning new courses, curriculum design, and redeveloping course material. These are time consuming processes because quality teaching requires significant planning. Planning underpins individual professors' implementation into their teaching. Note that the participants from departments with active development and implementation plans—such study board planning or participation in the Digital Core Curriculum—had much clearer views of how and when they could implement what they learned in the DSD course into their teaching. Leadership can further support the digital transition by recognising the need to allocate time into both competence development training and instructional planning.

⇒ Provide DSD graduates a network for continued learning and peer resources.

Based on the reviews of the course from the participants it is clear that they gained valuable insights in their introduction to digital health and data. However, digital health is a quick changing field because there are presently rapid developments in big data, machine learning, analytics, and AI. Given this, this topic area is not a domain that a single competence course can cover because that course will quickly be out of date. One way to address this is to support professors in becoming experts in the area of digital health. Experts in the course of their work stay up to date on the latest topics. Such individuals are best suited to training individuals in the topics that they are expert in

and using in their work and research. However, it seems like the University of Copenhagen is adopting the approach of expecting many professors to gain this expertise for the sake of educating their students, whether or not they are experts in those topics based on their own research and work. In this context, graduates from competence development courses such as the DSD course will benefit from ongoing support that will help them become independent learners, staying up to date and learning as the field progresses rapidly. A facilitated peer network accomplishes this goal because it allows individuals to collaborate and learn from each other. Further, this type of network can be enhanced by being facilitated by some experts who create resources, summarise complex material, and provide ongoing training.

Future research

Currently, this evaluation is being followed up with a focus group and survey-based study of how participants of the DSD in 2021 are transferring what they learned into practice. To date, six KU participants and several KP participants have been recruited. This collaborative research effort with KP researchers (see Jensen et al., 2022) looks at how teacher competence training programs impact instruction long term. Specifically asking participants about what blocks or facilitates them implementing course learning in real life instruction. Additionally, this study can see how different institutional focuses (teaching at KP and research at KU) influence the uptake of digital competencies into teaching. This research will be conducted in 2023 with results expected in 2024.

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→ These materials are written in Danish. Quotes from these materials referenced in this report have been translated to English.

3. Supplerende materiale



TRANSFER FRA DSD

Følgeforskning, efteruddannelsesforløbet
Digital Sundhed og Data 2021-2022

Forfattere:

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INDHOLD

BAGGRUND	3
Kurset.....	3
Første forløb	3
UNDERSØGELSENS BAGGRUND OG METODE.....	4
Om transfer	5
Interviews og analyse	5
Data fra evalueringerne... ..	5
UNDERSØGELSENS RESULTATER.....	6
Hovedpointer ift. transfer.....	6
Indhold, metoder, niveau og organisation	8
Indhold og undervisningsmetoder	8
Niveau	10
Organisation... ..	10
VIDERE ARBEJDE OG PERSPEKTIVER.....	12
Professionernes udvikling	12
Formidling.....	12
Referencer	13
BILAG	
Bilag 1; Skitse til forskningsprojekt	14
Bilag 2; Henvendelse til respondenter	15
Bilag 3; Samtykkeerklæring.....	16
Bilag 4; Abstract til NERA konference	17
Bilag 5; Abstract til E-Sundhedsobservatoriet.....	18

BAGGRUND

Kurset

Kompetenceudviklingsforløbet Digital Sundhed og Data er opstået i et samarbejde mellem Københavns Universitet og Københavns Professionshøjskole, og finansieret af Undervisnings- og forskningsministeriet. Kurset er målrettet undervisere fra KU og KP indenfor de sundhedsvidenskabelige og sundhedsfaglige områder.

Fra projektbeskrivelsen:

Forløbets direkte formål er at give undervisere inden for det beskrevne fag felt på Københavns Universitet (KU) og Københavns Professionshøjskole (KP) et kompetenceløft, der bringer dem i stand til at indarbejde moderne datadrevne metoder og teknologi i deres undervisning. KU og KP går sammen om dette kompetenceudviklingsforløb, fordi der er oplagte muligheder for synergi og tværprofessionel læring på det sundhedsfaglige område.

Undervisernes/målgruppens forventede udbytte er:

- Viden om og indsigt i centrale teknologiske muligheder og udviklinger med fokus på data, der påvirker det sundhedsfaglige område.*
- Praktisk erfaring og kompetencer i forhold til at omsætte de didaktiske overvejelser om teknologiens påvirkning af fagområde og professionsudøvelse i undervisningen, herunder underviserrollen.*
- Tværfagligt netværk og indsigt i praksis på baggrund af projektarbejde.*
- Forståelse af baggrunden for udvalgte digitale sundhedsløsninger.*

