SoTL 2025
Taking Learning Seriously
Scholarship of Teaching and Learning

Poster Session 11.30 – 12.30	Room Q34
Ninni Carlsund	*Särskild Behörighet på en kurs gör skillnad*
Anita Kullen, Tobias Oechtering, Tomas Karlsson	*Student Essays in Times of Generative AI*

Session 1, 13:25-14:00	Room Q34
Thashmee Karunaratne, Elisabet Lövkvist	*Data-Informed Education (DInE) at KTH- From theory to practice*
Imane Bayane	*Enhancing Active Learning through Generative AI: A Case Study in Structural Dynamics Education*
Magnus Andersson	*Student assessment of a questionnaire used during external master admission*

Session 2, 14:10-14:45	Room Q34
Pontus Juth, Magdalena Svanberg	*AI-drivna forskningsassistenter: En undersökning*
Niclas Hjelm, Joakim Dalfors	*Kan gruppövningar varje vecka öka lärandet i matematik*
Viggo Kann	*Vad gör studenterna när dom inte är på lektionen?*

Session 3, 15:15-15:50	Room Q34
Lars Uppvall, Pontus Wadström	*Engaging with Engineering Education: Industry Partners' Motivations and Experiences in Problem- and Project-Based Learning Courses*
Sofia Strömqvist	*Design for all: Facilitating the involvement of cognitive diversity in students design projects*
Emma Riese, Olle Bälter, Tomas Ekholm, Ric Glassey, Viggo Kann	*Experiences, Impacts and Implications of a STINT Teaching Sabbatical*

Keynote, 16.00	Room Q1
Suzanne Brink	*Designing Courses and Programmes from Learner Experience Perspectives*

Särskild Behörighet på en kurs gör skillnad.

Ninni Carlsund

Numerisk Analys, Matematik, KTH

STRUKTURERAD SAMMANFATTNING

BAKGRUND OCH SYFTE

Jag undervisar i ett antal grundkurser och det har alltid varit några studenter som klagar över att kurserna är svåra, men på sistone har det känts som att det är allt fler som klagar och med allt högre röster.

När jag tog upp det på assistentmötet så sade en av assistenterna att den var förvånad. Han gick själv kursen förra året och tyckte att den var så intressant att han ville bli assistent på den och han hade blivit förvånad över den högljudda diskussion som uppkommit strax före kursslut i hans kursomgång. Han tyckte inte att kursen var svår utan tvärtom att den hade en bra progression, vilket också är vad kursnämnden har sagt. Så varför är då åsikterna så olika och varför känns det som om de som klagar blivit fler?

När jag nyligen skulle rapportera in en av de studenter som blev klar sent, på en restredovisning efter en hel del extra handledning, så noterade jag att den personen egentligen inte var behörig att gå kursen. Saknas förkunskaper så blir kursen förstås svårare att klara av. Jag har länge tyckt att det känns som om studenternas förkunskaper har blivit sämre, och om de faktiskt inte klarat de kurser som står som förkunskapskrav för att få gå min kurs så stämmer ju det.

Så hur ofta förekommer det att studenterna på min kurs inte uppfyller kraven för att få gå den (dvs ”Särskild Behörighet”) och hur går det för de studenter som antagits?

GENOMFÖRT / PLANERAT ARBETE

Jag har tagit fram statistik över några av mina grundkurser som har liknande struktur och rekommenderade förkunskaper. Två av kurserna går på hösten i årskurs två och de kurser som är förkunskapskrav, dvs listade som Särskild Behörighet, går på hösten i årskurs ett. Studenterna har då haft ett halvår på sig efter kursslut för att göra omtentor och komplettera eventuella rester på de kurser som är förkunskapskrav för att gå kursen.

Ett utdrag ur Ladok har gjorts över alla som påbörjat dessa kurser från och med januari 2021 till-och-med halva mars 2025. Denna statistik kan inte användas som ett exakt mått på genomströmning från olika kursomgångar utan siffrorna ska bara användas för jämförelse. Detta eftersom olika kursomgångar därmed fått olika lång tid på sig att komplettera och sista kursomgångarna ännu håller på med redovisningar, men kurserna jämförs på lika datautdrag. (En mer detaljerad studie planeras!)

KTH SoTL 2025, KTH Kungliga Tekniska högskolan, 20 maj 2025.

RESULTAT / LÄRDOMAR

Under den utvalda tiden har det varit 907 unika studenter på höstens kurser. Av dessa var 158, dvs 17% obehöriga. Av de obehöriga har 57% klarat kurserna medan bland de behöriga har 78% klarat dem. En ganska stor skillnad!

Med tanke på att när nästan hälften av de obehöriga inte klarar kursen och alltså måste gå om kursen så kommer andelen obehöriga i varje kursomgång vara ännu större än vad statistiken anger eftersom här räknas varje student bara en gång. Men det kan undersökas mer. Det är två olika kurser som läses av två olika civilingenjörsprogram.

Kurs A läses av program 1. Där har programmet berättat för mig som kursansvarig att de vet att de släpper upp några som inte uppfyller de formella kraven men de gör en egen bedömning om vad som får fattas. I denna kurs är andelen formellt obehöriga 12% men urvalet från program-ledningen verkar ha effekt: Av de obehöriga har 66% klarat kursen, klart bättre än genomsnittets 57%.

Kurs B läses av program 2. I detta program säger man att klassgemenskapen är viktigare än förkunskapskravet och släpper därför upp studenter till synes utan att ta hänsyn till den särskilda behörigheten. Andelen obehöriga i denna kurs är hela 35%, dvs mer än var tredje student uppfyller inte förkunskapskraven. Av de obehöriga har 48% klarat kursen, dvs knappt hälften! (jämför med den andra kursen, där de gör ett speciellt urval, där klarar sig två tredjedelar!) Av de behöriga har 77% klarat kursen, dvs färre än genomsnittet för samtliga studenter under höstterminen.

Kursomgången med högre andel obehöriga går sämre än kursomgången med lägre andel obehöriga, inte bara för de obehöriga utan även för de behöriga studenterna!

Ett argument jag fått höra av det program som ignorerar kraven på särskild behörighet är att det finns andra kursomgångar där kravet på Särskild Behörighet inte finns, alltså kan de bortse från kravet för det är viktigare att hålla ihop årskursen och kompisgänget. Statistiken visar emot!

Under vårterminen går en liknande kurs som är avsedd för ett program redan i årskurs ett. Kursen kan också läsas av andra program, då i årskurs två eller tre. Då vårterminskursen går precis kant-i-kant med de två kurser som är listade som särskild behörighet för hösttermins-kurserna så anges de två kurserna endast som "Rekommenderade Kurser" här. Jag använder beteckningen "behörig" och "obehörig" för samma kategorier som ovan fastän alla studenter på vårens kurs är formellt behöriga.

I denna vår-kurs med totalt 810 deltagare är andelen "obehöriga" i årskurs ett 30%. Av de "obehöriga" har 54% klarat kursen, medan av de "behöriga" så har 83% klarat kursen. Återigen så visar det vikten av att ha rätt förkunskaper när man går en kurs. Att komma ihåg här är att i gruppen "obehöriga" ingår här alla studenter som haft en liten rest de redovisat någon vecka in på vårterminen eller klarade tentan på omtentan och som skulle ha klassats som behöriga om kursen gått på höstterminen.

Noterbart är också att bland de studenter som i årskurs två eller tre väljer den som valfri kurs så är det endast 6% som är "obehöriga" men även för dessa studenter är genomströmningen låg, bara 50% klarar kursen.

BUDSKAP ATT TA MED HEM

- Särskild behörighet gör skillnad och hjälper studenter att gå kurser i rätt ordning.
- Ett program gör en student en stor björntjänst genom att utan förberedelse låta den gå en kurs den saknar förkunskaper till.
- Den allmänna nivån på den kurs som många studenter felaktigt tillåts gå sänks.

ACKNOWLEDGEMENTS

Ett stort tack till Monika Lundell på Teoretisk Datalogi, EECS/KTH, som hjälpt mig att ta fram data ur Ladok.

NYCKELORD

Särskild behörighet, förkunskaper, antagning till kurs, kursnivå, genomströmning.

REFERENSER

Ladok.

Student Essays in Times of Generative AI

Anita Kullen[1], Tobias Oechtering[2] and Tomas Karlsson[1]

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STRUCTURED ABSTRACT

BACKGROUND AND PURPOSE

The course EH1110 Global Impact of Electrical Engineering is an obligatory course that spans over the entire three-year bachelor program in electrical engineering at KTH. The course was set up in 2013 with the intention to provide the ~240 bachelor students a broad background in electrical engineering. First-year students are often not aware of the enormous importance of electrical engineering in today's increasingly digitalized and automatized societies. The core part of the course consists of six semi-popular talks per year, given by professors from KTH and other universities, as well as speakers from industry. This spring we were lucky to have M. Frodigh, head of Ericsson research (6G technology) and Nobel laureate A. L'Huillier (attosecond resolution lasers) as speakers.

