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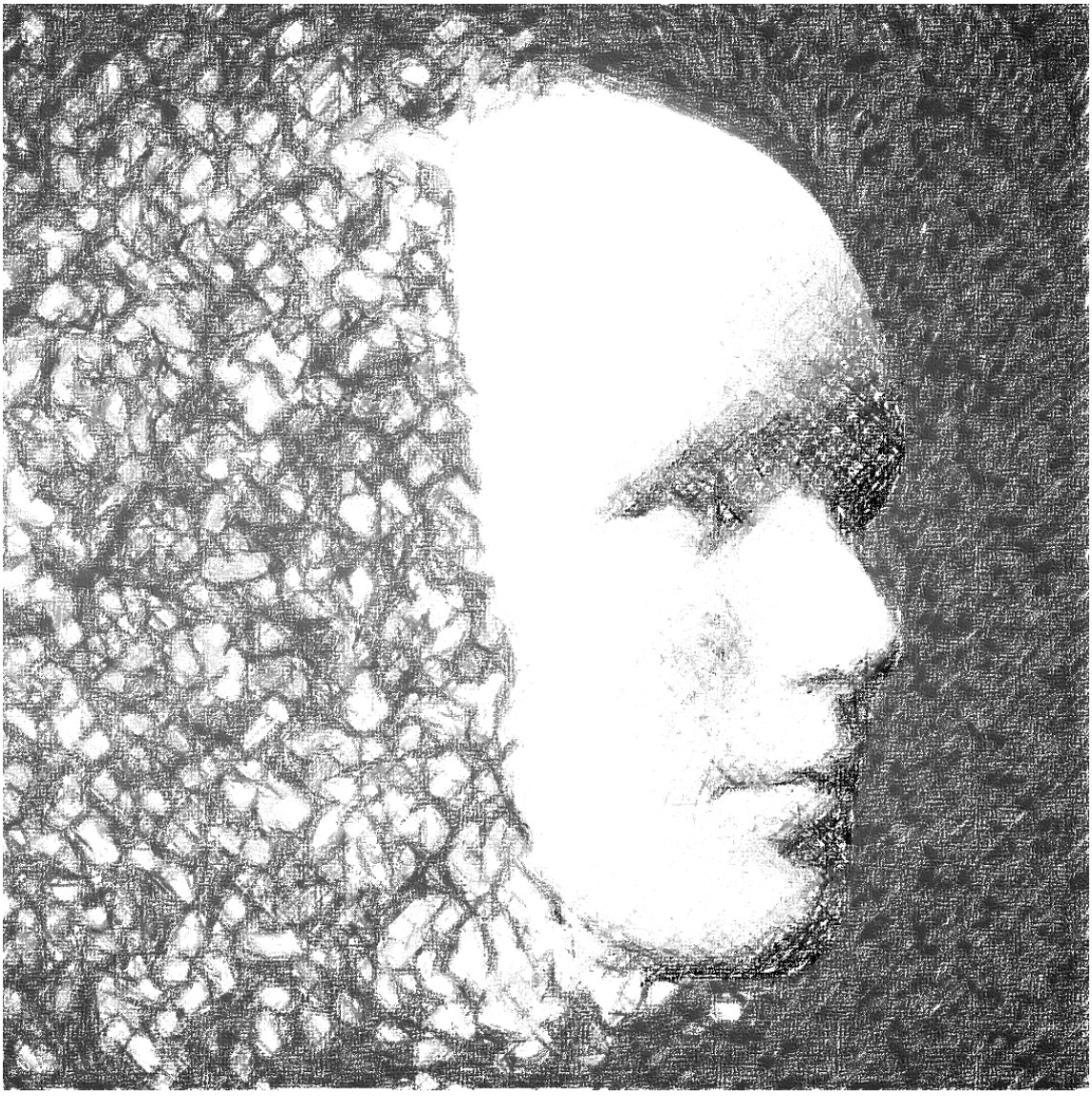

Abstract booklet

UiA Universitetet i Agder

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(01A) Artificial intelligence in teacher education – Perspectives on Bildung in a post-digital society

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Bildung generally revolves around understanding oneself within society (Hegel & Elster, 1967) and being able to critically contribute to society's development (Kant & Zehbe, 1975). This entails being aware of oneself, one's social role, power relations and ethical and democratic responsibilities in different contexts. Bildung has been an explicit goal of Nordic education but has received less focus since measurable individual learning outcomes and competences have been emphasized in curricula in the Nordic countries (Biesta 2020, Erstad & Voogt, 2018). We argue that Bildung is of outmost importance in a post-digital society where digital technologies have become intertwined and embedded in existing economic, political, and social practices, and borders between humans and technologies are blurred (Knox, 2019), where interfaces are ever changing and we collaborate with digital tools as partners (Lund & Aagaard, 2020).

In this symposium we address the question: *How can teacher educators promote Bildung in a world of generative AI?* Building on experiences and examples from teacher education, we highlight several perspectives on how generative AI challenges Bildung. Teacher education is not only responsible for fostering Bildung within the individual student but also for providing meta perspectives which enable the future teachers to foster Bildung in their pupils. The presentations will address aspects that are crucial to emphasize in teacher education such as technocultural perspectives (Løvlie, 2003), digital citizenship (Tømte et al. 2024), ontological perspectives (Ejnavarzala, 2019), 21st century skills and media literacy (Erstad & Amdam, 2013; Erstad & Voogt, 2018), agency (Nagel, 2021) and technoethics/ technoskepticism (Heath et al. 2024).

Presentation 1: Technocultural perspectives (Mari-Ann Letnes, NTNU)
Technocultural perspectives explore how the intersection of the self and culture is transformed in the age of the internet, where traditional concepts of Bildung are challenged by rapidly evolving technology (Løvlie, 2006, 2003). While classical Bildung emphasized transformation through the cultivation of the self in relation to culture, today's technocultural landscape. Drawing on Donna Haraway's (1987) concept of the

cyborg, which blurs the boundaries between human, machine, and nature, we see today's technocultural landscape as characterized by hypertransformative experiences, with constant online presence and an intensified sense of self and others. This interface, characterized by restlessness and transition, redefines Bildung as it navigates the meeting point of human creativity, critical thinking and artificial intelligence. Rather than focusing on specific educational practices in response to AI, we aim to reconsider how Bildung can be fostered in an educational landscape shaped by hypertransformation and the pervasive presence of artificial intelligence.

Presentation 2: Digital citizenship (Cathrine Tømte, UiA)
Digital Citizenship is a relatively new concept that builds upon existing research on citizenship (Gisbert Cervera & Caena, 2022). In a recent systematic review, Richardson and colleagues uncovered that, despite growing international interest in digital citizenship, research remains limited in terms of how digital citizenship is integrated into primary and secondary education. There are few empirical studies, and only a small number include specific measures of digital citizenship (Richardson et al., 2021). Norway introduced a new national curriculum in 2020, and the subject social science included elements of digital citizenship, yet little is said about what this means. In 2016, based on a review of previous research, Choi suggest different dimensions of digital citizenship. These are ethics, media and ICT skills, the ability to participate and engage in society, and critical distance (Choi, 2016). Inspired by Choi's four dimension, we have adapted and developed a model suited to Norwegian education. Choi's four categories—ethics, media and ICT skills, participation and engagement, and critical use—form the structure for our empirical review of responsible and effective use of digital technology for teachers. In this presentation, we first present Choi's approach to these categories and our further interpretation of them, and how they may align with AI.

Presentation 3: Ontological perspectives (Ann-Therese Arstorp, USN)
This conceptual paper explores how an ontological turn in the field of educational technology might contribute with an expansive perspective on digital technology. At the base of the argument are three perspectives on technology in education as we find them across existing research and frameworks: 1) Digital skills/competences perspective, 2) Pedagogical perspective, 3) Societal/humanistic perspective. We add to this an epistemological view as an undercurrent to the other three. We argue that these perspectives do not reflect a pressing influx of double bind situations, created particularly by generative artificial intelligence (AI). Double bind situations are ontological in their nature, requiring an ontological turn in how we view technology in education. Generative AI challenges us on what is true, what is trustworthy, but also on what is essentially human. As AI is becoming widespread it will most likely continue to position us in double bind situations with no immediate escape or solution. Thus, we argue for an ontological turn in how we articulate, position and relate to technology. We believe that discussions focusing solely on the more practical and epistemological aspects of digital technology in education are insufficient.

Presentation 4: 21st century skills and media literacy perspectives (Synnøve Amdam, HVO)
21st century skills have been an educational focus through the last decades, seemingly emphasizing a shift in focus in education from individual academic achievement towards digital competence and meta competences such as collaboration, critical

thinking and problem solving (Erstad & Voogt, 2018). However, the focus on Bildung in 21st century skills frameworks often reduce societal engagement and democratic participation to socalled life skills such as knowledge of individual duties and rights (Amdam, 2022). With generative AI simplifying and amplifying the spread of misinformation throughout the post-digital society, measures to not only protect pupils from misinformation but also to teach pupils how to engage with and counter misinformation are needed (Erstad & Amdam, 2013). In this presentation, media literacy perspectives on societal engagement and participation focusing on analytical knowhow and structural and systemic understandings are presented as broader perspectives that may provide pre- and in service teacher education with understandings and tools for promoting Bildung in the age of generative AI.