Første forløb

Der var ca. 40 tilmeldte til det første forløb, i efteråret 2021 og foråret 2022, som bestod af 2 grundforløb, som alle skulle deltage i, og 3 specialiseringer, hvoraf hver skulle vælge en. Der var 12 deltagere fra KP, som stadig var aktive deltagere i januar 2022: fire fra Bioanalytikeruddannelsen, tre fra sygeplejerskeuddannelsen, to fra Praksis- og innovationshuset, én fra DIKO, én fra Ernærings- og sundhedsuddannelsen og én fra Fysioterapiuddannelsen

UNDERSØGELSENS BAGGRUND OG METODE

Vi udarbejdede et lille forskningsprojekt rettet mod at undersøge muligheder og forhindringer for deltagere fra KP for at omsætte deres læring fra forløbet om Digital Sundhed og Data ind i deres undervisning på KP (se skitse til projektet i bilag 1). Vi kontaktede alle 12 deltagere fra KP (se mail i bilag 2), medsendt en samtykkeerklæring (bilag 3), og sendte desuden en kort mail om projektet til alle deres ledere. Alle 12 deltagere meldte positivt tilbage, og vi fordelte dem ligeligt imellem os således at ingen interviewede deltagere fra deres "egen" uddannelse. Interviewene foregik mellem 2. februar og 7. marts 2022. Dvs. efter de to grundmoduler var afholdt, men (for de flestes vedkommende) før specialiseringsmodulerne (hvoraf det første blev afholdt 23. februar).

Vi brugte nedenstående guide til at strukturere interviewene:

Interviewguide Digital sundhed og data

Fokus i interviewet er deltagernes begrundelser og refleksioner ift. at omsætte læringen fra kompetenceudviklingsforløbet ind i deres undervisning på KP. Det er vigtigt vi får deltagerne til at knytte deres besvarelser til praksiseksempler undervejs:

Hvad fik dig med på efteruddannelsesforløbet?

Hvilke refleksioner har din deltagelse i efteruddannelsesforløbet givet dig i forhold til din egen undervisning?

Hvad tager du med fra efteruddannelsesforløbet til din egen undervisning?

Kom gerne med nogle eksempler fx hvordan har du trukket på viden fra forløbet i din undervisning, i forhold til indhold, undervisningsmetoder m.m.?

Er der noget fra efteruddannelsesforløbet du har kunnet anvende direkte eller har du skulle oversætte det til din undervisning?

Giv eksempler på, hvordan du oversætter til egen undervisningskontekst

Hvor stort har du oplevet oversættelsesarbejdet?

Hvordan foretages dette oversættelsesarbejdet?

Har du eksempler på noget, der har gjort det nemt at omsætte den nye viden ind i din undervisning?

Er der noget, der har hindret denne omsætning?

Er der noget fra undervisningen som har undret/overrasket dig?

Vil du anbefale efteruddannelsesforløbet til dine kollegaer

Hvis ja hvorfor?

Hvis nej hvorfor ikke?

Denne interviewguide blev udviklet af forfatterne i fællesskab, og kryds-checket ift. principper for transfer fra Wahlgren og Årkrog (2012) og Stegeager (2014). Disse kilder blev også efterfølgende brugt i analysen af interviewene.

Om transfer

Transfer er et begreb som især bruges i forbindelse med efter- og videreuddannelse (EVU), og som handler om hvorvidt og hvordan ny viden, kompetencer og læring fra EVU-forløb kommer i spil i, og sætter sig aftryk på, det daglige arbejde hos deltagerne, samt i den organisation eller virksomhed som de arbejder i. At dette ikke bare sker af sig selv, kommer til udtryk i undersøgelser som viser at det faktisk oftest ikke er tilfældet og at deltagerne ofte fx selv falder tilbage i gamle vaner eller ikke har mulighed for at omsætte den nye viden i deres praksis (Burke & Hutchins, 2007).

Der er derfor grund til at være opmærksom på om rammer og vilkår for EVU, både i uddannelsesforløbene og i deltagernes organisation, er fremmende for transfer.

Interviews og analyse

Interviewene tog mellem 30 og 50 minutter. Om muligt blev de foretaget ved fysisk fremmøde, i tre tilfælde foregik interviewet dog over Teams.

Efterfølgende blev interviewene transskriberet ved at centrale dele blev fuldt transskriberet og andre dele blev opsummeret.

Hver af transskriptionerne blev derefter gennemgået af én af forfatterne og kodet for udsagn der pegede på hhv.:

- Barrierer for transfer
- Facilitatorer for transfer
- Andet

De kodede interviews blev derefter analyseret af de tre forfattere i fællesskab.

Data fra evalueringerne

Deltagerne har gennemført en elektronisk evaluering ud fra et tilsendt spørgeskema efter hvert kursusforløb. Vi har haft adgang til alle de elektroniske evalueringsdata og har set dem igennem både før og efter de gennemførte interviews for at se om de nævner noget, der er helt anderledes end det vi så i interviews. Vi skønner ikke at dette er tilfældet og har ikke inddraget disse data yderligere.