To pass the course, the students need to write three essays per year about any key technical concept that has been mentioned at least once during the previous two lectures. The essays have a given structure: introduction, technical development, impact on society and environment, and own opinion about opportunities/challenges of this concept (see appendix). The essays are afterwards discussed in groups of 6-12 students, each led by a senior staff researcher. The students belong to the same group during the entire 3 years. The senior staff group leaders do not only grade and discuss the essays with their students, but also act as their mentors (see course-PM 2022).

After students' requests to learn more about scientific writing (see course evaluation 2014), a writing seminar was added in autumn 2015. During that seminar, the students corrected a draft of their first essay, before handing it in for grading. That improved the quality of the essays considerably. Some years later, a second writing seminar was added, focusing on written argumentation. The course goals were extended accordingly to include scientific writing. This worked well until November 2022.

With the arrival of chat-GPT in 2022, the entire concept of teaching students how to write essays and reports, collapsed. As soon as it became online available, students used chat-GPT to skip the painful task to formulate an own essay, and express one's own opinion in writing. We teachers were suddenly confronted with the impossible task to grade essays fairly that were (partly) written with help of an AI tool. The question arose what should be the aim of report writing in higher education from now on.

In this study, we evaluate two years of experimenting with report writing tasks in the new era of generative AI tools. The goal is to find a new form of teaching the students report writing such that it will be useful in their future work life /research career where generative AI tools will be a natural part of their work environment.

WORK DONE

The essay assignments in the course have been changed in two steps in autumn 2023 and again in 2024 to adapt to the new reality of generative AI tools (see appendix).

Changes year 2023/2024: The students need to write essay 1 with paper and pen under supervision, and essay 2 at home with help of Chat-GPT. All questions to chat-GPT need to be included in the essay. The third essay is replaced by a role-play to practice oral argumentation (details skipped here, as the role-play is not part of the present study). **Evaluation**: Student survey, course evaluation and teacher meeting about the new assignment rules after the course round was finished (see course evaluation 2024).

Changes year 2024/2025: Modified rules for essay writing with chat-GPT: all Chat-GPT questions and answers must be added as appendix 1. In appendix 2, the students need to reflect on how to use chat-GPT in such that the text is still the students' own work.

LESSONS LEARNED

In autumn 2023, the new format with one paper-and-pen and one chat-GPT essay was introduced. The students were highly critical about this setup (course evaluation 2024). Two third of the students did not like the paper-and-pen exercise at all. Many found it uncomfortable to write by hand. Several students accused the course leaders of mistrust (the course leaders had argued, students would use chat-GPT to cheat). Interestingly, one third of the students were ok with the paper-and-pen exercise, but found it useless to write an essay with help of chat-GPT, as the learning outcome is zero.

In autumn 2024, the setup was much better explained. a) To practice scientific writing without AI tools is necessary, as this helps training the thinking process. Hence, the task to write an essay with paper and pen. b) It is also important to practice generative AI, as this is the future. Thus, the task to write an essay with help of chat-GPT and the written reflection about how to use it in the best way. Most students took the exercise seriously, and presented good utilization examples. So far, student feedback was rather positive.

TAKE-HOME MESSAGE

In an overview course for electrical engineering students, the students needed to write several essays at home. With the arrival of generative AI tools, this type of assignment is not applicable anymore. After two years of experimenting, we found a new way to train written communication in a meaningful way: Students should a) write essays with paper and pen under supervision to practice expressing ideas in own words; b) students should also write essays with help of generative AI at home. However, this must include a reflection about how to use AI in such a way that the text is still the student's own work.

KEYWORDS

Student essays, scientific writing, generative AI tools, chat-GP

REFERENCES

Kullen A. and J. Gross, Course-PM 2022/23 for EH1110/EN1001 Global Impact of Electrical Engineering, EECS, KTH, Stockholm, 2022.

J. Gross and A. Kullen A. Course evaluation 2013/14 for EH1110/EN1001 Global Impact of Electrical Engineering, EECS, KTH, Stockholm, 2014.

J. Gross and A. Kullen A. Course evaluation 2023/24 for EH1110/EN1001 Global Impact of Electrical Engineering, EECS, KTH, Stockholm, 2024.

APPENDIX

ESSAY WRITING RULES IN COURSE-PM 2023/2024

Essay in period 2: **Write with paper and pen**
Write with paper and pen during 2 hours in classroom. No help devices are allowed.

Mandatory structure: *(2-5 handwritten pages, no references needed)*

- **Short introduction** (1-3 sentences)
- Describe the **technical development of the chosen technical concept.**
- Describe its **impact on society and environment** (possibilities/challenges).
- **Own opinion:** Give your opinion on two aspects: a) Will the chosen technical concept have any importance in the future (technically)? b) Will it be useful for society (and/or environment)? Motivate your opinion by using the classical argumentation structure: thesis/pro/contra/conclusion for each aspect.

Essay in period 3: **Use chat-GPT**
You can write your text in the usual way by not using chat-GPT or similar programs. You are, though, encouraged to try it out. In that case, mark all parts that are generated by chat-GPT in **red**, own formulated parts in **black**. Copy all questions you asked to chat-GPT to help creating this text at the bottom of your reflection. Mark these in **blue**.

Mandatory structure: *same as essay in period 2, 2 pages plus references*

ESSAY WRITING RULES IN COURSE-PM 2024/2025

Essay in period 2: same as paper-and-pen essay in 2023/2024

Essay in period 3: mandatory use of AI tool, same structure as above plus references.

NEW: Add two appendices at the end of your essay:

Appendix I: List all prompts to, and answers generated from, chat-GPT (or similar tool)

Appendix II: Reflect on how to use chat-GPT appropriately such that you get the best essay possible. Reflect also on how to use chat-GPT to improve the quality of your own thinking in your essay. Focus on what kind of interaction seems to generate the best value. Follow the EECS code of conduct: “it should always be clear what each student has done themselves and what they have not done themselves” (100-500 words).

Data-Informed Education (DInE) at KTH- From theory to practice

Thashmee Karunaratne, Elisabet Lövkvist

Institute of learning, Department of Digital learning

STRUCTURED ABSTRACT

BACKGROUND AND PURPOSE

Educational data generated through interactions with technology is a valuable asset for universities. When systematically curated and analysed, it provides evidence-based insights that enable educators to refine teaching strategies, personalise instruction, and enhance student learning experiences. Research highlights the role of data in fostering transparency and accountability in education (Macfadyen & Myers, 2023; Khalil et al., 2023). By analysing student performance, engagement, and progress, educators can implement early interventions, provide targeted support, and differentiate instruction to accommodate diverse learning needs (Law & Liang, 2020). Moreover, evidence of how students progress allows teachers to communicate effectively with stakeholders, including students, parents, administrators, and policymakers (Olney et al., 2021). Despite growing research supporting data-informed teaching, a gap remains between theoretical advancements and practical implementation. Addressing this grey zone requires greater integration of data-informed practices into everyday teaching, enhanced faculty training, and the development of ethical and effective frameworks for educational data use. Albeit, we argue, the point of departure for a data-informed culture for teaching and learning should begin even before planning data collection. Provided good evidence resides in quality data, our focus originates from the importance of datafication, which carefully curates student data (Tsai & Gasevic, 2017) as the first step of the research-driven practical implementation of data-informed education.

WORK DONE

At KTH, DInE research and development (R&D) was initiated as a point of departure from learning analytics (LA), which, in principle, systematically collects and processes learner data for optimised learning (Olney et al., 2021). The first (scoping) activity was to identify the requirements for a practically viable solution that will result in a high impact, according to scientific research. So, a systemic review was instrumented with a research question of what the current LA landscape in the context of Engineering Education is. The outcomes were a set of technical, legal, organisational and ethical requirements, leading the way forward for originating an action plan for DInE (KTH, 2024) (Figure 1). Furthermore, DInE was divided into data-informed teaching (DIT), a teacher-centred approach with a short-term implementation plan, and Data-Informed learning (DIL) – a student-centred approach with a long-term implementation plan.

The subsequent activity was to scope DIT. Three parallel activities were conducted in this regard: 1) Identifying the teachers' priority for DIT. 2) Testing a Dashboard prototype for DIT, and 2) Exploring the use of Canvas New Analytics as a starting point for DIT. The final detailed outcome of this activity is summarised in Figure 2 in Appendix 2.

WORK PLANNED

Building on the outcomes achieved so far, the next steps include implementing a series of workshops organised by the Digital Learning Support team to enhance teachers' data literacy and to promote the use of Canvas New Analytics towards data-informed learning design (KTH Intra, 2024). Additionally, a focus group study will be conducted to evaluate the impact of the New Analytics application. The findings from these activities will inform future expansions of DInE.