Presentation 5: Agency and technoethics/ technoskepticism (Ilka Nagel, HiØ) The nuanced and complex partnership between people and AI in education (and life in general) raises broader societal, ethical, and epistemic questions. Critical awareness of digital technologies including AI and their (unintended) consequences for and impact on pupils is vital (Coker, 2020). This presentation highlights the importance of extensive critical analysis, reflection and heightened awareness related to the use of AI in teaching and also when fostering student's digital competences. An approach addressed is critical technoethics or technoskepticism, which involves considering the social implications of technology and evaluating not only the pros and cons of using digital tools but also their embedded values and unintended consequences (Heath et al. 2024). Furthermore, teachers and teacher educators have to be able to reflect on epistemic questions, such as the nature of knowledge and how it is acquired when using AI (Nagel et al., 2023). These critical reflections are considered the foundation for empowerment and human agency, steering away from technology determinism in teaching and learning as well as everyday life (Nagel, 2021).

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(02A) Hva kan en samtalerobot bringe inn i lærerstudenters arbeid med simulert praksis?

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Temaet for denne presentasjonen er bruk av samtalerobot som en del av en simulert praksis i grunnskolelærerutdanning. Formålet med studiens som presenteres, er å utvikle kunnskap om hvordan studenter erfarer det når vi supplerer en simulert praksisressurs med en samtalerobot som er trent på relevant faglitteratur for tematikken som tas opp i den simulerte praksisressursen. I simulert praksis får studentene se filmer hvor reelle hendelser, problemstillinger og dilemmaer lærer og elever står overfor, er iscenesatt. Filmene kontekstualiseres av tekstdokumenter en lærer typisk har tilgang til, og som viser noe av kompleksiteten i situasjonene og inviterer til fordypning. De simulerte praksisressursene har tematikker som lærerstudenter har rapportert at lærerutdanningen forbereder dem for dårlig på (psykososialt klassemiljø; skole-hjem-samarbeid; relasjonsbygging med elever som strever i livet og på skolen; å være nyutdannet og på vei inn i en skolekultur). De simulerte praksisforløpene har blitt implementert i grunnskolelærerutdanningen for 5.-10. trinn, og studentevalueringene er svært gode. I denne studien undersøker vi hva som skjer når vi supplerer en allerede utviklet simuleringsressurs med en samtalerobot kalt Professor Samuelsen, som er trent spesielt med fagtekster om de tematikkene de simulerte praksisforløpene omhandler. Roboten er også instruert til å stille studenten spørsmål tilbake i en dialog.

Datainnsamling vil skje i tilknytning til implementering av simulert praksis høsten 2024, og på konferansen vil vi presentere tidlige analyser. Studiens empiri vil bestå av studentenes dialoger med samtaleroboten, studentsvar på et spørreskjema, eventuelt fulgt opp av intervjuer. Analysene vil guides av følgende forskningsspørsmål:

- Hva kjennetegner studenters dialog med en samtalerobot når denne inngår som en del av arbeidet med simulert praksis?
- Hvilken verdi uttrykker lærerstudenter at en samtalerobot har i arbeidet med simulert praksis?

Analysene av dialogen med roboten vil kunne gi innsikt i både innhold (hva studentene går i dialog med roboten om, relevansen i robotens svar), engasjementet i dialogen (i hvilken grad går studentene inn i en reell dialog, og følger opp robotens svar og spørsmål) og hvordan dialogen forholder seg til den simulerte praksisressursen for øvrig (hvilke sider ved det som tas opp i ressursen går studentene i dialog med roboten om, hvor tett opp til simuleringsressursens temaer, problemstillinger og dilemmaer går dialogen). Intervjudata vil kunne supplere denne innsikten med studentenes egne erfaringer og refleksjoner fra å være i dialog med samtaleroboten. Studien har relevans som et konkret eksempel på en utforsking av hvordan samtaleroboter kan tas i bruk i undervisning, og hvorvidt en slik bruk ser ut til å ha verdi for studentenes opplevde læring. En praktisk tilleggsverdi av studien er at den undersøker spørsmål av teknisk og rettighetsmessig art, f.eks. knyttet til hvilke GKI-verktøy vi kan ta i bruk i UH-sektoren, som har sine egne GDPR-klarerte avtaler, og hvilke tekster kan vi trene en samtalerobot på for å være innenfor regler for opphavsrett.

(02B) Kunstig intelligens i lærerutdanningen: erfaringer fra Høgskolen i Østfold

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Denne presentasjonen handler om et forskningsprosjekt ved Høgskolen i Østfold som undersøker hva lærerstudenter har lært om generativ kunstig intelligens (genKI), og hvordan de har brukt dette før de begynner i lærerutdanningen. Basert på spørreundersøkelser og gruppediskusjoner har vi kartlagt studentenes eksisterende ferdigheter og erfaringer med generative KI-verktøy, samt deres behov for videre opplæring.

Forskningsprosjektet søker å svare på følgende spørsmål: 1) Hva slags opplæring i bruk av chatboter har lærerstudenter mottatt før de starter i lærerutdanningen? 2) Hva ønsker studentene å lære om KI, og hvilke ferdigheter mener de er nødvendige for fremtidig undervisningspraksis? 3) Hvilke refleksjoner har studentene om etisk bruk av KI i skolen, og hvordan dette kan integreres i undervisningen?

Studentene ble stilt spørsmål om deres tidligere erfaringer med genKI, hva de bruker slike verktøy til, og hvilke etiske spørsmål som oppstår ved bruk av genKI i skolen. Dataene fra diskusjonene ble analysert gjennom tematisk analyse for å identifisere sentrale temaer og mønstre i studentenes oppfatninger og erfaringer.

Foreløpige resultater viser at mange studenter har minimal formell opplæring i genKI før de begynner på studiet. De uttrykker et klart ønske om spesifikk opplæring, spesielt knyttet til kritisk vurdering av informasjon fra chatboter, etikk, og hvordan man kan lære elever å bruke KI på en ansvarlig måte. Studentene ser potensialet for genKI i undervisningen, men er usikre på hvordan de skal balansere teknologiens muligheter med akademisk integritet.

Vi vil også presentere hvordan Høgskolen i Østfold har tilrettelagt opplæring i KI for lærerstudenter, inkludert en MOOC om KI literacy, profesjonsdager med praktiske øvelser, og diskusjoner om etisk bruk av KI i undervisning.

(02C) Artificial Intelligence for Teachers: Perceptions and Practical Integration

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This presentation shares findings and insights from the continuing education online course “MM-919 Innføring i Kunstig Intelligens for Lærere (University of Agder, 2024),” designed to equip educators with essential knowledge and skills for utilizing AI technology in education. The course aims to develop teachers' competencies and elevate their teaching practices through the integration of AI. Delivered online, the course leverages digital platforms for interaction and follow-up, ensuring flexibility and accessibility for teachers nationwide.

The course introduces the fundamental principles and functions of artificial intelligence (AI) and demonstrates practical methods for applying AI tools in educational settings. It emphasizes the integration of AI technology in both pedagogical activities and administrative tasks, highlighting the ethical and legal considerations, including privacy and data management.

This study explores teachers' perceptions of how AI use in education influences learners' and educators' critical thinking abilities. Furthermore, it investigates the factors behind accepting AI technology as a tool for enhancing teaching effectiveness.
According to Skolenes Landsforbund (2024), 64.7% of educators believe that "screens" are already overused in schools. Furthermore, only 17.4% have received training in digital pedagogy, despite a strong demand for such training. In this context, the rapid development of AI presents an even greater challenge.

Using an action research approach, we administered a survey questionnaire to 100 participants after one month of the course and conducted one-on-one interviews with 10 participants at the course's conclusion. This presentation discusses preliminary results and provides recommendations for adopting AI technology to enhance teaching effectiveness.

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(03A) Bruk av generativ kunstig intelligens i språkfag: Utforsking av likheter og forskjeller mellom engelsk og fremmedspråk

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Elevenes uregulerte bruk av generativ kunstig intelligens (GKI) i skolearbeidet rammer språkfag spesielt hardt fordi tekstproduksjon, språkføring og grammatisk og stilistisk korrekthet inngår i stor grad som en del av vurderingsgrunnlaget. Det er godt kjent at GKI kan hallusinere falsk informasjon eller produsere innholdstomme setninger, men teksten er så å si alltid grammatisk korrekt, og med riktig ledetekst kan GKI løse de aller fleste typiske språkfagsoppgaver på en nokså tilfredsstillende måte. Selv om GKIs potensial for å støtte og personliggjøre språklæring har vært diskutert siden de første språkmodellene ble offentlig kjent i 2022 (bl.a. Mao et al., 2024), er det per i dag lite forskning på hvordan GKI kan brukes i språkfag og hva effekten av en slik bruk er på elevenes språklæringsarbeid og språkutvikling (Barrot, 2023). I dette innlegget presenterer vi foreløpige resultater fra et utforskende prosjekt i samarbeid med en ungdomsskole i Agder, hvor vi undersøker GKI-støttet skrivearbeid i engelsk og spansk. Problemstillingen vi vil besvare er «Hvordan bidrar GKI i elevers skriveprosess i engelsk og spansk?» Vi tar utgangspunkt i skrivemodellen utviklet av Flower & Hayes (1981, Cognitive process theory of writing), implementerer GKI-baserte aktiviteter i hvert steg i modellen (planlegging, oversettelse av tanker til setninger, redigering) og samler inn skjermopptak for å kartlegge elevenes interaksjon med GKI mens de produserer tekst. Siden elevene har ulik kompetanse i engelsk og spansk, vil både type tekst og omfang variere i de to språkene. Ved å sammenligne dataene elevene produserer i de to språkene vil vi undersøke om elevene forholder seg ulikt til det KI tilbyr og om deres behov for assistanse er forskjellig i spansk og i engelsk på grunn av ulik språkkompetanse. Vi forventer at behøv for hjelp er ulik: ordforråd nivå og grammatikk i spansk; struktur, ideer og argumentasjon i engelsk (lower-order vs. higher-order concerns, se Koltovskaia et al., 2024). Vi drøfter om utbyttet av GKI-støttet skrivearbeid varierer avhengig av språkkompetansen til elevene (estimert ut ifra en tekst skrevet uten hjelpemidler), noe som kan eksemplifiseres med vilje til å bearbeide GKI-produsert tekst eller kun godta og kopiere GKIs produksjon.