UNDERSØGELSENS RESULTATER

I analysen fokuserede vi som nævnt på barrierer og facilitatorer for transfer, og opsummerer hovedpointerne i disse to temaer nedenfor. Derudover gennemgår vi pointer fra interviewene som adresserer temaerne: Indhold, undervisningsmetode, niveau og organisation (både på kurset og på KP).

Hovedpointer ift. transfer

Vi fandt fire hovedtemaer indenfor *Barrierer for transfer*; disse er opsummeret i tabel 1.

Barrierer	Citater
Uklarhed ift. struktur og formål med kurset	<i>at da vi startede kurset tænkte jeg hvad i alverden er det jeg har begivet mig ind i? Jeg havde meget svært ved at se hvor det bevægede sig hen.</i> <i>Overrasket over at kurset er super-utydeligt</i>
Fokus på at indarbejde moderne datadrevne metoder og teknologi i undervisning ikke tydelig	<i>Det kunne være fuldstændigt forskningsmetode kursus indtil de sidste to timer på sidste dag, så begyndte man at tale undervisning, og så kom der et andet hold undervisere på banen som havde det fokus: Så blev det straks sværere, det var lidt svært at omsætte, til hvordan skal vi have de studerende med der. Nu var det lige så sjovt...</i>
Udfordringer ift læreplaner: Stoftrængsel, lange planlægningshorisonter, centralt fastsatte læringsmål	<i>Udfordringen er at der er så meget indhold på uddannelserne at det er svært at finde de der huller til...</i>
Strukturelle barrierer på KP	<i>Men organisationen KP som sådan og den måde der blive lagt skemaer er fuldstændigt galimatias. Mine (kursus)dage har været blokeret, men skemalæggerne er ligeglade...</i>

Tabel 1: En kortfattet opsummering af hovedpointerne i de 12 interviews ift. barrierer for transfer

Tilsvarende fandt vi fire hovedtemaer indenfor *Facilitatorer for transfer* (tabel 2).

Facilitatorer	Citater
En læringspartner, for projektet og/eller i det daglige arbejde	<i>(om at have en læringsmakker til projektet) Især når det er så uspecificerede rammer som det har været, så har det næsten været altafgørende at vi har været to og at vi selv kunne sige, hvad er det så vi vil indenfor de her rammer.</i>
Kravet om et projekt om egen undervisning	<i>I starten var jeg superskeptisk da de sagde at vi skulle lave undervisningsforløb... Jeg havde ikke brug for det didaktiske/metodiske. Men det giver mening nu at jeg bliver presset til at lave et undervisningsforløb - det bygger bro og giver mening for mig (men det var ikke tydeligt fra første dag)</i>
Eksempler fra praksis, autentiske cases	<i>....sindssygt dygtig formidler og det han også er god til det er at gøre det konkret og praksisrettet.</i>
Støtte fra nærmeste leder	<i>Fuld, 100% opbakning fra nærmeste leder, og der er afsat tid.</i>

Tabel 2: En kortfattet opsummering af hovedpointerne i de 12 interviews ift. facilitatorer for Transfer

Den allervigtigste pointe for KP i forhold til transfer i analysen er helt klart ønsket om en læringsmakker. Stort set alle nævnte dette. Hvis de havde en makker, så nævnte de det som et vigtigt element i deres transfer, og hvis de ikke havde det, så nævnte de det som et ønske, og nævnte fx manglende fælles viden med kolleger som en barriere for at implementere det nye stof i undervisningen. Det vigtige i at have nogen at støtte sig til, sparre og samarbejde med i transfer arbejdet er da også en af pointerne i litteraturen om transfer (Wahlgren & Årkrø, 2012). I litteratur om teknologiforståelse viser forskning også at det har betydning at dele viden for at opnå ny professionalisme i forhold til at anvende egen og andres viden om teknologierne i en kollektiv professionel kontekst som i dette tilfælde er i forhold til den didaktiske tilgang (Gars Jensen & Bork, 2015).

De vigtigste pointer ift. selve kurset er at det dobbeltdidaktiske (at der skal undervises med henblik på implementering i undervisning) ikke var tydeligt, og at balancen mellem tiden til én-vejs præsentationer, og tiden til at bearbejde materialet, reflektere og netværke, ikke var optimal.

Ift. til udfordringer med stoftrængsel og fastsatte læringsmål var der en af respondenterne, der beskrev hvordan dette kan tænkes på en anden måde:

” Straks havde man diskussionen af: Hvad skal man så tage ud, som om det er én ting man mase ind et sted.. i stedet for at tænke langt og tænke hvor skal de der kompetencer bo (1., 2, semester etc.). Hvordan kan vi, bare ved at omformulere det vi allerede gør, nå nogle af de kompetencer som vi gerne vil.”