RESULTS TO DATE

This study practically establishes the definition of Data-informed education, articulating what and why DInE is and how it is to be implemented as part of KTH teaching and learning practices. Two major results are the DInE design requirements (cf. Figure 1) and the teacher's priorities for DIT. The requirements were grouped into technical, legal, organisational, and semantic perspectives, emphasising the fact that the implementation of DInE is a complex problem that needs to be segmented to separate multidisciplinary perspectives, yet the implementation should be conducted within a co-creation setting with a multi-stakeholder team. The current implementation team consists of researchers, pedagogy developers, research engineers, ethics and legal experts, and IT professionals.

We also created and piloted a teacher dashboard partially containing requirements identified for DIT. This dashboard was tested with the teachers at KTH, and results were reported in Nguyen et al., (2024).

The designs for DIT, triangulating the teacher's needs and good practices from literature (cf. Figure 2), are conducted with the help of Canvas's new analytics. Accordingly, we have structured the outcomes into four thematic areas that emerged from this analysis: class progress and engagement, individual learner progress and engagement**,** learner grade achievement, and engagement with selected course resources. A detailed description of the pedagogical questions and how the questions can be answered are presented in Figure 2 in the Appendix.

TAKE-HOME MESSAGE

Data-informed teaching methodologies can help teachers understand how students are referring to the course material, verify the constructive alignment, and validate the quality of their courses. KTH Digital Learning unit plans to help teachers use Canvas New Analytics and other advanced data analytics in the future through training sessions.

KEYWORDS

Data-Informed Education, Data Literacy, Teacher Training, Evidence based teaching and learning.

REFERENCES

Khalil, M., Prinsloo, P., & Slade, S. (2023). Fairness, Trust, Transparency, Equity, and Responsibility in Learning Analytics. *Journal of Learning Analytics*, *10*(1), Article 1. https://doi.org/10.18608/jla.2023.7983

KTH. (2024). *Data informed learning at KTH | KTH Intranet*. KTH. https://intra.kth.se/en/utbildning/systemstod/data-informed-education/overview-1.1362757

KTH Intra. (2024). *Canvas New Analytics | KTH Intranet*. KTH. https://intra.kth.se/en/utbildning/systemstod/data-informed-education/canvas-new-analytics-1.1363240

Law, N., & Liang, L. (2020). A Multilevel Framework and Method for Learning Analytics Integrated Learning Design. *Journal of Learning Analytics*, *7*(3), Article 3. https://doi.org/10.18608/jla.2020.73.8

Macfadyen, L. P., & Myers, A. (2023). The “IKEA Model” for pragmatic development of a custom learning analytics dashboard. *ASCILITE Publications*, 482–486. https://doi.org/10.14742/apubs.2023.465

Nguyen, N. B. C., Lithander, M., Östlund, C. M., Karunaratne, T., & Jobe, W. (2024). TEADASH: Implementing and Evaluating a Teacher-Facing Dashboard Using Design Science Research. *Informatics*, *11*(3), Article 3. https://doi.org/10.3390/informatics11030061

Olney, T., Walker, S., Wood, C., & Clarke, A. (2021). Are We Living In LA (P)LA Land? Reporting on the Practice of 30 STEM Tutors in their Use of a Learning Analytics Implementation at the Open University. *Journal of Learning Analytics*, *8*(3), Article 3. https://doi.org/10.18608/jla.2021.7261

Tsai, Y.-S., & Gasevic, D. (2017). Learning analytics in higher education—Challenges and policies: A review of eight learning analytics policies. *Proceedings of the Seventh International Learning Analytics & Knowledge Conference*, 233–242. https://doi.org/10.1145/3027385.3027400

APPENDIX A

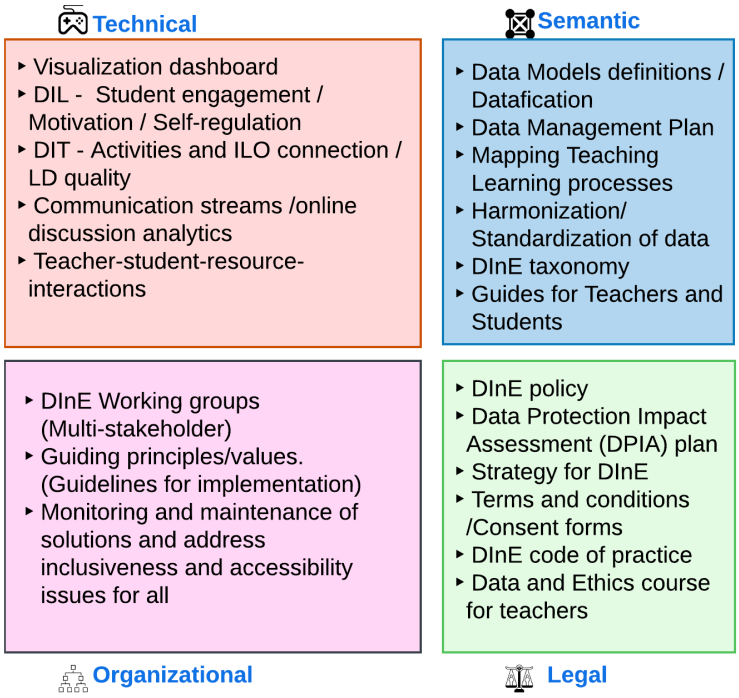

Figure 1: Requirements drawn from a Systematic scoping review of the literature.

APPENDIX B

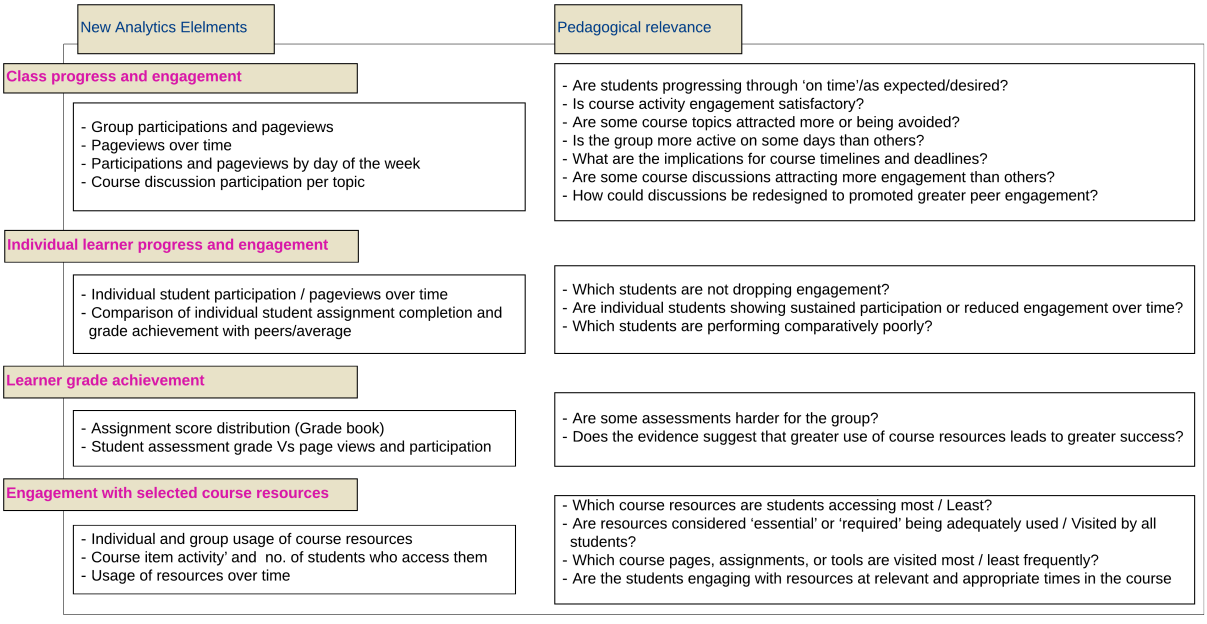

Figure 2: Teachers' interest in pedagogical questions vs. New Analytics data: drawn from the Interviews with teachers triangulated with Canvas data and related literature.

Enhancing Active Learning through Generative AI: A Case Study in Structural Dynamics Education

Imane Bayane

Structural Engineering and Bridges, KTH-Royal Institute of Technology, Stockholm, Sweden

STRUCTURED ABSTRACT

BACKGROUND AND PURPOSE

In the field of engineering education, traditional lecture-based teaching often limits student engagement and knowledge retention. These lectures are typically characterised by a teacher-centric approach, where the instructor served as the primary source of knowledge transmission. However, this approach often led to passive learning and limited student interaction, especially in a complex subject like Structural Dynamics, which requires both theoretical understanding and practical problem-solving skills.