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(03B) Exploring the Efficacy and Pedagogical Implications of AI Chatbots in ESL classrooms

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Using Chatbots for language learning in English as a second language (ESL) is nothing new. Previous research on chatbots based on supervised training, machine learning and expert systems is often divided into personalized learning/teaching (Chen et al., 2021), intelligent tutoring systems (ITS) and automatic feedback on students' text (Weng & Chiu, 2023). Although chatbots based upon generative AI globally have been tested in different subjects and grades, the research findings from empirical classroom studies are still scarce (Viantika & Dangin, 2024; Wong & Hung, 2024).

Over the last year, many schools in Norway have made GDPR-safe AI systems based on LLM from OpenAI or Gemini for teaching, learning and assessment (Gilje, et al., 2024). Oslo municipality have developed an interface where teachers can design their own chatbots.

Building on a dialogic teaching perspective (Alexander, 2018; Alexander, 2006; Wegerif & Major, 2024), the present study investigates how the chatbots are designed and used as dialogue partners to give students in lower secondary schools' feedback across various tasks and assignments in ESL. By using observation and recording the screen, the project aims at understanding how students use the chatbots as a "dialogue partners".

Preliminary observations indicate that the ESL students preferred receiving personalized feedback on their texts from their teachers. However, it was also observed that they appreciated the immediate nature of feedback provided by chatbots, as this allowed them to continue their text-related work without the need to wait for teacher instructions. Using ChatBots as dialogue partners was also found to be an engaging language-learning method for students, but it was noted that specific instructions in the pre-prompt were crucial for enabling a meaningful dialogue. The findings have several implications ESL didactics and working with dialogue, both between student and chatbots, but also in students' conversations.

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(03C) Effekten av lærerstyrt bruk av generativ kunstig intelligens på kompleksitet og innhold i elevtekster engelskfaget

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Inntoget av generativ kunstig intelligens (GKI) i skolen har skapt bølger av spenning og nysgjerrighet, men også frustrasjon og bekymringer i utdanningssektoren (Chapelle, 2024). I dette innlegget presenterer vi resultater av et klasseromseksperiment i engelskfaget i samarbeid med en ungdomsskole i Agder hvor vi evaluerer effekten bruk av GKI har på elevers skrivearbeid i engelsk i to parallelle klasser i 8. trinn (mellomgruppe-design med kvasi-eksperiment, Creswell & Guetterman, 2021). Tidligere undersøkelser viser at GKI hjelper til å utjevne forskjeller ved å ha større effekt for dem som var svakere i utgangspunktet (Dell'Acqua et al., 2023; Noy & Zhang, 2023). Det er også dokumentert at GKI kan brukes til å gi målrettede tilbakemeldinger i læringsprosesser (Dai et al., 2023; Steiss et al., 2024). Det meste av forskning på effekt av bruk av GKI er imidlertid gjort på voksne, enten i arbeidslivet eller på universitetsstudenter. Det er også gjort noen undersøkelser om hvordan skoleelever tar i bruk GKI-baserte verktøy i andre sammenhenger (bl.a. Sørhaug, 2024), men per i dag finnes det ingen analyser av effekten GKI har på kvalitet av elevtekster i språkfag. Vi samler derfor først inn elevtekster skrevet på skolen uten hjelpemidler som vi bruker som sammenligningsgrunnlag. Deretter samler vi in skjermopptak og tekster skrevet senere i skoleåret under samme forutsetninger i begge klasser (tema, undervisningsopplegg, tid til skriving, antall utkast, osv.), men den ene klassen jobber kun med de vanlige hjelpemidlene (skriveheftet, internettsøk, retteprogram i Google Docs, Lingdys, ordbok) mens den andre klassen blir også undervist i hvordan de kan bruke GKI i tre forskjellige skrivefaser (planlegging, strukturering, revidering) . Elevenes ferdigskrevne tekster blir sammenlignet på tvers av klassene for å vurdere effekten bruk av GKI har på arbeidet, både språkmessig (tekstlengde i ord, syntaktisk kompleksitet, ordforråd, språkfeil) og innholdsmessig (gjenbruk av ideer fra skriveheftet/tankekart vs. egne forslag). Vi forventer at bruk av GKI-støtte i skriveprosessen vil føre til at elevene skriver lengre og mer komplekse tekster, spesielt elevene som slet med å skrive alene i pre-test. Samtidig kan bruk av GKI føre til begrenset kreativitet og unaturlige vendinger i språket når elevene kombinerer sine tanker med GKI-genererte setninger.

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(04A) Does it matter if AI wrote the feedback? Evaluating the Influence of Perceived Source of Feedback: Human, AI, and Human-AI Collaboration

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This study examines the impact of perceived feedback source—human, AI, or human-AI collaboration—on Norwegian university students' valuation of feedback received on a written assignment. Participants (N = 160) were divided into three groups: one group received feedback as normal, another group was told the feedback was AI-generated, and a third group was told the feedback was produced by humans with AI support. All groups received only human generated feedback. Using a Multivariate Analysis of Covariance (MANCOVA), we aimed to determine how the students' perceived feedback source influenced their reported trust and usefulness of the feedback, while controlling for attitudes, experience and knowledge about generative AI tools and academic writing self-efficacy. The findings will provide novel insights that enhance our understanding of learning mechanisms involving generative AI in higher education.

(04B) Exploring the Pedagogical Potential of AI-Driven Feedback: A Cultural-Historical Perspective on Enhancing Learning-to-Learn Strategies

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The importance of teaching students learning-to-learn strategies, emphasising lifelong learning, critical thinking, and problem-solving have been emphasised by researchers and educational practitioners for several years (Engeness, 2021; Smith et al., 2016). Different approaches such as Inquiry-Based Science Education, Constructivist approach to learning and integrating formative assessment (feedback) with self-regulated learning have proved to be useful to enhance these strategies (Brandmo et al., 2020; Linn, 2000). However, the recent rise of AI in education presents both opportunities and challenges, particularly regarding AI-driven feedback (Hopfenbeck et al., 2023). This urges a need for further research to fully understand AI's pedagogical potential and feedback it can offer to support students' writing process and their understanding of what it means to write a good text.

By applying the cultural-historical concept of cultural tools and the developmental impact of human activity (Galperin et al., 2023), this study discusses how this theoretical framework can deepen our understanding of the educational potential of individuallytailored AI feedback to support Assessment for Learning (AfL) approach and inspire the design principles of AI-based educational technologies.

The Essay Assessment Technology (EAT) based on the proposed design principles, is introduced as an example of how AI can enhance AfL strategies in schools, showcasing its potential to improve student learning and foster their growth as learners. EAT has been designed by the interdisciplinary teams working in the Norwegian Research Council funded project Artificial Intelligence for Assessment for Learning to Improve Learning and Teaching in the 21st Century (2022-2026). Grant number 326607.

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(04C) The effects of AI feedback coaching on peer feedback composition, quality, and experience

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Peer feedback can be an effective alternative to expert feedback, though its quality can suffer from inadequate scaffolding (Carless & Boud 2018). Prompting during peer feedback has been found to enhance its quality (Gan & Hattie 2014). With the recent developments in LLM-based applications, adaptive prompting has become more feasible. This study examines how adaptive AI-prompting influences the composition, quality, and experience of peer feedback writing.

Through a mixed-methods approach data was gathered from a course for Ph.D. students, where the students provided peer feedback on written lesson plans. Through two iterations of the course, the intervention group (IG) had an AI feedback coach suggesting feedback improvements, while the control group (CG) did not. Feedback comments were analysed using NLP for sentiment, readability, and length, alongside an adapted Feedback Quality Index (Hansen et al. 2023; Hutto & Gilbert 2014; Prins et al. 2006). Open-ended survey responses were thematically analyzed (Braun & Clarke 2006).

Results showed that the IG's comments were shorter but more complexly written. They had shorter sentences (p=.001, d=0.7), fewer tokens per comment (p=.024, d=0.491), and were harder to read based on syllables per token (p<0.001, d=1.108), as well as several measures for readability (Flesch Reading Ease (p=.001, d=0.739), SMOG (p=.016, d=0.539), Coleman Liau (p<.001, d=0.985), and Lix (p=.014, d=0.551)).

Concerning the Feedback Quality Index, the IG used fewer reflective questions (p=.031, d=.217) and adhered less to feedback criteria (p=.044, d=0.203).

Thematic analysis revealed mixed sentiments in survey responses. Positive aspects included increased reflection, while negative aspects involved distraction, as well as a tendency to over-rely on the AI's approval or over-trust the AI's judgment.

The study thus contributes to discussions surrounding adaptive prompting, over-reliance on AI applications, and a rising need for scaffolding AI-technology-enhanced learning activities.