Her beskrives hvordan man, i stedet for at tænke på at presse Digital Sundhed og Data ind som et nyt emne, kan tænke uddannelsens elementer på nye måder, fordi professionen ændrer sig. Dette spejler til dels den strategi, der ligger på fx ISE med at identificere et teknologibånd. Formålet med dette teknologibånd er at kvalificere undervisningen i teknologi og digitalisering på tværs af semestre og uddannelsessteder, herunder at sikre sammenhæng og progression i uddannelsen med fokus på læringsudbyttet for teknologi og digitalisering.

Indhold, undervisningsmetode, niveau og organisation

Indhold og undervisningsmetoder

Mht. selve undervisningsformen i DSD-forløbene var der også centrale temaer i de 12 interviews, som pegede på elementer, der hhv. støttede eller stod i vejen for at stoffet kunne tænkes ind i en undervisningskontekst på KP. Tabel 3 og 4 opsummerer hhv. barrierer og facilitatorer i undervisningsformerne (og til dels indhold).

Barrierer	Citater
For mange præsentationer og énvejs kommunikation	<i>En ting er et powerpointoplæg og 1000 oplæg på en dag, og hvad kan man huske bagefter, men det kan også være godt at man læser noget selv. Jeg gik egentligt ud fra at jeg skulle på en uddannelse, men jeg synes ikke jeg er blevet særligt uddannet</i>
Irrelevant indhold	<i>Som vores undervisning ser ud nu, er det som er længst væk det her databehandlingsprogram (Orange)... Det kræver bare noget mere undervisning rettet direkte mod det end hvad vi lige nu har Det ville i hvert fald kræve noget mere gentækning af undervisningen.</i>
Manglende tid til networking og refleksion	<i>Specielt i starten blev vi opfordret meget til at netværke ... men det var meget svært at kunne mentalt nå både at netværke med de andre og nå at sluge al den viden der blev kastet i hovedet på os....</i>
Mangel på dobbeltdidaktik (at undervisningen direkte peger på undervisningsmæssige overvejelser)	<i>Der må altså gerne være et tydeligere formål med det her, i stedet for at vi starter med at snakke om data, om klinikdata og systemer, om hvordan kan man så bruge dem. Altså, det handler om medicinsk forskning, indtil vi begynder at tage underviserbrillen på, når vi har været igennem det ... også fordi det ændrer perspektivet på den snak man har at det der scope ikke er sat fra start af.</i>

Tabel 3: En kortfattet opsummering af pointer i de 12 interviews ift barrierer for transfer i selve undervisningen

Facilitatorer	Citater
Inspiration, nye vinkler, nye perspektiver, øget opmærksomhed, storytelling	<i>Nogle af de andre lavede traditionelle forelæsninger. Det kan jo også være meget inspirerende; det er jo meget fedt, jeg bliver også fascineret af kloge mennesker der laver forelæsning</i>
Bekræftelse af at man er på rette spor	<i>De emner der har været oppe, har mindet meget om det vi har gjort tidligere. Noget af det har jeg syntes var spændende, men jeg har ikke rigtigt kunne overføre, men det gør ikke så meget, for det giver mig et fundament, så jeg har et lidt bredere at stå på, så jeg er lidt mere sikker på det jeg gør.</i> <i>Vi har ramt rigtigt med at løfte det ud af det specifikke. Det handler om hvordan får de studerende de kompetencer som er relevante og tale generiske kompetencer....</i>
Praksisnær, autentiske cases, problemløsning	<i>Helt vildt inspirerende og meget relevant for mig fordi han taler direkte ind i det professionsrettede.</i>

Tabel 4: En kortfattet opsummering af pointer i de 12 interviews ift. facilitatorer for transfer i selve undervisningen

Som citaterne ovenfor antyder, er der delte meninger om både indhold og undervisningsmetoder. Der er dog noget, der tyder på, at kurset med fordel kunne skære ned på mængden af én-vejs kommunikerende undervisning. Indholdet i de mange præsentationer opfattes dog som både relevant og spændende, og en mulighed kunne være at lægge nogle af præsentationerne online, for at skabe mere tid til interaktioner på selve dagen, som det foreslås af en af respondenterne:

"Måske kunne man vende det om, have mere snak tid sammen når man er der på dagen, måske mere oplæg online"

At mere dialogiske og aktiverende undervisningsformer understøtter transfer, rapporteres også i litteratur om transfer (Stegeager, 2014).

Indholdet opfattes generelt som relevant, og mange italesætter at de mange vinkler giver både ny inspiration og nye perspektiver, og tjener til at tegne landskabet op (se citater i tabel 4). Men når respondenterne bliver spurgt om der er noget, som de nærmest kan se 1:1 ind i deres undervisning så er det eksempler fra de dele af undervisningen, som er hands-on og/eller aktiverende i form af øvelser eller lignende som de nævner, og også at det er undervisning med praksisnære eksempler (se citater i tabel 2 og 4). Indhold, som specifikt bliver nævnt som direkte overførbart er øvelser i Orange, konceptet Computational thinking og praksisnære, problemløsnings eksempler.