To address these challenges, the course was redesigned to incorporate active learning strategies and leverage generative AI tools. The purpose of this transformation was to create a more engaging and effective learning environment, where students actively participate in their learning process. By integrating quizzes, problem-solving activities, and feedback loops facilitated by generative AI, the new approach aimed to enhance students' understanding of dynamic systems while reducing the time burden on instructors.

WORK DONE

A total of four lectures from the Structural Dynamics course, which is part of the curriculum for Civil Engineering students at KTH Royal Institute of Technology, were redesigned to incorporate active learning elements. The updated lecture format includes the following components as illustrated in Figure 1:

- A brief introduction on learning outcomes and historical context.
- Menti quizzes after each 45-minute lecture block to assess knowledge acquisition and address weak points.
- Group problem-solving activities to apply theoretical concepts.
- Small exercises for immediate feedback and reflection.
- An open quiz for feedback and continuous improvement.
- Generative AI, such as ChatGPT, was used to assist in designing quizzes, generating problem-solving activities, and collecting student feedback. This

integration allowed for more dynamic and engaging content while reducing the time burden on instructors.

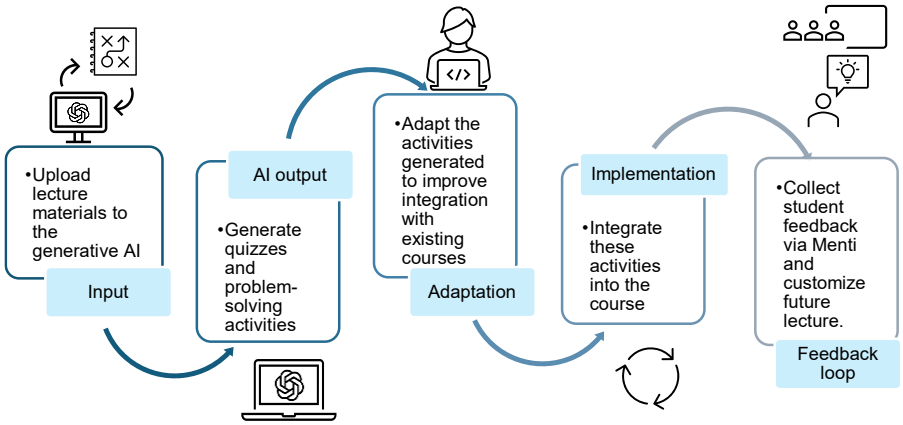

Figure 1.Generative AI Workflow for Enhancing Active Learning in Structural Dynamics Education

RESULTS AND LESSONS LEARNED

- Students reported higher engagement and improved understanding of complex concepts.
- Positive feedback highlighted the balance between teacher and student-centered learning.
- The use of generative AI streamlined the design of quizzes and activities, allowing for more frequent updates and adaptations.
- Students, especially those who experienced online learning during the COVID-19 pandemic, appreciated the interactive and participatory nature of the lectures.

TAKE-HOME MESSAGE

Integrating generative AI in lecture design can effectively support active learning and enhance student engagement. However, continuous effort from instructors is required to adapt and update teaching materials. The strategic use of AI tools can alleviate some of the time constraints faced by teachers who are also researchers and supervisors.

KEYWORDS

Active Learning, Generative AI, Structural Dynamics, Engineering Education, Student Engagement

REFERENCES

Biggs, J. (1999) 'What the Student Does: teaching for enhanced learning', Higher Education Research & Development, 18(1), pp. 57–75. Available at: https://doi.org/10.1080/0729436990180105.

Biggs, J., Tang, C. and Kennedy, G. (2022) Teaching for Quality Learning at University 5e. McGraw-Hill Education (UK).

Chalmers, D. and Hunt, L. (2013) University Teaching in Focus: A Learning-Centred Approach. Routledge.

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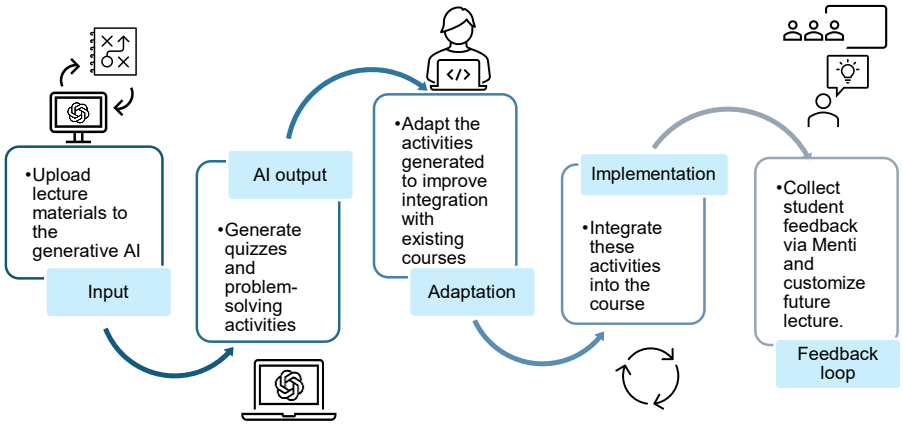

Figure 1.Generative AI Workflow for Enhancing Active Learning in Structural Dynamics Education

RESULTS AND LESSONS LEARNED

- Students reported higher engagement and improved understanding of complex concepts.
- Positive feedback highlighted the balance between teacher and student-centered learning.
- The use of generative AI streamlined the design of quizzes and activities, allowing for more frequent updates and adaptations.
- Students, especially those who experienced online learning during the COVID-19 pandemic, appreciated the interactive and participatory nature of the lectures.

TAKE-HOME MESSAGE

Integrating generative AI in lecture design can effectively support active learning and enhance student engagement. However, continuous effort from instructors is required to adapt and update teaching materials. The strategic use of AI tools can alleviate some of the time constraints faced by teachers who are also researchers and supervisors.

KEYWORDS

Active Learning, Generative AI, Structural Dynamics, Engineering Education, Student Engagement

REFERENCES

Biggs, J. (1999) 'What the Student Does: teaching for enhanced learning', Higher Education Research & Development, 18(1), pp. 57–75. Available at: https://doi.org/10.1080/0729436990180105.

Biggs, J., Tang, C. and Kennedy, G. (2022) Teaching for Quality Learning at University 5e. McGraw-Hill Education (UK).

Chalmers, D. and Hunt, L. (2013) University Teaching in Focus: A Learning-Centred Approach. Routledge.

Student assessment of a questionnaire used during external master admission

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STRUCTURED ABSTRACT

BACKGROUND AND PURPOSE

External students who apply to master's programmes at KTH are asked to fill in a digital questionnaire that summarizes their merits. The questionnaire consists of two parts:

i. A common part that gathers basic information used by all master's programmes
ii. A programme specific part with questions related to a single programme

This questionnaire is today used by 29 out of 60 master's programmes at KTH. The purpose of this work is to study and reflect on how different ways to express questions in the programme specific part correlate with student views on the questionnaire.

WORK DONE

All applicants were encouraged to voluntarily give feedback on how they rated the clarity of the questionnaire they just had filled in. Answers were gathered on a 6-level Likert scale with the alternatives: (Very bad, Bad, Reasonable, Good, Very good, Excellent). In total, 6381 answers were collected which corresponds to a response rate of 86.5%.

RESULTS

A Wilcoxon rank-sum test (Wilcoxon, 1945; Mann & Whitney, 1947) was performed to statistically determine the probability for equal distribution of answers between two different programmes. An unequal distribution should primarily be related to differences in the way questions were asked in the programme specific part of the questionnaire. Comparisons between some programmes are shown in Table 1, where the p values given in each cell is the probability for an equal distribution of answers between programmes P1-P7 and programmes P2-P8 respectively. To counteract possible country dependent differences among respondents, only program with more than 200 respondents were considered and the level for rejecting the null hypothesis of equal distributions was set to $p<0{,}025$. Unequal distributions are marked by red colour in the table and in all those cases, clarity is better for column programmes in (P2-P8).

Table 1. Resulting *p*-values from pair-wise hypothesis tests between different master's programmes at KTH. Red colour mark statistically significant differences in answers.

	P2	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**
P1	*0,55*	*0,35*	*0,88*	*0,58*	*0,13*	*0,032*	*0,025*
P2	-	*0,82*	*0,41*	*0,88*	*0,029*	**0,0051**	**0,0053**
P3	-	-	*0,19*	*0,64*	**0,0011**	**0,00026**	**0,00031**
P4	-	-	-	*0,41*	*0,12*	**0,023**	**0.018**
P5	-	-	-	-	**0.016**	**0,0018**	**0.0019**
P6	-	-	-	-	-	*0.46*	*0,35*
P7	-	-	-	-	-	-	*0,8*

A detailed analysis suggests the following advice for programme specific questions:

- Do not refer to any course codes at KTH
- Ask for credits in broader subject areas, not for credits in each subject separately
- Order separate subjects in a running text, not in an itemized list

All these practices have one thing in common – they reduce the cognitive load required to understand the questions, which is directly reflected in the experienced clarity. Some comments from students will also be highlighted during the conference.