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(05A) Generativ KI i barnehagen og barnehagelærerutdanningen

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I dagens samfunn, der digital teknologi og kunstig intelligens (KI) er overalt, er det viktig å stimulere barn og unge til å utvikle en digital robusthet (OECD, 2023). Det finnes både muligheter og risiko knyttet til digital teknologi. Det er dessverre ikke mulig å eliminere risiko helt, men den kan reduseres. Barnehagelærernes profesjonsfaglige digitale kompetanse (PfDK) er derfor svært sentral, og utviklingen av denne må starte i barnehagelærerutdanningen (Dardanou et al., 2023; Madsen et al., 2023; Undheim & Ploog, 2023). Dette gjelder også i forhold til KI (SU et al., 2024). Bruk av generativ KI (GKI) er en teknologi som gir mange nye muligheter, men også utfordringer. På den ene siden kan vi se på digital teknologi som et verktøy – men samtidig må vi også se på teknologien som en tenkemåte. Å utvikle PfDK krever innsats og utforsking gjennom varierte erfaringer, i et sosialt fellesskap. I barnehagelærerutdanningen er det derfor viktig at vi diskuterer, reflekterer og prøver ut ulike aspekter knyttet til digital teknologi sammen med studentene, slik at de kan tilegne seg både teoretiske kunnskaper og praktiske ferdigheter (Dardanou et al., 2023; Madsen et al., 2023; Papavlasopoulou et al., 2024; Undheim & Ploog, 2023). Vi spør: Hvordan kan vi gi barnehagelærerstudentene erfaring med GKI i utdanningen og hvorfor er det viktig å legge til rette for at studentene får utforske GKI? Vi gir konkrete eksempler på hvordan vi har brukt GKI sammen med studentene i barnehagelærerutdanningen og hvordan studentene deretter har brukt det sammen med barn i praksisperiodene. Eksemplene bygger på undervisning sammen med barnehagelærerstudenter i grunnutdanningen, en fordypning og en videreutdanning. Forventet resultat av dette arbeidet er at studentene utvikler en mer reflektert, kritisk og kreativ PfDK, som inkluderer å kunne bruke GKI klokt og kritisk som fremtidige barnehagelærere.

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(05B) How Children Think about Generative Artificial Intelligence

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Since the release of Open AI's large language model ChatGPT in late 2022, so-called artificial intelligence (AI) – and more specifically generative artificial intelligence (GAI) – has become a fast-growing topic of discussion in nearly all aspects of society. The newly available technologies impact children's lives as well, as everything from social media platforms to the education system are making changes to adapt to the new pitfalls and possibilities. But what are children's receptions of and perspectives on these emerging technologies? This paper presents tentative answers to this question, drawing on preliminary findings from a participatory action research and speculative design-based (Bradbury, 2015; Jensen, 2019; Wargo & Alvarado, 2020) study among approximately 60 8-10-year-old children from two different after school settings that participated in three workshops at each location (six in total). The data set consists of 09:55:32 hours of video data and a subset of digital photographs and field notes.

The objective of the workshops has been to engage in pedagogically scaffolded creative processes where GAI is understood as an "artificial friend" to whom we also need to become "artificial friends", also to remain private/anonymous to the different service providers. Naturally, working with children as informants requires rigorous adherence to ethical principles of research, including parental consent and children's assent (Docket & Perry, 2011). Data were gathered in after school clubs during the spring and summer of 2024, and subsequently analysed thematically (Braun & Clarke, 2006). The preliminary findings reveal that the children word distinct functionalities and concerns when defining the nature of GAI that resonate with familiar practices of anthropomorphising (Bartneck et al., 2009). Moreover, their fascination of using GAI fluctuated in relation to their creative ambitions as well as their view on other (non-digital) materials that were available to them in the workshops.

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(06A) GKI-assistert skriving i lærarutdanninga GLU 5-10

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I lærarutdanninga er det viktig å legge til rette for at studentane som sjølve skal bli skrivelærarar og leselærarar, har praktisk og teoretisk kompetanse og erfaring med dei nye skriveteknologiane som nå blir tatt i bruk i skolen. Dette prosjektet har som overordna mål å gjere studentane som vel norsk i GLU 5-10 utdanninga medvitne både om dei moglegheitene og utfordringane som oppstår når ein brukar såkalla generativ kunstig intelligens (GKI) i skriveopplæringa.

For å få nytte av chatbotane må ein kunne stille gode spørsmål, noko som krev gode skriveferdigheiter. Å lese svara frå chatbotane krev leseferdigheiter, allmennkunnskapar og kritisk literacy. Framtidas lærarar må bli førebudde på ein skolekvardag med GKI-assistert skriving, og trente opp i kritisk refleksjon over kva slags didaktiske val omgangen med slike teknologiar fordrar.

I august gjennomførte vi ei pilotundersøking der ei gruppe studentar fekk bruke KI-verktøy på ulike skriveoppgåver, og etterpå svarte på eit spørjeskjema om erfaringar, moglege fordelar og utfordringar ved teknologien. I hovudundersøkinga i slutten av oktober utvidar vi prosjektdesignet. Her får ein heil GLU 5-10-klasse tilgang til to ulike chatbotar som brukast i grunnskolen. Studentane får ei introduksjonsøkt om GKI og høve til å teste ut teknologien meir allment, før dei skal bruke chatbotane i skolerelevante skriveforløp der dei mellom anna ber chatboten forklare språklege bilde, samstundes som vi skjermfilmar og loggfører dialogen deira med chatbotane. Vi ber så studentane, i ei revidert utgåve av spørjeskjemaet, reflektere over didaktiske val, utfordringar og moglegheiter med teknologien i klasserommet.

I presentasjonen vil vi vise funn frå undersøkinga, der vi analyserer både kommunikasjonen studentane har med chatbotane og svara dei gir oss. Vi undersøker kven som tar styringa i og formar dialogen med chatbotane: Om interaksjonen eller turtakinga best kan fortolkast i ein institusjonell eller kvardagsleg ramme (Skovholt mfl., 2021), og om språkbruken i seg sjølv kan rammast inn som primær eller sekundærdiskurs (Gee, 2000). Vi vil òg nytte kritisk diskursanalyse i tradisjonen etter Fairclough (2013) som ei meir overordna forklaringsramme når vi ser chatbotinteraksjonen og svara studentane gir oss i samanheng.

I innlegget vil vi presentere metoden i prosjektet og foreløpige funn både frå spørjeundersøkinga og samtalane studentane hadde med chatbotane.

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(06B) Diffraction patterns in writing practices and processes

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Currently, great attention is given to what AI tools may mean for educational practices, not least when it comes to writing. Since tools like ChatGPT have proved to create texts of good quality when prompted to create common school tasks, questions arise about how algorithmic collaborations, and authorship will play out in the writing process (Henrickson 2021).

This presentation builds on an analysis of Swedish teenagers writing stories about Futures together with AI tools (Lindberg & Haglind, 2024). We aim to explore how diffraction may be used as a theoretical lens for describing and understanding the entangled process and practice of writing (Barad, 2007; Bergviken Rensfeldt & Player-Koro, 2024). With the term diffraction Barad (2014) seeks to explore differences, not as opposites but as a relation of differences within that may come together, or rather diffract. Diffraction is engaged as a way of seeing how differences come into play in the creative endeavour of text production. How diffraction patterns contribute to emerging writing practices with generative AI, will be the focus of the analysis.

The data consists of recordings of screens and of what groups of students say and do when creating stories. The students partook in a one-day event where they were given the task to create a story about Futures using AI tools for text and image creation (cf. Ross, 2023; Lindberg & Öberg, 2023). They were instructed to start their writing process by discussing the plot, setting, and main characters with their peers.

Particular attention is given to two groups of students and their practice and process of writing. The entanglement of pasts, presents, and futures are explored in relation to the practices and the process of text and image creation where matters of different kind come to matter and make a difference.

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(06C) Lærerproduserte chatboter i Osloskolens KI-prosjekt – design og utprøving i prosessorientert skriving på videregående skole

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Bruken av generativ kunstig intelligens og chatbots blir både ansett som en mulighet og en utfordring for elevenes læring i grunnopplæringen (Zhung & Tur, 2024). I Norge har rådgivere hos skoleiere det siste året designet ulike, egne chatbots som lærere kan ta i bruk (Gilje et al., 2024), mens Osloskolens løsning gir lærerne selv mulighet til å skreddersy slike chatbots i en åpen løsning der det kan legges inn en såkalt systemledetekst (pre-prompt). I dette paperet analyseres det systematiske arbeidet med å designe systemledetekst, og prøve dem ut for å trene elevens delferdigheter i et prosessorientert skriveopplegg i norskfaget på to ulike videregående skoler.

Det er bred enighet om at prosessorientert skriveopplæring, kombinert med bruk av eksplisitte skrivestrategier, er en hensiktsmessig og effektiv tilnærming til skriveopplæring (Andrews et al, 2009; Graham og Perrin, 2007). Nyere forskning viser at tilbakemeldinger på riktig tidspunkt i skriveprosessen har stor effekt for elevens utvikling av delferdigheter i skrivingen (Kvithyld og Johannessen, 2011), og her kan chatbots med forhåndsdesignede systemledetekster spille en viktig rolle (Adiguzel,et al, 2023, Hartono, et al, 2023, Steiss, et al, 2024).

Eksempler på krevende delferdigheter eleven må mestre er organisering av ikke-lineær og ikke-narrativ tekst, bruk av kommunikasjonsfremmende tekstbinding, og etterrettelig, korrekt og kritisk kildebruk. I dette FoU-prosjektet samarbeider forskere og lærere ut fra to forskningsspørsmål som legger vekt på å designe gode systemledetekster (chatbots) og undersøke hvordan disse kan gi elevene verdifull feedback i sanntid gjennom et prosessorientert skriveforløp:

> Hvilke elementer må med i en systemprompt for å skape en chatbot som hjelper elever med å utvikle delferdigheter i skriveprosessen?
>
> Hvordan opplever elevene at disse chatbotene hjelper dem med å videreutvikle en tekst?