Det er dog også tydeligt at opfattelsen af relevans afhænger meget af respondentens eget faglige ståsted og – område. Fx blev programmeringsdagen opfattet som meget relevant og helt

irrelevant afhængigt af respondenterne. Nedenstående citat illustrerer dog at emner, som umiddelbart kan ses som irrelevante, godt kan vise sig at være relevante:

”Jeg kom for sent den 1. dag og missede noget og der var en forelæsning med en, der talte meget, meget hurtigt og i nogle sprog jeg overhovedet ikke forstod noget af, og jeg tænkte: Hvad er det her for noget? Og så sagde jeg til min makker: Jeg ved ikke rigtig om det er det rigtige for mig, og så sagde han til mig, og det er jeg glad for, at han gjorde: Prøv at tro på det, prøv at blive lidt endnu, fordi på et eller andet tidspunkt så vil du tænke, at det er okay. Og det var lige præcis det der skete med det program der hedder Orange og vi arbejder inde i det og man prøvede bare at putte nogle data ind og for at se hvordan man kunne koble tingene, så skete der faktisk noget for mig. Så tænkte jeg: Gud det her det er bare sindssygt smart og det kan jeg næsten også bruge mit meget kvalitativt tænkende hoved til”

Dette citat illustrerer samtidigt, igen, hvor stor betydning det kan have at have en makker, der kan hjælpe med at oversætte til relevans ift. ens egen praksis. Det illustrerer også, igen, betydningen af hands-on oplevelser for transfer. Denne videns deling ses også som en betydningsfuld pointe i forskning om teknologiforståelse, hvor vidensdeling kan lære os at se på teknologierne med nye øjne som i ovenstående citat. Her er vidensdeling med til at skabe mulighed for at reflektere over hvad data også kan bruges til. Informantens vaner og rutiner brydes her (Hasse, 2015).

Niveau

Det, at kurset er et samarbejde mellem KP og KU, og at det rummer så bredt et spektrum af professioner, blev italesat både som en styrke og som en svaghed ved kurset. Styrken lå i de forskellige perspektiver man mødte, i at blive klogere på hvad der fylder hos andre professioner i sundhedsvæsenet, og i at det er godt at alle i gruppen ikke ligner hinanden. Svagheden lå i at KP og KU opfattes som havende forskelligt fokus, og at KU-deltagerne fx kunne ”kuppe” samtalen over til specifikke forskningsemner (som illustreret i et af citaterne i tabel 3).

Ellers blev niveauet mest italesat ift. undervisningen på Grundforløb 2, især forløbet om programmering i Python, som af nogle blev opfattet som virkeligt godt og relevant, og af andre som helt uforståeligt. Især i dette forløb sås et stort spænd i deltagernes forudsætninger. Andre dele af stoffet blev opfattet som velkendt, men bortset fra at nogle gerne ville have haft mulighed for at forberede sig og/eller læse anbefalede tekster efter forløbene var opfattelsen at det var OK at dele af stoffet var kendt på forhånd.

Organisation

Som det ses af citaterne i tabel 1 var der nogen af respondenterne, der ikke kunne se struktur og formål med forløbet fra starten. Nogle respondenter kommenterede også at tidsplan og materialer kom for sent, da lokale arbejdsopgaver tit planlægges i meget god tid.

Ifølge organisation af kurset var der især mange, der syntes at fokus på hvordan man *underviser* i digital sundhed og data skulle have været mere tydeligt fra starten af kurset. Vi synes at dette er en meget central pointe, da hovedformålet med kurset er at klæde deltagerne på til at indtænke disse emner netop i deres undervisning.

Vi synes at forslaget fra en af respondenterne, om at man kunne lægge nogle af præsentationerne online, og lade deltagerne se dem inden de møder ind, for at give mere tid til opgaver, refleksion og networking når man er sammen, lyder meget fornuftigt.

Som det også fremstår i ovenstående citater, er det i forhold til kursusorganisationen en vigtig pointe at det især er praksisnære eksempler og kravet om et projekt om egen undervisning, der understøtter transfer.

Ift. organisation på KP er det meget positivt at opbakningen fra nærmeste leder stort set over én kan ses som meget stærk. Den væsentligste anbefaling er at sikre at flere fra samme faggruppe kan deltage sammen på forløbet. Dette understøttes også af forskning i transfer (Årkrog & Wahlgren, 2012) og beskrives som en del af transfermiljøet i organisationen. Vi ser dog også i nogle af citaterne at der ses nogle strukturelle hindringer fx i form af skemalægningsproceduren. Ydermere ved vi at nogle deltagere har måtte springe fra forløbet på grund af tidspres.