TAKE-HOME MESSAGE

Cognitive load must be made meaningful to students!

ACKNOWLEDGEMENTS

The work presented here has been supported within the framework of Future Education (2025) under the DDMV project (2024). A special thank goes to Mats Bengtsson, who did most of the development work when setting up this year's questionnaire.

KEYWORDS

Summary of merits, student view, questionnaire, statistics.

REFERENCES

DDMV project (2024). *Data-driven assessment of qualifications to master's programmes*. https://intra.kth.se/en/utbildning/framtidens-utbildning/aktiviteter/projekt/2023/datadriven-antagning-till-masterprogram

Future Education (2025). *Future Education at KTH*. https://intra.kth.se/en/utbildning/framtidens-utbildning

Mann, H.B. & Whitney, D.R. (1947). On a test of whether one of two random variables is stochastically larger than the other. *Annals of Mathematical Statistics* 18(1), 50-60.

Wilcoxon, F. (1945). Individual comparison by ranking methods. *Biometrics Bulletin* 1, 809-83.

AI-drivna forskningsassistenter: En undersökning

Pontus Juth, Magdalena Svanberg

KTH Biblioteket

BAKGRUND OCH SYFTE

De vanliga chattbotarna med generativ AI fungerar inte för litteratursökning, men det dyker upp många AI-baserade verktyg, de flesta baserade på Retrieval Augmented Generation (RAG), som säger sig kunna hjälpa forskare och studenter att snabbt hitta litteratur. Leverantörerna av traditionella bibliografiska databaser arbetar också med att utveckla AI-verktyg. Syftet med undersökningen är att ta reda på:

1. Hur användbara är dessa verktyg för olika typer av sökning? Exempelvis för att slå upp enstaka referenser (lookup), utforska ett nytt ämnesområde (exploratory) eller skriva en litteraturöversikt (systematic) (Gusenbauer & Haddaway, 2021) samt

2. Hur ska vi förhålla oss till dessa verktyg som pedagoger, t ex när vi ger anvisningar till studenter om hur dessa verktyg bör användas, hur de kan förbättra lärandet och när de riskerar att vara till nackdel i studierna.

Vi ville också kunna tillhandahålla ett underlag för den möjligheten att inköp av licenser till verktyg skulle bli aktuell.

GENOMFÖRT ARBETE

KTH Biblioteket genomförde under hösten 2024 tester av fyra AI-verktyg för vetenskaplig litteratursökning: Scite, Scopus AI, Web of Science Research Assistant samt Primo Research Assistant. Utvärdering gjordes av studenter, doktorander och forskare. Användarnas synpunkter samlades in genom en enkät, möten med fyra testpaneler, i samband med forskarworkshopar samt i workshopar med bibliotekets personal. Mer utförlig beskrivning av metoder och resultat sammanställdes i en skriftlig rapport som kan delges intresserade.

Under våren genomförs motsvarande undersökning med tre andra verktyg (Avidnote, Keenious och Undermind). Resultaten från denna undersökning kommer att tas i beaktande i presentationen.

RESULTAT / LÄRDOMAR

Undersökningen visade variation i den upplevda användbarheten, relevansen och uppfattning av hur lätt det var att använda de olika verktygen (se figurer 1-3). Scopus verktyg framstod som det mest användbara överlag, vilket också bekräftades i fokusgrupper. Den bristande transparensen, att vi inte vet hur resultaten sökts fram, får som konsekvens att denna typ av verktyg inte är lämpliga för systematisk sökning. Dock kan de vara användbara för kompletterande sökning för systematiska litteraturöversikter. Dessa resultat verkar ligga i linje med vad andra har observerat (Zhao, 2024).

För alla typer av sökningar är det viktigt att notera att de olika verktygen ger helt olika sökresultat när de får samma fråga. Det beror säkert i viss utsträckning på vilka publikationer de respektive verktygen har tillgång till, men det är i flera fall osäkert vilka publikationer det är. Verktygen är av dessa skäl vanskliga att använda i de fall användaren behöver försäkra sig om att få en heltäckande bild, eller att inte missat avgörande bidrag inom något forskningsfält. Riskerna är särskilt stora för nya studenter som saknar tillräcklig kunskap för att bedöma relevansen hos de resultat de får (Tay, 2024).

BUDSKAP ATT TA MED HEM

Den viktigaste slutsatsen är att de verktyg som undersökts är bäst lämpade för novisen som behöver skaffa sig en rudimentär överblick inom något väl beforskat fält, samt för den seniora forskare som har möjlighet att hitta tidigare okända publikationer genom att dra fördel av de semantiska kopplingar som en AI-driven sökmotor kan göra, men som kan missas av en traditionell nyckelordssökning.

Det är också viktigt att vi som ska lära studenterna hur de bör gå till väga när de ska söka efter vetenskaplig information hittar pedagogiska förklaringar som hjälper studenterna att förstå de nya AI-drivna sökverktygens möjligheter och begränsningar.

ACKNOWLEDGEMENTS

Flera av våra kollegor har varit aktiva med både datainsamling och analys. Vi vill särskilt tacka Mattias Vesterlund, Sofie Seo, Agne Larsson, Ika Jorum, Annika Peurell och Elin Palm som på olika sätt bidragit i arbetet med undersökningen.

NYCKELORD

AI literacy; RAG; research assistant; literature search

REFERENSER

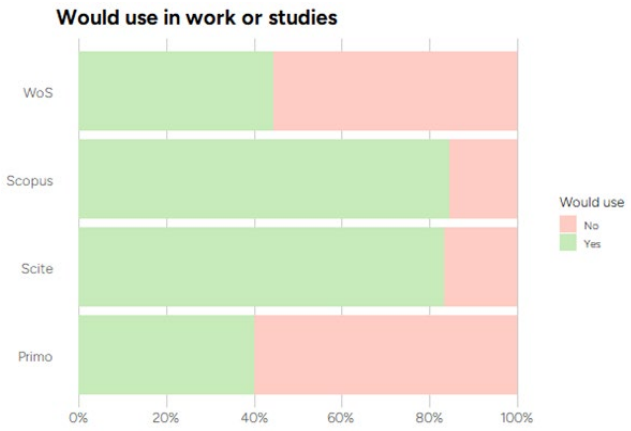
Gusenbauer, M., & Haddaway, N. R. (2021). What every researcher should know about searching – clarified concepts, search advice, and an agenda to improve finding in academia. *Research Synthesis Methods*, *12*(2), 136–147. https://doi.org/10.1002/jrsm.1457

Tay, A. (2024, November 18). *Why use of new AI enhanced tools that help with literature review should be discouraged for undergraduates | Aaron Tay's Musings about librarianship*. https://musingsaboutlibrarianship.blogspot.com/2024/11/why-use-of-new-ai-enhanced-tools-that.html?view=classic

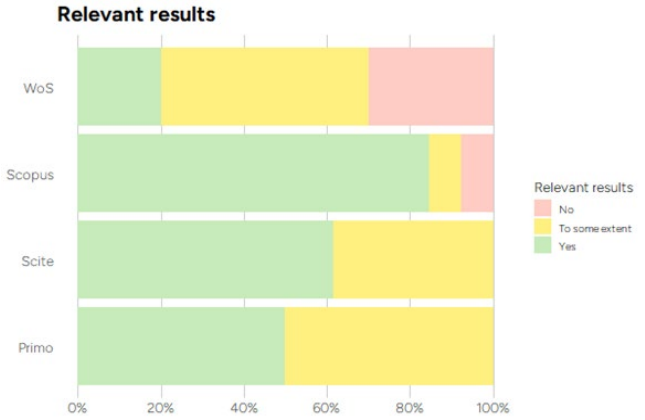
Zhao, A. (2024, March 20). *Trust in AI: Evaluating Scite, Elicit, Consensus, and Scopus AI for Generating Literature Reviews*. https://library.hkust.edu.hk/sc/trust-ai-lit-rev/