Gjennom systematisk design av systemledetekster, samt elevobservasjoner gjennom systematiske feltnotater og videodata, i tillegg til intervju av elever i etterkant av undervisningsopplegget, analyserer vi hvordan tilbakemeldingen i skriveopplæringen kan gjøres med designede chatbots i osloskolens KI-prosjekt. Foreløpige funn viser at systemledetekster i tilpasset format (som JASON) samt inkludert faglig kontekst, er avgjørende for å lage gode «didaktiske chatboter» som gir elevene hensiktsmessig tilbakemelding. I tillegg blir det tydelig for eleven hvilke delferdigheter de trener på i den

enkelte skriveoppgave når systemledeteksten er gitt på forhånd av læreren i designet av chatboten. Det overordnede målet med prosjektet er å utvikle et bibliotek der norsklærere i osloskolen kan velge ut og tilpasse de til enhver tid mest relevante chatbotene for sin planlagte undervisning. Slik belyser prosjektet hvor spesifikt chatbots i skolen må utvikles av spesialiserte lærere før det potensielt kan ha en betydning for en større gruppe lærere som for eksempel skal la elevene arbeide med prosessorienterte skriveforløp i norskfaget.

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(07A) Integrating Multimodal GenAI in Adaptive Instructional Systems: Opportunities & Challenges

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Adaptive Instructional Systems (AIS) refers to computer-based systems which accommodate individual learners' differences, such as cognitive, affective, and motivational states, to customize content and adjust pedagogical strategies to learners' performances, needs, characteristics, and preferences in real-time [1] [2]. Starting over 50 years ago as rule-based Expert Systems, known as *Intelligent Tutoring Systems* (ITS), the current technologies are more data-driven and adaptive due to extensive use of AI and Machine Learning (ML) techniques, i.e. *Reinforcement Learning* for the selection of next optimal instructional intervention; or *Bayesian Knowledge Tracing* (BKT) for learner modelling and profiling [3]. Numerical empirical studies, including large-scale investigation of systems like *Cognitive Tutor and ALEKS*, demonstrated their effectiveness in improving various learning outcomes [4] [5].

Recent advancements in Natural Language Processing (e.g., LLMs like Transformers used in GPT) and Computer Vision (e.g., Diffusion models) paved the way for the emergence of Generative AI (GenAI). These technologies surpass common ML approaches due to their capacity of producing original contents and authentic outputs [6]. This study explores the potential of GenAI to solve three main challenges in adaptive systems: (a) profiling in illdefined domains, (b) authoring tools, and (c) adapting to emotional and affective states of learners. We also discuss how GenAI can optimize current AISs to support the development of 21st Century skills such as collaboration and teamwork [7]. Finally, we present a framework outlining the challenges and weakness associated with the use of GenAI-based AISs, including issues of g*overnance, accountability, fairness*, and their implications for classroom teaching and educators, such as AI-and-Data literacy.

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(07B) Bloom’s taxonomy and development of Artificial Intelligence literacies

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This presentation aims to develop a conceptual paper where the goal is to apply Bloom’s taxonomy (Anderson & Krathwohl, 2001) and connect it to further understanding of what Artificial Intelligence (AI) literacy might be. Bloom’s taxonomy has played a pivotal role in educational research and teaching and represents a tremendous framework for, among other things, the operationalization of the various phases of cognitive learning. The taxonomy has been applied to formulating educational objectives, assessment, and testing across subjects and disciplines (e.g.: McGrath & Willcutt, 2022; Näsström, 2009; Ormell, 1974). But with the widespread adoption of AI technologies, professionals have recently started to apply Bloom’s taxonomy as a framework to understand how AI can support pedagogical practices. Its strength lies in its ability to organize and explain in more nuanced ways how AI technologies can support the execution of different pedagogical practices—something that might appear ambiguous and challenging for educators to put into practice and make sense of. Recent theorizing has suggested that the taxonomy can emphasize, on the one hand, the capabilities of AI technologies, while on the other hand, delineate the distinct human skills that are crucial in educational contexts (Elim, 2024; Hmoud & Shaqour, 2024). The argument this conceptual paper will further develop, however, is the need for understanding the taxonomy in light of an ongoing asymmetrical and relational relationship where technology and practice mutually support each other as part of the educational context. This means, among other things, that it becomes imperative to theorize how AI capabilities and human skills complement each other. This will be exemplified through different educational practices connected to Bloom’s taxonomy. In this way, the paper invites to a broader discussion on the relational potential between AI and humans and its impact on what might constitute AI literacies.

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(08A) Elevperspektiv på samtaleroboter som ChatGPT i skriving på skolen

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Da ChatGPT ble gjort tilgjengelig i november 2022, ble skriveopplæringen satt under press. Mens det å ha en skriftkyndighet på et relativt høyt nivå er ansett som essensielt for å fungere godt i vårt skriftbaserte samfunn, kan tilgang til teknologi som kan skrive for oss/generere tekst gjøre at det oppleves som lite meningsfullt å tilegne seg slik kompetanse. Lanseringen av ChatGPT førte også til en frykt om at elever og studenter vil bruke teknologien til å jukse eller ta snarveier i læringsarbeidet. Selv om forskningsfeltet på generativ KI i utdanningssektoren er i vekst, foreligger det når dette abstractet skrives, lite empirisk forskning som undersøker hvordan elevene ser på denne teknologien.

Formålet med denne presentasjonen er å belyse hvordan elever i videregående skole ser på bruk av samtaleroboter som ChatGPT i skriving i skolen. Gjennom en spørreundersøkelse har vi kartlagt elevers kunnskaper om, erfaringer med bruk, syn på – og holdninger til bruk av samtaleroboter som ChatGPT i arbeid med skriving i skolen. Spørreundersøkelsen er gjennomført to ganger, med et års mellomrom, første gang i perioden februar/mars i 2023 og deretter i samme periode i 2024. Dette gir oss grunnlag for å, i tillegg til å si noe om elevperspektiver på samtaleroboter i skriving, si noe om eventuell utvikling fra 2023, da teknologien hadde vært tilgjengelig ca. 4 måneder, og til 2024. Deltakerne er 1399 elever i videregående skole, både studieforberedende utdanningsprogram og yrkesfaglige studieprogram (n= 414 i 2023, og n= 985 i 2024).

Analysearbeidet er i sluttfasen når dette abstractet skrives. I tillegg til deskriptive analyser, er det gjennomført faktoranalyse og regresjonsanalyse. Resultater vil være klare til å presenteres på konferansen. Som forventet, har flere elever fått erfaring med teknologien i 2024 enn det som var tilfellet i 2023, og elevenes kunnskap om teknologien har økt. Andelen som svarer at de er veldig interessert i teknologien er nokså lik, ca. 23 %. Elevene ser at teknologien kan åpne for snarveier, men flere anser det som juks eller noe de ikke ønsker å gjøre i 2024 enn i 2023. Gjennom de pågående regresjonsanalysene vil vi kunne svare på hvilke variabler som kan forklare elevenes oppfatninger av samtaleroboter i arbeidet med skriving.

Studien har relevans for utdanningssektoren ved at den kan bidra med empirisk kunnskap som kan nyansere de mer spekulative forestillingene av hvordan elever ser på bruk av ChatGPT. Den gir et tidsbilde av hvordan elever ser på bruk av samtaleroboter i skriving kort tid etter teknologien ble lansert og et år senere. Dette sier også noe om hvordan ny teknologi tas i bruk i skolen – fra et elevperspektiv. Studien er også et bidrag inn i en større diskusjon om hva skriveopplæring skal være framover.

(08B) Elevers bruk av ChatGPT i videregående opplæring

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Hva tenker elever i videregående opplæring om bruk av generativ KI (GKI) i utdanning, og hvordan brukes språkmodellen ChatGPT i skolearbeid? Dette undersøkte vi i vår masteroppgave om muligheter og utfordringer med inntoget av GKI i skolen. Studien inkluderte en spørreundersøkelse sendt ut til 11 videregående skoler, samt intervjuer blant lærere. I et bidrag i «Udforsk AI 2024» ønsker vi å fokusere på funn fra elevundersøkelsen, og supplere med relevante funn fra intervjuene, for å skape et helhetlig bilde.

Av de 516 elevene som svarte, har 71% brukt ChatGPT til skolearbeid. Vi finner en tydelig forskjell i bruk av ChatGPT mellom elever som studerer studiespesialisering (74%) og yrkesfag (57%). Språkmodellen brukes mest til å "forklare pensum" og "skrive tekst". Mange (32%) bruker KI-chatboten for å "bli fortere ferdig med skolearbeid", en større andel (35%) ønsker å "lære mer". Flertallet (65%) er enig eller sterkt enig i at gode faglige forkunnskaper er nødvendig for å bruke ChatGPT. Fåtallet (14%) opplever at skolen er positiv til bruk av ChatGPT. Lærerne forteller om ulik evne til kritisk bruk, og varierende læringsutbytte blant sterke- og svake elever.

Studiens funn kan ses i lys av faglitteratur om ny KI-teknologi i utdanning. KI-chatbots kritiseres for å kunne gi usanne opplysninger, manglende kildehenvisning (Stumke, 2023, s. 160; Opara et al., 2023, s. 33) og inneha evnen til å fremme stereotypier (Dwivedi, 2023, s. 11; Sullivan, Kelly & McLaughlan, 2023 s. 6). Utfordringer vedrørende vurdering og læring trekkes spesielt frem i mediedebatten (Solevåg, 2023; Brøyn, 2023; Molnes, 2024). Derimot viser forskningsstudier og faglitteratur at god og kritisk bruk av KI-verktøy kan bidra til veiledning og ideer i skoleoppgaver (Møgelvang, Ludvigsen, Bjelland & Schei, 2023, s. 23 & 39; Boulay, 2016, s. 76; Darvishi, Khosravi, Sadiq, Gasevic og Siemens, 2023, s. 1-2; Strumke, 2023, s. 160; Lirhus, 2024, s. 53; Elstad & Eriksen, 2024, s. 13).