VIDERE ARBEJDE OG PERSPEKTIVER

Om professionernes udvikling

Der tales ofte om at især den teknologiske og digitale udvikling fører til jobglidning i professionerne, og dette kan opfattes som udfordrende for professionsidentiteten, eller sågar, i nogle tilfælde, som en fare for selve professionen (Gars Jensen & Skov, 2018). I det lys er det interessant at nogle af respondenterne talte om hvilke muligheder denne udvikling åbner for:

” Hvis man forstår hvad interaktionsdesign er, hvordan et skærbillede er opbyggetog hvad det er for nogle algoritmer, der ligger bag. Jeg tænker det må også være en del af kvalitetssikringen i det arbejde en bioanalytiker udfører.”

” Vi har meget arbejdsglidning, fordi faget bliver mere og mere automatiseret, så bliver der løsnet op for at vi kan varetage andre felter, som vi i virkeligheden sagtens kan (og som akademikere laver nu).

Den professionalisme og professionsfaglige udvikling er også i fokus i TEKU- modellens fokusfelt fire (Gars Jensen & Bork, 2015).

Formidling

Centrale resultater fra projektet er præsenteret ved NERA konferencen 1-3/6 2022 i Reykjavik (se abstract i bilag 4), og vil blive præsenteret ved E-sundhedsobservatoriet konferencen i oktober 2022 (bilag 5). Præsentationen fra Reykjavik er delt med evalueringsgruppen for DSD og bruges som basis for samarbejde med KU om yderligere følgeforskning.

Projektgruppens arbejdsproces

Vi har i dette projekt arbejdet i en gruppe på tværs af KP, og har oplevet at vi havde stor nytte af at kombinere vores kompetencer i hhv. didaktik, transfer og teknologiforståelse. Ulla og Marianne var i forvejen tilknyttet projektet, med opgaver i hhv. undervisning på forløbet og deltagelse i evalueringsgruppen. Vi besluttede at det gav mening at samarbejde om denne følgeforskning og at inddrage Sofies kompetencer indenfor transfer. Den største udfordring vi har haft i dette arbejde, har været at vi måtte opgive at ansætte de to studentermedhjælpere, som vi havde fået kontakt til, idet den bureaukratiske arbejdsgang med at få dem ansat, og etableret i KPs administrative systemer, tog så lang tid at de studerende i mellemtiden var videre til andre opgaver.

Da interviewene blev foretaget i midten af kursusforløbet, før alle havde besluttet et projektfokus, synes vi det ville give god mening at følge op på nogle af deltagernes arbejde med konkret at tage nye vinkler fra kurset ind i egen undervisning.

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Nicolai Stegeager. 2014. Chapter 4: Transfer mellem uddannelse og arbejdsplads. In PhD thesis, Aalborg University: Viden i bevægelse - Et studie af masterstuderende i spændingsfeltet mellem uddannelse og arbejdsplads

Bjarne Wahlgren, Vibe Aarkrog. 2012. Transfer - kompetence i en professionel sammenhæng. Book. Århus Universitetsforlag.

Bilag 1

Skitse til lille forskningsprojekt om efteruddannelsesforløbet Digital Sundhed og Data (DSD) med fokus på omsættelse ind i undervisningen på KP.

- ved Sofie Kobayashi, docent på VU og Marianne Ellegaard, docent på ITE

Forskningsspørgsmål:

Hvordan omsættes indhold og metoder fra efteruddannelsesforløbet i DSD ind i KPs uddannelser?

Metode:

1. Indsamling af baggrundsdata:

a. Litteratur om transfer, herunder

Wahlgren, B. & Aarkrog, V. (2012). *Transfer - kompetence i en professionel sammenhæng*. Århus Universitetsforlag.

Stegeager, N. (2014): PhD Kapitel 4: Transfer mellem uddannelse og arbejdsplads

b. Data fra evalueringer af første modul, især svar på spørgsmålene:

Hvilke af dagens emner finder du relevante for din egen undervisning?

Hvorfor var de særligt relevante for dig?

Hvordan var det faglige niveau i forhold til dine studerendes behov?

2. Undersøgelse af projekter i professionsmodulerne:

Interviewundersøgelser med deltagere fra KP i starten/midten og i slutningen af projektforsløbet (fx i starten af februar og i slutningen af marts) om deltagernes begrundelser og refleksioner ift omsættes af læringen fra efteruddannelsesforløbet ind i deres undervisning på KP, fx:

Hvad tager du med fra efteruddannelsesforløbet til din egen undervisning? Giv eksempler

Hvad omsættes ind i din undervisning, indhold og eller undervisningsmetoder?

Kan det bruges 1:1 fra DSD eller skal det tilpasses?

Giv eksempler på, hvordan du tilpasser eller oversætter til egen undervisningskontekst

Hvor stort er oversættelsesarbejdet?

Hvordan foretages dette oversættelsesarbejde?

Hvad har fremmet omsætningen ind i undervisningen?

Er der noget, der har hindret denne omsætning?