APPENDIX

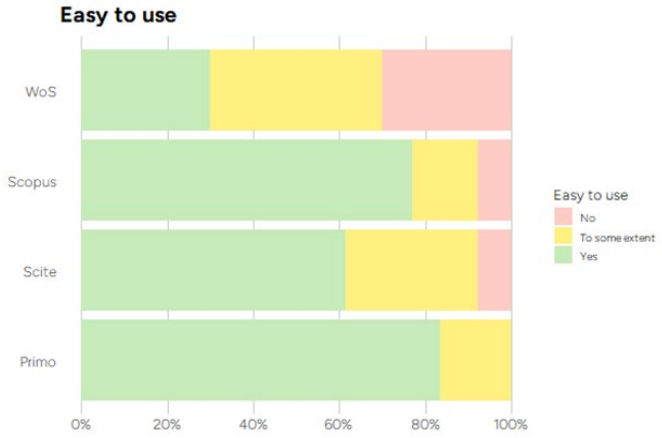
Figurer



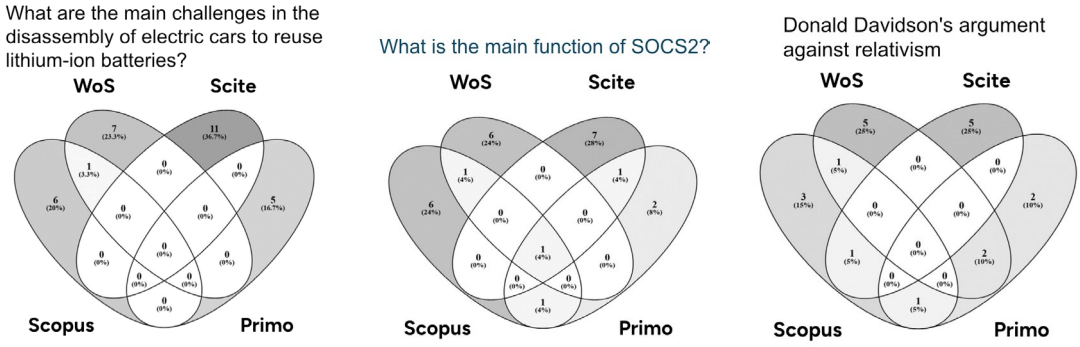
Figur 1. Upplevd användbarhet.



Figur 2. Upplevd relevans hos sökresultat.



Figur 3. Upplevd användarvänlighet.



Figur 4. Överensstämmelse mellan sökresultat för tre olika promptar.

Kan gruppövningar varje vecka öka lärandet i matematik?

Niclas Hjelm, Joakim Dalfors

KTH, Medicinteknik och hälsosystem

STRUKTURERAD SAMMANFATTNING

BAKGRUND OCH SYFTE

Veckovisa gruppövningar har visat sig vara en uppskattad undervisningsform, samt ökat kvaliteten på studenternas tentamenslösningar, på matematikkurser på Tekniskt-naturvetenskapligt basår vid Umeå universitet (Sande, 2019).

På Tekniskt basår, Campus Flemingsberg, har läraktiviteten gruppövning använts i matematik- och fysikkurser sedan läsåret 2021/2022. Studenterna löser under ett undervisningspass (2x45 minuter) utdelade uppgifter i grupper om 2-4 personer, medan läraren ambulerar mellan grupperna och besvarar frågor samt ger återkoppling på studenternas lösningar. Utvärderingsenkäter från de första kursomgångarna har visat att gruppövningar är en uppskattad undervisningsform (Hjelm & Shamoun, 2022).

Eftersom lärarna uppfattar att studenterna är mer aktiva på gruppövningar än på lektioner har vi på kursen Matematik II för basår denna termin gjort om detaljplaneringen och ersatt fem lektioner med gruppövningar, så att varje vecka slutar med en gruppövning. Detta är i samklang med hur övriga matematik- och fysikkurser på tekniskt basår utvecklats, där inslaget av gruppövningar stegvis ökat de senaste läsåren. Vi vill även undersöka om det går att se effekter av förändrat kursupplägg i examinationsgrad och betygsfördelning.

GENOMFÖRT OCH PLANERAT ARBETE

Under aktuell kursomgång i kursen Matematik II för basår (VT25) har antalet gruppövningar ökats, från 7 till 12, samtidigt som antalet lektioner minskats i samma omfattning. Vi har i samband med detta behövt framställa fler uppgifter till gruppövningarna.

En enkätundersökning har genomförts mitt i kursen, d v s efter läsperiod 3, för att undersöka studenternas erfarenheter av förändrat kursupplägg (Tabell 1). En femgradig skala har använts där 1 = stämmer mycket dåligt och 5 = stämmer mycket bra.

Vi planerar även att jämföra studenternas resultat från ordinarie tentamen för första delkursen (TENA) med resultat från den kurs de läste i höstas, Matematik I för basår. Såväl prestationsgrad som betygsfördelning för de studenter som deltagit vid de ordinarie tentamina kommer att studeras. Även resultat för två tidigare studentgrupper, antagna HT22 samt HT23, då kursen genomfördes med färre gruppövningar, kommer att analyseras.

RESULTAT / LÄRDOMAR

Studenterna uppfattar gruppövningarna som en bra undervisningsform, där både gruppmedlemmar och lärare kan ge återkoppling. Gruppövningarna blir också ett naturligt repetitionstillfälle för studenterna. Huruvida gruppövningarna påverkar studenternas resultat kommer att undersökas efter att TENA ägt rum.

BUDSKAP ATT TA MED HEM

Gruppövningar är ett bra sätt att aktivera studenterna och de faciliterar kollaborativt lärande, samt möjliggör rikligt med formativ återkoppling från läraren. Kursdesignen gör att inslag av repetition blir mer framträdande än tidigare.

Examinationsdata kommer under våren att analyseras, för att kunna avgöra om studenternas resultat skiljer sig från resultat från tidigare kursomgångar.

NYCKELORD

Aktivt lärande, kollaborativt lärande, formativ feedback.

REFERENSER

Hjelm, N. & Shamoun, M. (2022). *Gruppövningar i matematik på tekniskt basår.* Bidrag från Nätverk och Utveckling 2022. Stockholms universitet. 15 juni – 17 juni 2022.

Sande, O. (2019). *Synligt lärande med gruppuppgifter I matematik.* Bidrag från 7:e Utvecklingskonferensen för Sveriges Ingenjörsutbildningar. Luleå tekniska universitet, 27 november – 28 november 2019

APPENDIX

Tabeller

Tabell 1. Medelvärden för enkätfrågor.

Påstående	**Medelvärde**
Gruppövningarna var lärorika.	4,34
Jag får värdefull återkoppling från läraren på gruppövningarna.	4,15
Det är lärorikt att arbeta i grupp.	4,46
Gruppövningarna hjälper mig att förstå hur jag ska redovisa mina lösningar på tentan.	4,12
Gruppövning i slutet på varje vecka hjälper mig att repetera det som gåtts igenom under veckan	4,66

Vad gör studenterna som inte är på lektionen?

Viggo Kann

KTH Teoretisk datalogi

STRUKTURERAD SAMMANFATTNING

BAKGRUND OCH SYFTE

Många lärare upplever att andelen studenter som deltar i undervisningsaktiviteter har minskat och frågar sig varför studenterna inte deltar i större utsträckning (Menendez Alvarez-Hevia, Lord & Naylor, 2021). Beror det på att studenterna arbetar vid sidan av studierna, att dom inte hänger med i kursen eller något annat? Lägre närvaro kan vara en pandemieffekt, på så sätt att studenters studieteknik och förhållningssätt till deltagande i undervisningen ändrades under pandemin och har hängt kvar efteråt. Syftet med denna studie är att ge större förståelse för varför KTH-studenter deltar eller inte deltar i undervisningen, så att lärarna kan utforma sin undervisning så att den når fram till studenterna. En studie med liknande syfte genomfördes 2024 vid LTH, men till skillnad från vår studie var det en kvalitativ intervjustudie med en liten grupp ingenjörsstudenter (Samuelsson m.fl., 2024).

GENOMFÖRT ARBETE

Öppna frågor och flervalsfrågor om deltagande i undervisningen, vilka främsta skälen är för att inte delta respektive delta i undervisningen och vad man gör istället för att gå på undervisningen ställdes till över 800 datastudenter i maj 2024 inom ramen för den programsammanhållande kursen. Den obligatoriska enkäten gick ut till alla studenter i årskurs 1-3 på civilingenjörsprogrammet i datateknik och alla studenter på master-programmet i datalogi. Hälften av studenterna på civilingenjörsprogrammet går vidare på datalogimastern och hälften av studenterna på datalogimastern kommer från civilingenjörsprogrammet i datateknik. Här presenteras resultaten för studenter som i enkäten gick med på att svaren skulle kunna användas helt anonymt för forskningsändamål (94 %), cirka 170 svar per årskurs, totalt 837 svar.

RESULTAT OCH LÄRDOMAR

Detaljerade resultat presenteras på postern. Här följer en kort sammanfattning.