Faglitteratur og skoleansatte understreker at det trengs mer forskning på feltet, og kunnskap om hva som skjer i klasserommene (Dillenbourg, 2016, s. 544; Holmes, Persson, Chounta, Wasson & Dimitrova, 2022, s. 11 & 75; Børte, Lillejord, Chan, Wasson & Greiff, 2022, s. 12-16; Unesco, 2023, s. 18; Dwivedi, 2023, s. 30; Rudolph, Tan & Tan, 2023, s. 346; Sullivan et al., s. 1). Funnene i vår studie bidrar med nye perspektiver i debatten om hvorvidt, og hvordan GKI bør innlemmes i skolen. Den omfattende bruken av ChatGPT åpner for diskusjon om KI-språkmodeller sin påvirkning for læring, og evne til å tenke kritisk. Hvis elever har ulike forutsetninger til å anvende nye KI-verktøy, kan bruk av ChatGPT lede til større digitale skiller. (Aissaoui, 2022; Strumke, 2023, s. 162; Lirhus, 2024, s. 53; Kulberg, 2024). I konferansen vil vi utdype egne funn og se nærmere på diskusjonene ovenfor.

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(08C) Prepare Teaching with Generative Artificial Intelligence - what teachers at the upper secondary level do and need to know

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Teachers face new opportunities, challenges, and demands in an educational landscape where Generative Artificial Intelligence (GAI) is increasingly prevalent. Teachers are responsible for managing GAI tools thoughtfully to ensure an effective and ethical use of GAI in a school context. To maximize the benefits of using AI in teaching practice, it is critical to continuously consider, evaluate, and adapt the implementation of AI based on students' and teachers' needs and expectations.

This study aims to investigate how Swedish teachers at the secondary school level understand and prepare teaching using GAI. It takes an exploratory, inductive approach based on two workshops where 25 colleagues discussed different aspects of using GAI in their teaching practice. The discussions are transcribed and analysed using thematic analysis.

The findings show that the teachers use GAI in several ways, such as producing tasks and questions and predicting misconceptions, when preparing their teaching. Furthermore, they discuss what knowledge and skills they likely need to have or develop to use GAI productively when preparing for teaching. The teachers talk about the importance of prompting effectively to collaborate with GAI, having a critical approach, and valuing reasonableness to responsibly shape teaching with GAI, which they think contributes to increased learning. They believe knowledge of GAI technology, teaching subjects, and English is probably required to succeed. The analysis also reveals various tensions, for example, between quality and efficiency, opportunities and injustices, and within the concepts of creativity, interactions, and future education.

The study's implications are primarily pedagogical, as it gives insight into teachers' thoughts about changing teaching practice. It is also ethical, as the teachers highlight several perspectives on the importance of a critical approach and the teacher's role and responsibility regarding GAI.

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(09A) Enhancing Educational Experiences: The Impact of AI Chatbots on Student Learning in Online Courses

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The rapid integration of Artificial Intelligence (AI) into educational environments has created unprecedented opportunities for teaching and learning (Baron, 2023; Gentile et al., 2023; Holmes & Tuomi, 2022). AI technologies are revolutionising traditional educational practices by providing personalised learning experiences, automating administrative tasks, and offering innovative tools for both students and educators.

Drawing on cultural-historical theory (Galperin et al., 2023; Vygotsky, 1986), we examined students' learning experiences with pre-designed AI chatbots in online courses aimed at enhancing teachers' digital competence. Our research focused on understanding the diverse interactions between students and AI, and how these interactions influenced students' learning in online environments.

A mixed-methods approach was employed to analyse the data (Clark & Creswell, 2011), combining quantitative analysis of AI chatbot usage patterns with qualitative analysis of interviews to gain deeper insights into students' learning experiences.

Findings suggest that students increasingly relied on AI chatbots for immediate assistance with course-related queries, content comprehension, and administrative support. The data indicates that AI chatbots served not only as informational resources but also as collaborative partners in developing students' understanding of key concepts. While some students expressed concerns about the potential impact of using chatbots on their academic integrity, others reported growing trust in these specifically developed tools. Students particularly valued the ability to communicate with chatbots in their native languages, which facilitated better communication and a deeper understanding of the course material. This multilingual support opened new avenues for enhancing students' learning processes and overall educational experience.

These findings have significant implications for teachers and online course designers, emphasising the need to develop course-specific chatbots trained on the course materials rather than suggesting students use general AI tools like OpenAI. Tailored chatbots can more effectively enhance learning and improve students' educational experiences.

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(09B) Professional development of teacher educators' digital competence by creating and implementing online courses by use of Generative AI technologies

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Since the widespread adoption of Generative AI in 2022, the technology has posed new challenges, offered new possibilities, and sparked the need for digital competence development among teacher educators. Little is known about how this subject matter is approached in current research on professional digital competence among teachers, aside from certain recent studies (Czerkawski, 2024; Hai-Jew, 2024). To contribute to this growing research stream, this study focuses on how a group of teacher educators used AI technologies to create and implement online courses as a means of developing their own professional digital competence. In order to establish a research direction, however, the following research question was formulated: How do teacher educators use AI in developing and implementing a new online course and what are their reflections on their use of AI? Methodically, the study establishes an autoethnographic approach (Ellis et al. 2011) and builds on the personal narratives of three teacher educators on how they developed two online courses using AI technology in 2023. The data consist of their personal memories, documentation of work processes, and personal reflections. It includes cultural artefacts such as screenshots that document the work processes and examples of the teacher educators' reflections which, among other things, were used for content creation and assessment in online teaching. The data was analyzed thematically to identify themes and patterns that show how the teacher educators developed their professional digital competence. The expected findings are on how the making and implementing of the online courses lead to the development of more specific educational strategies in how online pedagogy and assessment can be practiced while at the same time advancing a critical stand on the use of AI in online education, meaning further progression of their transformative digital agency.

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(09C) Inspiring or illegitimate? The learning potential of chatbot voices in Graduate Counseling Education

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This paper presents findings from an exploratory study on how graduate students in a counseling course experience and negotiate interactions with chatbots (GAI) in various roles within the course framework. The ability to reflect and act on chatbot interactions has become a crucial counselor competence because future clients may interact with chatbots before seeking counseling or use it as a supplement.
The study design allowed students to:

1. Explore chatbots' potential for role-playing as both counselors and counselees and reflect on these interactions (Maurya et al., 2023; Maurya, 2024)
2. Engage with chatbots in a peer role, both on dialogue on course content and feedback on written drafts (Saini, 2024)

Data was collected in a Fall 2023 counseling elective course at Aarhus University, Denmark, involving 18 students. The dataset includes:

1. Pre- and post-course online surveys on knowledge and emotional attitudes towards GAI in counseling contexts
2. Eight student-recorded audio reflections in study groups, captured three times during the course
3. Thirteen individual written proposals for supervision

Data analysis was informed by an inductive thematic and analytical approach (Braun & Clarke, 2012) inspired by a sociocultural perspective including Bakhtin's dialogical understanding of meaning-making and learning. Therefore, we consider learning to be a social process contingent with students' participation and interaction (Dysthe, 2006) in which the tension between their different perspectives – i.e. voices – becomes a driver for learning (Bakhtin, 1981; Nordentoft, 2023).

The findings indicate that chatbot interactions have potential for developing both general academic competencies and specific dialogic counseling skills. However, students' ambivalent emotional responses to GAI influence the realization of this potential and calls for 1) further discussion about the creation of educational designs with chatbots in higher education and 2) designs which enable students to elevate and negotiate their individual chatbot experiences into a collective and dialogic reflection space.

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(10A) Generativ AI som dialogpartner i læremidler – en undersøgelse af potentialer i læremiddelintegrerede Chatbots

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I denne artikel undersøger vi potentialerne i at integrere generativ AI som dialogpartner i læremidler gennem en empirisk undersøgelse af brugen af en GPT-baseret chatbot. Med afsæt i præsentationen af et aktivitetscenteret metateoretiske rammeværk, analyserer vi hvordan AI-teknologier kan indgå i læringssammenhænge og understøtte elevers netværkslæring.

Vi anvender en kvalitativ tematisk analyse til at undersøge tegn på læring i seks måneders autentisk kommunikation mellem elever på en ungdomsuddannelse og en GPT-baseret, fagtilpasset chatbot, udviklet af det danske undervisningsforlag PRAXIS. Analysen er struktureret omkring diskuterende, kumulative og undersøgende dialoger mellem elever og chatbotten, hvilket gør det muligt at vurdere kommunikationens kompleksitet, relevans og iterative tilpasning. Desuden undersøger vi, i hvilket omfang der etableres partnerskaber mellem eleverne og deres AI-partner, og graden af udlicitering af læringsopgaver til chatbotten.

Resultaterne fremhæver både læringsfremmende og læringshæmmende faktorer i elevernes brug af den fagligt afgrænsede chatbot, der er integreret direkte i læremidlet. Vi finder, at mens chatbotten kan facilitere dybere forståelse gennem undersøgende og diskuterende dialoger, er hovedparten af kommunikationen bliver overfladisk og repetitiv. Dette rejser spørgsmål om, hvordan chatbots bedst designes for at støtte meningsfulde læringsprocesser.

Afslutningsvis diskuterer vi, hvordan design af chatbots kan forbedres for at fremme elevernes interaktion med AI-integrerede læremidler. Vi præsenterer her et bud på et tilpasset begrebsmæssigt rammeværk, der kan forbedre vores forståelse af, hvordan mennesker lærer med AI, og hvordan disse teknologier kan integreres på en måde, der understøtter og beriger læring i ungdomsuddannelserne.