Skønnet timeforbrug:

- Forberedelse (læsning, analyse af baggrundsdata): 20 timer (10 pr. person)
- Logistik (møder, planlægning, transport): 40 timer (20 pr. person)
- Undersøgelse (interview skabelon, udføre interviews): ca. 2x10 interviews @ 1 time x 2 personer = 40 timer
- Databehandling: Transskribering (gerne ved en studentermedhjælp, eller købt ude i byen). Skønnet 5-7 timer pr. time = 100-150 timer. Kan købes for 250 kr/time ~ 20.000 kr.
- Analyse og skrivearbejde: 100 timer (50 timer pr person)

I alt: 200 arbejdstimer (100 timer til hver af Sofie og Marianne) og 65 timer til Ulla

Ca. 20.000 kr (eller 100-150 arbejdstimer) til transskribering

Bilag 2

Kære X

Som en del af evalueringen af efteruddannelsesforløbet Digital Sundhed og Data (DSD), og for at skaffe viden til udvikling af forløbet, er vi i gang med en undersøgelse af muligheder og vilkår for omsætning af indhold og metoder fra efteruddannelsesforløbet ind i KPs uddannelser.

I den forbindelse vil jeg gerne interviewe dig om dine oplevelser af forløbet og dine foreløbige tanker ift. at anvende læring og inspiration fra forløbet i din daglige praksis.

Interviewet vil tage omkring 45 – 60 minutter. Vi er en gruppe på tre, der skal gennemføre interviews med alle deltagere fra KP, og vi håber at foretage alle interviews i løbet af februar. Muligvis vil vi gerne følge nogle af disse interviews op efter at hele forløbet er slut, i det sene forår.

Gruppen bag projektet er:

- Ulla Gars Jensen, ulje@kp.dk, Lektor på sygeplejerskeuddannelsen, KP og med i den rådgivende gruppe, der har udarbejdet ”teknologi-båndet” på uddannelsen
- Sofie Kobayashi, soko@kp.dk, Docent med fokus på undervisning på videreuddannelsen, med særligt fokus på transfer af læring i efter-og videreuddannelse ind i egne praksis
- Marianne Ellegaard, mell@kp.dk, Docent med fokus på undervisning på Institut for de Teknologiske uddannelser

Projektet er en del af KPs engagement i DSD og er koordineret af Merete Carlson og Zoe Zachariassen, DIKO. Vi håber at resultaterne også vil kunne bruges bredere til at informere fremtidige indsatser på KP inden for den digitale ambition.

Jeg håber du har lyst til at deltage og vedhæfter en samtykkeerklæring som jeg vil tage med hvis du vil deltage i interviewet. Jeg har været inde og se i din kalender og vil høre om du måske har tid XX. Jeg kommer gerne til dig på X hvis du har et roligt sted vi kan sidde men du er også velkommen hos mig på X. Hvis der er et andet tidspunkt som passer dig bedre må du endelig vende retur med det.

Har du behov for mere information om projektet før du siger ja til at deltage er du velkommen til at kontakte mig

Jeg ser frem til at høre fra dig.

Mange hilsner fra

X

Bilag 3

Samtykkeerklæring

Interviewets formål

Som en del af evalueringen af efteruddannelsesforløbet Digital Sundhed og Data (DSD), og for at skaffe viden til udvikling af forløbet, er vi i gang med en undersøgelse af muligheder og vilkår for omsætning af indhold og metoder fra efteruddannelsesforløbet ind i KPs uddannelser.

I den forbindelse vil vi gerne interviewe dig om dine oplevelser af forløbet og dine foreløbige tanker ift. at anvende læring og inspiration fra forløbet i din daglige praksis.

Projektansvarlige

Gruppen bag projektet er:

- Ulla Gars Jensen, ulje@kp.dk, Lektor på sygeplejerskeuddannelsen, KP og med i den rådgivende gruppe, der har udarbejdet "teknologi-båndet" på uddannelsen
- Sofie Kobayashi, soko@kp.dk, Docent med fokus på undervisning på videreuddannelsen, med særligt fokus på transfer af læring i efter-og videreuddannelse ind i egne praksis
- Marianne Ellegaard, mell@kp.dk, Docent med fokus på undervisning på Institut for de Teknologiske uddannelser

Fortrolighed og anonymisering

Vi behandler og opbevarer naturligvis dine svar og data fortroligt. For at sikre dig bedst muligt arbejder vi med anonymiserede data både i analysedelen og i den efterfølgende formidling. Det vil derfor ikke være muligt at identificere dig som person i forbindelse med behandlingen af det, du siger i interviewet.

Samtykket

Jeg tilkendegiver med min underskrift nedenfor, at jeg er blevet informeret om projektet og dets indhold, og at de anonymiserede informationer må bruges til de formål, der er angivet ovenfor.

Du kan til enhver tid trække dit samtykke tilbage. Det gør du ved at sende en mail til Marianne Ellegaard mell@kp.dk.