I årskurs 1 fördelar sig studenterna jämnt vad gäller närvaro (20 % deltar i mindre än 20 % av undervisningen, 20 % deltar i 20-40 %, 20 % deltar i 40-60 % etc.). I högre årskurser minskar närvaron något men inte så mycket. Ungefär hälften av studenterna arbetar vid sidan av studierna, men det är en liten andel som arbetar mer än 10 timmar per vecka. Det viktigaste skälet till att studenter inte deltar i undervisningen är att dom

Figur 1. Enkätsvar på frågan om vad det är vanligt att man gör istället för att gå på undervisning. Flera alternativ kunde väljas. För vart och ett visas antal procent av studenterna som valde det.

tror att det inte är effektivt använd tid. Minst viktigt är att ämnet är tråkigt, salen är dålig eller att man inte går av princip. Lång resväg till KTH anges som skäl av 18 %.

Väl genomförda undervisningsaktiviteter som studenterna tror kommer att hjälpa dom att lära sig något som behövs för att klara kursen ökar närvaron, liksom aktiviteter som ger bonuspoäng eller annan tillgodoräkning. Om aktiviteten är i Zoom eller i en sal är inte avgörande. Vanligaste sysselsättningarna för studenter som inte deltar i ett undervisningspass är att själv plugga samma sak och att arbeta med uppgifter i samma kurser eller andra kurser; det är betydligt ovanligare att tiden används åt lönearbete, sektionsverksamhet, fritidssysslor eller vila (se figur 1).

Resultaten rimmar bra med Büchele (2021), som har relaterat studenters närvaro och engagemang till deras prestationer och drar slutsatsen att det inte är hög närvaro som är viktigt - det är engagerande och studentaktiverande undervisning som kan höja prestationerna.

BUDSKAP ATT TA MED HEM

Att studenter inte är på undervisningen betyder inte att studenterna inte pluggar. För att öka närvaron vid och nyttan med undervisningen bör vi se till att undervisnings-aktiviteterna tydligt ger deltagarna något som hjälper dom att klara kursen.

ACKNOWLEDGEMENTS

Tack till alla datastudenter som svarade på enkäterna som denna studie bygger på.

NYCKELORD

Studentnärvaro, arbete vid sidan av studierna, undervisningsupplägg.

REFERENSER

Büchele, S. (2021). Evaluating the link between attendance and performance in higher education: the role of classroom engagement dimensions, *Assessment & Evaluation in Higher Education*, 46:1, 132-150, DOI: 10.1080/02602938.2020.1754330

Menendez Alvarez-Hevia, D., Lord, J., & Naylor, S. (2021). Why don't they attend? Factors that influence the attendance of HE students of education. *Journal of Further and Higher Education*, 45(8), 1061-1075. DOI: 10.1080/0309877X.2020.1851664

Samuelsson, J. m.fl. (2024). *Students' Reasons for Absence in First-cycle Engineering Education - an Interview Study*. Rapport nr 4 i CEE:s rapportserie. Lunds universitet. https://www.lth.se/cee/publikationer/rapport-nr-4/

Engaging with Engineering Education: Industry Partners' Motivations and Experiences in Problem- and Project-Based Learning Courses

Lars Uppvall[1], Pontus Wadström[2]

[1]Industrial Economics and Management, Management and Technology
[2]Pontus Wadström, A Real Movment

STRUCTURED ABSTRACT

BACKGROUND AND PURPOSE

Today, there is an active discourse on how our educational programs should address the demands placed on the professional roles that future engineers are expected to assume within both the private and public sector, particularly in light of the transition towards more sustainable societies (e.g., Lönngren, 2017). In particularly, there are clear expectations that our students should be able to tackle complex challenges, often referred to as "wicked problems" (e.g. KTH).

This backdrop highlights the current and future importance for higher engineering education institutions to master advanced problem- and project-based learning (PPBL) courses. In these courses, students engage with authentic, context-rich, and complex challenges presented by collaborative partners and explore them from the perspectives of multiple stakeholders.

However, while much research on PPBL courses focusses on course design and the challenges faced by students and faculty – for example, in studies on challenge-driven education (e.g., Rosén et al., 2020) and courses specifically addressing wicked problems through PPBL (e.g., Brundiers and Wiek, 2013) – the perspectives of external partners remain largely unexplored (Pan et al., 2023). Partners' views on the collective engagement within the course and, most importantly, the perceived value and benefits of these collaborative relationships are rarely considered.

Hence, this study aims to explore collaborative partners' motivation and perceived value of participating in a large PPBL course in engineering education.

WORK DONE / PLANNED WORK

The empirical material in this study is based on a large PPBL course (ME2502, 12 ECTS, annual enrollment of 70–110 students) in the Industrial Management master's program

(TINEM) at KTH. This capstone course has been offered and developed over 14 years. In the course four to five partner works with three student groups each (six to seven students per group). To date, 26 companies have participated as partners, contributing to over 150 student projects (for more details, see Blomkvist and Uppvall, 2012a; Blomkvist and Uppvall, 2012b; Uppvall et al., 2017).

The results presented in this study represent an initial analysis of work conducted within a project funded by the change program Future Education at KTH. The data is based on six in-depth interviews (1-1,5 hours each) with the partners who participated in the course during the autumn semester 2024.

RESULTS / LESSONS LEARNED

Our initial results show that all companies argued that their main motivation for participation was the expected knowledge and learning that the collaboration would bring to their organization. Although student interaction, employer branding, and the opportunity to work with potential employee candidates were also part of their motivation.

When asked about how this value benefited their organizations, the responses covered a range of specific useful outcomes, including the scientific framing of the problem and its outcome, the advantage of students' external perspective on the business, their innovative efforts, and their unique way of interacting with the target organization – shaping the outcome while simultaneously stimulating employees' interest and engagement.

When explicitly asked whether students' work offered any unique benefits that could not be gained elsewhere, these types of collaborative projects were seen as uniquely beneficial compared to research collaborations due to their speed, integration of technical, societal, and commercial factors, and approaches to "valley of death" situations related to sustainable transitions. Unlike external consultants, students were valued for their ability to manage investigations while simultaneously engage employees, as well as provide comprehensive literature support to contextualize challenges and substantiate recommendations.

TAKE-HOME MESSAGE

Industrial partners in the PPBL course perceive the outcomes of students' projects as strategically important to their organizations, offering values that are unique to these projects. Notably, some companies described what we interpret as an emerging "value creation model" for their engagement. That is, a more structured and strategic approach to deriving value from the collaboration – going beyond merely receiving the students' results. We see this as an interesting tentative concept in PPBL courses and will continue to analyse how this "value creation model" can be utilized as a tool to strengthen the win-win value in relationships with partners, improve students' learning through deeper integration of their work within the partners' organizations, and bring more aspects of implementation into the scope of projects.

KEYWORDS

Industry partners, University-industry collaborations, Problem-based project courses.

REFERENCES

Blomkvist, P., & Uppvall, L. (2012a). A chain is only as strong as its weakest link: Managing change in the curriculum of industrial management education. *International Journal of Industrial Engineering and Management*, *3*(2), 53.

Blomkvist, P., & Uppvall, L. (2012b). Learning to love ambiguity: authentic live case methodology in industrial management education. *International Journal of Case Method Research & Application*, *24*(4), 272-285.

Brundiers, K., & Wiek, A. (2013). Do we teach what we preach? An international comparison of problem-and project-based learning courses in sustainability. *Sustainability*, *5*(4), 1725-1746.

KTH. (n.d.). *Definitions of the principles for future education. KTH Intranet*. Retrieved March 17, 2025, from https://intra.kth.se/en/utbildning/framtidens-utbildning/ramverket/om/definitioner-av-principerna-1.1224045

Lönngren, J. (2017). *Wicked problems in engineering education* (Doctoral dissertation, Chalmers Tekniska Hogskola (Sweden)).

Pan, G., SEOW, P. S., Shankararaman, V., & Koh, K. (2023). University-industry collaboration in project-based learning: Perspective and motivation of industry partners. *International Journal of Education*, *15*(3), 18.

Rosén, A., Peters, A. K., Daniels, M., Danielsson, M., Hemphälä, J., Håkansson, M., & Sandström, G. Ö. (2022, October). Transformation-Driving Education: Perspectives Emerging in a Dialogue between Teachers with Experiences from Challenge-Driven Education. In *2022 IEEE Frontiers in Education Conference (FIE)* (pp. 1-9). IEEE.

Uppvall, L., Blomkvist, P., & Bergqvist, W. (2017). Opening the black box of collaborative writing: experiences from a teamwork-based course in industrial management. *Production*, *27*(spe), e20162220.