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(10B) A qualitative exploration of a customized chat bot's justifications for coding educational dialogues

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When advanced language models based on generative AI-technology are used to code classroom dialogues, these technologies can also be prompted to provide explicit justifications for decisions to code. This opens compelling possibilities for researchers as they can now engage in critical exploration about the technology's "judgment" behind specific coding decisions. Such exploration can reveal crucial insights, not only about the limitations of state-of-the-art language models used for this particular purpose, but also on how coding definitions and rules in established coding schemes may be further specified and improved. In this study we design a simple chatbot, based on Open AI's latest Chat GPT-4o architecture, that can code educational dialogues at the level of the turn using coding definitions and rules from two established coding schemes in the dialogic literature. We then feed the designed chatbot with anonymized and prepared transcripts of dialogues based on recordings from authentic classroom lessons at the secondary level in Norway and ask the chatbot to code the dialogues in accordance with the coding schemes while also providing justifications for all coding decisions. Finally, we discuss a selection of justifications produced by the chatbot that illustrate both limitations of state-of-the-art language models for this particular purpose, but also how the models may have identified potential issues in the coding definitions and rules.

(10C) Didaktisk bruk av chatbotar: roller og hierarki i elevars chatbotdialogar

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Chatbotar med generativ kunstig intelligens (GKI) er ein teknologi som truleg vil gi omfattande konsekvensar for skole og utdanning, sjølv om kunnskapsgrunnlaget på dette området enno er ungt (Labadze et al., 2023). Frå pedagogars tidlege erfaringar synast det å vere sentralt at chatbotar i skolearbeid blir tilpassa mål og formål med undervisninga (Elstad, 2023; Furze, 2024), og at samtalen mellom elevar og chatbotar får ein didaktisk kvalitet (Sørhaug, 2024).

Tidlegare forsking frå utdanningsfeltet har vist at chatbotar kan ta ulike roller vis-a-vis brukaren, blant anna som overordna læremeister (*teaching agent*), som sideordna partnar (*peer agent*) eller som underordna assistent (*teachable agent*) (Kuhail et al., 2023). Med GKI-chatbotar basert på svære språkmodeller (LLM's) er det i stor grad systemleieteksten (system prompt) og den løpande dialogen med brukaren som styrer chatbotens val av rolle. Dette har didaktiske implikasjonar. Dersom målet er å lære seg ei ferdigheit vil det antakeleg vere betre for eleven å be chatboten om hjelp, enn å be chatboten om å løyse oppgåva for seg.

Eg vil presentere resultat frå ein pågåande studie av chatbotroller i skolearbeid, der eg har samla inn, kartlagt og analysert 109 skoleelevars chatbotdialogar frå 20 ulike klassar (barneskole, ungdomsskole og vidaregåande opplæring). Microsoft Co-Pilot er brukt som verktøy for ein kvalitativ analyse av rollehierarkiet mellom elev og chatbot i dialogane. Studien undersøker om chatboten tar ei underordna, sideordna eller overordna rolle vis-a-vis eleven, kva type leietekstar som trigger ulike roller, og om det er korrelasjonar mellom elevens alder, skrivelengde og chatbotens val av rolle. Formålet med studien er å få meir kunnskap om korleis instruksdesign (prompt engineering) formar chatbotars åtferd og didaktiske potensiale i skolen.

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(11A) AI Integration in Academic Supervision - Practices, Ethics, and Empowerment

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The rapid integration of Artificial Intelligence (AI) into educational settings actualise a critical examination of AI`s implications regarding academic supervision. In this exploratory review we aim to establish a foundational understanding of the current research discourse on academic supervision, especially at master's and PhD level. By synthesizing peer reviewed research on AI in academic supervision we will answer the following research question: *how is Artificial intelligence (AI) in academic supervision covered in the current research literature, especially regarding practices, relations, learning, empowerment and ethics?* Numerous comprehensive studies address diverse themes that are relevant for examining AI in academic supervision (e.g. Dai et al., 2023; Baron, 2023; Harding and Boyd, 2024). However, when it comes to our specific areas of interest, the notable scarcity of research regarding this topic, underscores the need of further studies.

The review utilises the PRISMA-ScR framework (Tricco et al., 2018) to systematically examine the literature, including searching, screening, coding and analysing the included papers. The preliminary findings indicates that the use of AI in academic supervision is an underresearched theme. Significant gaps and overlooked research questions within the domain of AI in academic supervision are also identified. The overarching goal is to contribute to the scholarly dialogue by providing insights that has the potential to guide future empirical studies and inform policymaking. This inquiry is particularly timely as educational institutions increasingly adopt AI technologies, necessitating a deeper understanding of their broader impacts on academic supervision.

The preliminary findings will be presented at the conference.

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(11B) Visuelle virkelighetsversjoner. KI-genererte bilder som inngang til kritisk literacy i skolen

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Kritisk tenkning og kritisk tilnærming til tekster og kilder står sentralt i gjeldende læreplan (LK2020), både i overordnet del og i fagplanene, deriblant norskfagets kjerneområde «kritisk tilnærming til tekst». Både nasjonalt og internasjonalt ser man derfor at *kritisk literacy* (se f.eks. Vasquez et al. 2019, Luke 2012, Janks 2010) får stadig mer forskningsmessig oppmerksomhet. I et samfunn der digitale medieteknologier setter sterke premisser for konsumpsjon, distribusjon og produksjon av tekster, trenger man ikke bare å ruste barn og unge til å møte tekster med kritisk bevissthet, men også selve medieteknologiene som tekstene på ulike måter involverer (Nichols et al. 2021). Videre har erfaringer fra det nylig avsluttede forskningsprosjekt CritLit (NFR, udatert) om kritisk literacy i norskfaget på ungdomstrinnet (Veum & Kvåle, 2024) vist at kritisk arbeid med visuelle *bilder* har et stort potensial for oppøving av kritisk bevissthet hos elever og lærere (Kvåle 2024b), også knyttet til digitale bilder og bildeteknologier (Kvåle 2024a, Kvåle 2023). De siste årene har utviklingen innen generativ KI gjort produksjon av bilder enkelt tilgjengelig, noe som forsterker behovet for oppmerksomhet på kritisk literacy-arbeid med visuelle bilder i digitale kontekster.

Dette paperet vil derfor rette oppmerksomheten mot hvordan bilder produsert ved hjelp av generativ KI kan inngå i skolens kritisk literacy-undervisning. Paperet bygger empirisk på en kritisk undersøkelse av hva slags typer bilder som verktøyet Dall-E fra OpenAI genererer for temaet «tenåringer» (Westberg og Kvåle, i review), i kombinasjon med erfaringer fra det nevnte CritLit-prosjektet. Den teoretiske basisen utgjøres av kritisk literacy-perspektiver (jf. over), multimodal kritisk diskursanalyse (Fairclough 2003, Machin 2013) og semiotisk teknologi-studier (Djonov & van Leeuwen 2017, Poulsen, Kvåle & van Leeuwen 2018).

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(11C) Gender, Diversity, Equity, and Inclusion in Higher Education in the Age of Generative AI?

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The widespread availability of a variety of generative language models has far-reaching implications for societies and politics including in the field of education and learning (e.g. Kasneci et al. 2023; Labadze et al. 2023). Conveying the ability to confidently, reflectively, and productively use these technologies creates new requirements for education at all levels.

In this theoretical paper, we (1) establish the concept of critical AI literacy as an extension of AI literacy (e.g. Long&Magerko 2020), we (2) evaluate teaching interventions for pre- and in-service teachers based on this concept and we (3) devise strategies on how to best convey AI literacy with regard to form and content.

The concept of *critical* AI literacy results from a triangulation of material conditions and technological affordances of generative technologies with critical feminist theories. Specifically, this examination includes issues of relations of production, business models, data gathering techniques, and resource requirements (e.g Crawford, 2021). Our intersectional analysis focuses on cultural biases in model outputs that result from these material contexts, such as imbalanced input data or the technical and economic infrastructure required by these models (e.g. Bender et al. 2021; Johnson et al. 2022; Navigli et al. 2023).

Based on these conceptual advances in terms of critical AI literacy we then address issues of teaching and learning *with* and *about* generative technologies. Drawing upon data from interventions in teacher education classes and an in-service teacher course gathered through unsystematic observation of teaching sessions and analyses of evaluation forms, we devise strategies on how to effectively convey critical AI literacy to pre- and in-service teachers along three axes – 1) knowledge about affordances and wider economic and societal contexts of these technologies, 2) critical reflections about these technologies, and 3) critical implementation in students' own educational practice.

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(12A) "Curious and Concerned" – A mixed-methods study of teacher educators' AI literacy, usage experience, and perceptions

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With the release of ChatGPT in November 2023, education institutions and teachers have been discussing how to incorporate GenAI. Teacher educators, who shape curricula, model best practices, and guide pre-service teachers, are key agents in this process at teacher education institutions (Moorhouse & Kohnke, 2024). Their approach to GenAI can significantly influence the attitudes and beliefs of future teachers, potentially impacting classroom practices and school students (Bai & Ertmer, 2008; Korthagen, 2016).

Therefore, this study aimed to investigate the following questions: (a) What are teacher educators' perceptions of AI's potential in teacher education? (b) How do AI literacy and experience with AI in teaching affect these perceptions? (c) Which AI literacy components do teacher educators consider essential for pre-service teachers?

Using a mixed-methods approach, quantitative and qualitative data were collected from 90 teacher educators across Danish teacher education institutions through surveys. The study assessed AI literacy (Ng et al., 2024), usage, and perceptions, analyzing the data through traditional thematic analysis (Braun & Clarke, 2006), GenAI-assisted thematic analysis (Morgan, 2023), and Natural Language Processing (NLP) sentiment analysis (Falcon & Leon, 2023).