Underskrift

Bilag 4 – Abstract for præsentation til NERA conference Reykjavik 1-3/6 2022

How are content and methods from continuing education translated into vocational bachelor's education programs? An example from a course on digital health and data for teachers in the health professions.

Marianne Ellegaard¹, Ulla Gars², Sofie Kobayashi³

¹Department of Technology, ²Department of Nursing and Nutrition, ³Further Education, Department of Management, Organization and Administration
All at University College Copenhagen

Rapid developments in digitization and technology require consideration, adaptation, and changes at all educational levels. In addition to online learning and digital didactics, this includes how to prepare students in higher education for current and future changes and challenges, driven by technological development, in their coming professions. In this paper we report on a study on drivers and barriers involved in implementing new insights gained from a training course on *Digital health and data* for teachers in the health professions at University College Copenhagen. 13 teachers of nursing, biotechnology-laboratory-science and related educational programs participated in this training course, which is aimed at increasing their competences to teach topics related to digital and technological transformations in the health sciences.

The research involved analyzing evaluations of the modules in the training course and interviewing the participants about potential, barriers and drivers to use the knowledge gained in the course to inform their teaching of these topics.

The data were analyzed relative to reports of factors that help and hinder transfer of continued education into professional practice (Stegeager 2014; Wahlgren & Årkrog 2012) and relative to a model of technological literacy in the health sciences (the TECS model; Gars & Skov 2017).

We report on which content and methods the participants saw as most relevant to their teaching practice, as well as which personal, methodical, and organizational factors influence the potential for transfer.

In almost all professions technological development in practice (e.g., hospitals, social services, administration, schools) is resulting in a need for further training for teachers at the corresponding educational programs. As much research indicates that training courses for professionals often result in little or no change to their practice, due to barriers for transfer, such analyses identifying elements that support transfer are highly relevant.

References

- Bjarne Wahlgren, Vibe Aarkrog. 2012. *Transfer - kompetence i en professionel sammenhæng. Book.* Århus Universitetsforlag.
- Nicolai Stegeager. 2014. *Chapter 4: Transfer mellem uddannelse og arbejdsplads. In PhD thesis, Aalborg University: Viden i bevægelse - Et studie af masterstuderende i spændingsfeltet mellem uddannelse og arbejdsplads*
- Ulla Gars, Hanne Skov. 2017. *The TECS model leads to active use of technology in home care. Nordic Journal of Nursing Research 37(1), 51-58.*

Bilag 5 – Abstract til en konference, der hedder E-sundhedsobservatoriet 22. Konferencen er i oktober og dens overordnede tema er : Mod et bæredygtigt digitalt sundhedsvæsen se link: <https://2022.e-sundhedsobservatoriet.dk/>

Linn Wagner og Ulla Gars Jensen

Titel:

Digitalisering og vigtig kompetenceudvikling for klinikere og underviser

Ifølge VIVE og KPMGs rapport fra 2022 fremstår kompetenceudvikling som et essentielt ben for, at vi kan komme i mål med ambitionerne om et mere digitaliseret sundhedsvæsen, hvor digitaliseringen skaber værdi. Rapporten omhandler: Styrkelse af digitale kompetencer inden for datadrevne teknologier til brug for automatisering, prædiktion og beslutningsstøtte hos sundhedspersoner.

Derfor vil vi gerne sætte fokus på kompetenceudvikling indenfor teknologiforståelse i praksis og på uddannelsesniveau. Vi vil tage udgangspunkt i et projekt, DIGITEK, hvor vi har udviklet et kompetenceforløb for sundhedsprofessionelle i kommunal praksis omhandlende fælles viden og kultur omkring teknologianvendelse. Dette med udgangspunkt i det danske forskningsprojekt Technucation.

Vi vil også gerne præsentere noget følgeforskning fra projektet: Digital Sundhed og data – bedre sundhedsuddannelser gennem upgrade af undervisere på tværs af universitets- og professionsuddannelser”. Hvilket er et kompetenceudviklingsforløb for undervisere fra Københavns Professionshøjskoles (KP) sundhedsuddannelser og undervisere fra Københavns Universitet (KU). Projektets formål er at give undervisere inden for KU og KP et kompetenceløft, der bringer dem i stand til at indarbejde teknologifokus i undervisningen. Forløbets formål er ikke at omskole kernefaglige undervisere til at blive data science specialister, men at udvikle et bredt forankret metodeberedskab og kompetencer til at tage højde for den løbende teknologiske udvikling og hvordan den påvirker og udvikler professioner og fagområder og dermed sikre relevant inddragelse i uddannelsen af fremtidige dimittender. Forskningen sætter fokus på hvilke muligheder og barrierer, der er for at opnå et kompetenceløft hos underviserne i forhold til deres egen undervisning.

Foreløbige resultater viser at kompetencekurset giver mulighed for at netværke, vidensdele, få ny viden indenfor e- sundhed som kan bringes tilbage i grunduddannelsesforløb.