Qualitative analyses revealed that teacher educators fear AI will harm pre-service teachers' learning, however, believe positive potential lies in AI forcing educators to rethink didactics. These findings are supported by the mediation analysis, which showed that higher AI literacy mediated by higher use of AI in teaching leads to more positive perceptions of the potential of AI for teacher education. However, teacher educators report a need for developing both their own and pre-service teachers' AI literacy, especially concerning critical thinking towards AI.

This study highlights the importance of professional development for teacher educators and the need to rethink educational practices in times of GenAI. It also demonstrates the potential of GenAI and NLP in data analysis in educational research.

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(12B) “I Have Found Myself Compelled to…”: Danish High School Teachers' Perceptions and Strategies in the Rise of Generative AI

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This large-scale study examines Danish high school teachers' knowledge, perceptions, and strategies regarding generative AI (GAI) in their teaching.

Data were collected through online surveys before school-based courses on ChatGPT and writing skills, offered by the Association of Upper Secondary School Teachers (GL). Surveys were distributed by the course teacher in two waves: Fall 2023 (27 schools, 1,368 respondents) and Spring 2024 (24 schools, 1081 respondents). The dataset combines quantitative and qualitative data from closed and open-ended questions. Qualitative data were thematically coded following grounded theory methods (Charmaz, 2006), guiding a discourse analysis (Laclau & Mouffe, 2001). By comparing data from both survey instances, this research maps the current landscape and tracks the development of teachers' attitudes and practices over time.

Findings reveal significant variation in teachers' knowledge and perceptions of GAI. While some explore its didactical potential, a larger group views it primarily as a tool for academic dishonesty (see also Elstad et al., 2024). Interestingly, while some teachers have adopted new pedagogical strategies (see also Bower et al., 2024)—such as increased scaffolding and more active engagement in student processes—they often seem to frame these changes as necessary evils imposed by AI, rather than recognizing their inherent educational value.

The study also highlights a tension between teachers' professional identities and their experiences with AI, with many reporting strained relationships with students and decreased job satisfaction. However, the data also suggests potential for positive change, particularly if teachers gain a deeper understanding of the technology and are able to align GAI use with core ideological values (Knudsen et al., 2024) such as student equality, critical thinking, and the importance of dialogue and trust in learning environments.

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(12C) Exploring and explaining AI literacy by involving teachers in co-design activities

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Artificial intelligence (AI) is a rapidly emerging technology changing our approaches to education, teaching, learning, and our understanding of an AI-integrated world. With increasing demand on teachers to develop knowledge about AI and prepare for incorporating AI into their pedagogical practice, there is an urgency for *AI literacy* development.

AI literacy is a swiftly evolving, multidimensional concept that intertwines various competencies for school teachers, including comprehending, embedding, and critically evaluating AI in educational practice. Visualization can serve as a powerful means to communicate elements of AI literacy, making its complexity more accessible through interactive visual representations. Therefore, visualizing AI-relevant information in an exploratory way that simultaneously affords explanation could enhance engagement with AI concepts and competencies. Since AI is new in teaching, collaborative processes that elevate teachers' voices are essential for bridging research and practice in exploring AI literacy.

Our research aims to create an interactive resource that allows teachers to explore and explain AI literacy through visualizations. We involved seven secondary school teachers specialising in different subjects in three co-design workshops over eight months to design a prototype relevant to teaching practice. The first workshop explored teachers' experiences and opinions about AI. The second workshop aimed to co-create possible teaching futures by engaging in design fiction games that stimulated speculation through prompting various scenarios. The final workshop aimed to collect teachers' feedback on the designed prototype, followed by potential iterations. Analysis of workshop dialogue and material revealed teachers' strong positions against AI-assisted assessment, while highlighting their hopes and concerns about various aspects of AI in education such as autonomy, agency and control. Our findings contribute to understanding teachers' competencies regarding AI in educational practice, which could potentially influence future development and integration of AI educational technology.

(13A) Generative AI in higher education: An ethnographic inquiry into the emergence of new assessment practices in Danish universities

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When ChatGPT was made openly accessible to all, the educational sector was pushed to act promptly on the risk of students cheating on exams as well as on the adaption of learning environments and societal demands for future expertise and professions. While the ability of chatbots such as ChatGPT and Copilot to mimic human-like language and conventions of writing is impressive, it also produces new human-machine relationships, ranging from delegating writing to AI to interacting with an AI for purposes of learning. From an educational institution's perspective, this introduces a fundamental uncertainty regarding whether students are cheating or learning (Selwyn, 2024). In this paper, we report an ethnographic study of the efforts of a Danish university to foster new practices of assessment. With inspiration from Actor-Network Theory, we "followed the actor" (i.e. the generative AI tool) and its configuration of socio-technical arrangements as it travelled between students, teachers, administrators, legal advisers, and university managers (Bowker et al, 2019; Latour, 2005). The paper reveals what one of the interlocutors terms a "hot mess" of trying to align new regulatory regimes across departments and areas of expertise. Most importantly, the paper reveals that the new practices of assessment emerged in three modes, marked by the use of generative AI as 1) cheating, 2) learning, 3) assisting, each affording distinct and sometimes contradictory forms of accountability. In this regard, the paper sheds light on how new regulatory regimes govern and shape assessment practices in a present and/or near future where generative AI tools are part and parcel of learning in higher education (Luitse & Denkena, 2021; Ou et.al., 2024).

This research project is a part of the Algorithm, Data and Democracy (ADD) research project, which has as its objective to advance digital democracy, by researching what happens in the practices of controversial AI and algorithms.

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(13B) Hvordan interagerer masterstudenter med chatbots for å øke sin forståelse av fagartikler?

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Denne studien undersøker hvordan studenter interagerer med chatbots for å forbedre sin forståelse av fagartikler. Vi anvender aktør-nettverk-teori (ANT) for å forstå samspillet mellom studenter, chatbots og fagartikler.

ANT er en sosiologisk teori hvor mennesker og ikke-mennesker, som teknologi, organisasjoner og objekter, betraktes som likestilte aktører som interagerer i nettverk. ANT er spesielt nyttig for å beskrive sosio-tekniske nettverk og systemer, der teknologiske objekter kan ha en *inskripsjon* som legger til rette for bestemte bruksmønstre (Latour, 2005).

Studien springer ut av et arbeidskrav i et av våre masterprogram, hvor masterstudenter ble satt sammen i par og fikk i oppgave å bruke en eller flere chatbots til å nærlese en fagartikkel som studentene syntes var utfordrende. Erfaringer fra dette samarbeidet ble tilgjengeliggjort gjennom refleksjonsnotater, som sammen med faglæreres erfaringer med å diskutere dem med studentene i etterkant, utgjør det empiriske grunnlaget for studien. Gjennom analyse av nettverkene og de ulike aktørenes rolle synliggjøres studentenes interaksjon med chatbotene og hvordan botene tas i bruk for å skape økt forståelse. Dette gir oss innsikt i forskjellige måter å bruke chatboten, samt innblikk i hvilken type samarbeid de forskjellige inngangene legger til rette for.

Analysen (som pr. august '24 ikke er avsluttet) vil kunne vise hvordan studentene brukte chatbotene på ulike måter, som ledet til ulike erfaringer og tilgang til kunnskap. Chatbotene fungerte som *obligatory passage points* (OPP) i det sosiale nettverket (Jessen & Jessen, 2014) og påvirket samspillet mellom studentene og fagartiklene på ulike måter. Chatbotenes algoritmer kunne bli en kilde til både frustrasjon og fasinasjon, da treningsdataene ikke var umiddelbart tilgjengelige (Gutierrez, 2023; Sperling, Stendlien, Nissen & Heintz, 2022).

Resultater fra undersøkelsen vil kunne belyse hvordan samspillet påvirker studentenes læringsprosesser, og vil kunne brukes til å tilpasse undervisningsmetoder og styrke studenters samarbeidsteknikker ved bruk av chatbots i læringsprosesser.

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(13C) Assemblages of Assistance: Bringing children and generative artificial intelligence (GAI) into play

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This study sheds light on the role of GAI as assistant in children's creative and playful processes. It provides a situated account of what happens when GAI is taken up by 8-10-year-old children, their pedagogical professionals, and two researchers, in processes of creative world-building in two Danish afterschool clubs. Based on participatory action research (Jensen, 2019), children, pedagogical professionals and researchers engaged in experimenting communities (Thestrup, 2018). Six activity sessions were collaboratively developed, carried out, and evaluated during 2024. Approximately 60 children participated over two months in the voluntary activities and were invited to develop and create imaginative worlds and creatures by employing GAI alongside other available materials and tools, such as cardboard, glue and play doh. Ethical considerations regarding video observation were upheld, both regarding formal participant/parental consent and children's in situ assent (Docket & Perry, 2011). Socioculturally informed interaction analysis (Wallerstedt et al., 2022) was used to analyze excerpts of the 09:55:32 hours of video observation. Based on empirical findings, and by combining sociocultural (Stetsenko, 2015) and new-materialist (Ingold, 2010) perspectives, the analysis employs Kendric & Drew's (2016) conceptualizations of how assistance is negotiated in human interaction. By expanding this approach to also include interactions between human and more-than-human agents, it is shown how processes of asking for, offering, and providing help unfold as assemblages of assistance across diverse agents in the activities. As an aspect of this, the analysis shows how GAI is not merely providing assistance in the children's creative processes, but also rejecting requests for help and recruiting assistance from the children. This leads to reflections on the inter-agentic distribution of efforts and benefits when GAI is brought into play in children's creative processes in institutional settings, just as it raises further questions regarding human and more-than-human agents' alliances and dissonances within assemblages of assistance.

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