Design for all: Facilitating the involvement of cognitive diversity in students design projects

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STRUCTURED ABSTRACT

BACKGROUND AND PURPOSE

Accessibility research involves working with people of diverse abilities, physical as well as cognitive. The involvement of diversity in research and design processes has led to a focus on Inclusive Research (Johnson & Walmsley, 2003; O'Brien et al., 2022), Participatory Design (Smith et al., 2025; Mack et al., 2021; Johansson et al., 2023), and theoretical frameworks like the Double Empathy problem (Milton, Gurbuz & López, 2022) and the Social model of disability (Barnes, 2011; Goodley, 2018) in my work as a researcher and educator. Facilitation impacts participation, especially when facilitating and designing with people who think differently than oneself. Scholars emphasize the need to integrate human diversity from the beginning of design processes for socially sustainable and usable outcomes (Johansson et al., 2023; Lazar, 2023; Johansson, 2019). This gives rise to the following questions:

- How does my role as facilitator, designer, researcher, and educator enable or limit participation?
- How can students be supported in recognizing the limits of their own perspectives and in using tools to engage human diversity during development processes?

The work presented explores participatory design as an experiential learning method (Kolb, 2012), building on Johansson's work on participatory design as a foundation for involvement and inclusion (Johansson, 2019). A key method is the "speed-dating" session format being done previously on the course by Stefan Johansson with Begripsam, where students meet Begripsams members with cognitive accessibility needs in short, structured dialogues, challenging assumptions and broadening understanding. The work presented here further builds on this format, continuing to explore and apply experiential learning to connect accessibility theory with practice for students in their projects.

WORK DONE

As part of the KTH course DM2624 Human Centered Technology for Disabilities, I was responsible for designing and supervising accessibility-focused student projects under guidance of Jan Gulliksen. The class consisted of nine groups with 4–5 students each (about 40 students total). The students' design projects spanned several weeks and followed a phased process, from learning accessibility frameworks to human-centered approaches. This abstract highlight a key participatory session where students engaged

with individuals with lived experience of cognitive accessibility challenges. The session was carefully prepared through one-on-one dialogues with ten consultants, nine affiliated with Begripsam and one from my personal network, who have lived experience of cognitive accessibility needs. A preparatory seminar with students introduced participatory design, facilitation strategies, and showed how the session had been co-designed with the consultants as an educational example itself.

The session was a two-hour in class moment, with students rotating through 15-minute discussions with four different consultants. Parallel sessions took place across nine tables, guided by a set schedule that included frequent breaks to manage cognitive load. Student-prepared protocols, tailored to each group's project domain, ensured focused conversations informing their projects. Students took on facilitation roles such as timekeeping and, in some cases, acted as translators between Swedish and English. Consultants were paid for their expertise and regarded as co-educators in the course.

The consultants received easy-to-read briefing documents and ethical onboarding materials; and the sessions space, the entire ground floor of Brinellvägen 28A, was chosen due to accessibility considerations. Consultants were matched with student groups based on topics of certain interest to ensure meaningful dialogue. Following the session, a collective reflection was held by Stefan Johansson, who also supported the session design and its implementation. Two consultants voluntarily attended the students' final presentations to offer another round of feedback. Though designed as a one-time session, the experience sparked ideas for integrating multiple participatory checkpoints in future course iterations.

RESULTS AND LESSONS LEARNED

The session provided hands-on experience in accessibility, transforming theory into learning by doing. Facilitation strategies discussed in a preparatory seminar were put into practice, with students applying insights gained directly to their projects. Feedback from a brief evaluation at the end of the session showed that all participants, students, consultants, and me as a teacher, benefited. Students expressed deep appreciation for the opportunity to engage in participatory formats and described the environment as warm and open. Consultants valued contributing to education and future designers' perspectives, and felt the students' well-prepared questions formed a strong foundation for dialogue. One consultant described it as an empowering experience, having never participated in such a session before. For group photo of all participants at the session, see figure 1. As facilitator and supervisor, it was rewarding to witness the interplay of preparation, theory, interactions and outcome. The session sparked ideas for future iterations, including potential applications in other courses. Stefan Johansson, who was present and assisted, concluded, based on participant feedback, that the session was a success. We await full course evaluations for further insights on students' experiences.

TAKE-HOME MESSAGE

By involving diversity into students' design processes, the projects embodied the foundational principle of 'Nothing about us without us' in accessibility work (Spiel et al,. 2020). The key message is that educators should seek experiential learning opportunities that bridge theory and practice. Possibilities emerge when we design enabling conditions.

ACKNOWLEDGEMENTS

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KEYWORDS

Participatory Design, Accessibility Education, Experiential Learning, Disability Studies, Born Accessible Design

REFERENCES

AccessCoVE. (n.d.). AccessCoVE: Accessibility Centers of Vocational Excellence. Retrieved June 1, 2024, from https://accesscove.org/

Barnes, C. (2011). Understanding disability and the importance of design for all. J. Access. Des. All, 1(1), 55–80. https://doi.org/10.17411/jacces.v1i1.81

Begripsam. (n.d.). Begripsam – Inclusive Design and Accessibility. from https://www.begripsam.se/english

Goodley, D. (2018). The Dis/ability Complex. Dig. J. Divers. Gend. Stud., 5(1), 5–22. https://doi.org/10.11116/digest.5.1.1

Johansson, S. (2019). Design for Participation and Inclusion will Follow: Disabled People and the Digital Society (PhD dissertation, KTH Royal Institute of Technology). Retrieved from https://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-262819

Johansson, S., Hedvall, P.-O., Larsdotter, M., Larsson, T. P., & Gustavsson, C. (2023). Co-Designing with Extreme Users: A Framework for User Participation in Design Processes. Scand. J. Disabil. Res., 25(1). https://doi.org/10.16993/sjdr.952

Johnson, K., & Walmsley, J. (2003). Inclusive Research with People with Learning Disabilities: Past, Present and Futures. Jessica Kingsley Publishers.

Kolb, A.Y., Kolb, D.A. (2012). Experiential Learning Theory. In: Seel, N.M. (eds) Encyclopedia of the Sciences of Learning. Springer, Boston, MA. https://doi.org/10.1007/978-1-4419-1428-6_227

Lazar, J. (2023). A Framework for Born-Accessible Development of Software and Digital Content. In Human-Computer Interaction – INTERACT 2023 (pp. 333–338). Springer Nature Switzerland, Cham. https://doi.org/10.1007/978-3-031-42293-5_32

Mack, K., McDonnell, E., Jain, D., Wang, L. L., Froehlich, J. E., & Findlater, L. (2021). What Do We Mean by “Accessibility Research”? A Literature Survey of Accessibility Papers in CHI and ASSETS from 1994 to 2019. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI ’21), May 07, 2021 (pp. 1–18). Association for Computing Machinery, New York, NY, USA. https://doi.org/10.1145/3411764.3445412

Milton, D., Gurbuz, E., & López, B. (2022). The ‘double empathy problem’: Ten years on. Autism, 26(8), 1901–1903. https://doi.org/10.1177/13623613221129123

O’Brien, P., Garcia Iriarte, E., Mc Conkey, R., Butler, S., & O’Brien, B. (2022). Inclusive Research and Intellectual Disabilities: Moving Forward on a Road Less Well-Travelled. Soc. Sci., 11(10), 483. https://doi.org/10.3390/socsci11100483

Spiel, K., Gerling, K. M., Bennett, C. L., Brulé, E., Williams, R. M., Rode, J., & Mankoff, J. (2020). Nothing about us without us: Investigating the role of critical disability studies in HCI. In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems (CHI EA ’20)* (pp. 1–8). ACM. https://doi.org/10.1145/3334480.3375150

Smith, R.C., Loi, D., Winschiers-Theophilus, H., Huybrechts, L., & Simonsen, J. (Eds.). (2025). Routledge International Handbook of Contemporary Participatory Design (1st ed.). Routledge.

APPENDIX

Figure 1. A group photo featuring students and consultants who consented to being photographed at the end of the session.

Experiences, Impacts and Implications of a STINT Teaching Sabbatical

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STRUCTURED ABSTRACT

BACKGROUND AND PURPOSE

One way to gain a new perspective and inspiration for one's teaching practice is to go on a teaching sabbatical and teach or co-teach in a new context at another institution. Awarding or sending faculty on sabbaticals is an old practice and, at some institutions, a well-integrated part of faculty development (Kang & Miller, 1999).

WORK DONE

All authors have been fortunate to go on teaching sabbaticals funded by The Swedish Foundation for International Cooperation in Research and Higher Education (STINT, 2025). Emma Riese was at Arizona State University 2024; Ric Glassey at the National University of Singapore 2023; Tomas Ekholm at Williams College 2019; Olle Bälter at Williams College 2008; Viggo Kann at Amherst College 2006; all in the fall semester.

LESSONS LEARNED

Going on a teaching sabbatical gave us all new perspectives and time to reflect. While moving to another country requires planning and determination, we all agree that it was definitely worth it! The experiences have broadened our perspectives, shaped us, and influenced our practices. Below are short descriptions of our journeys:

Viggo started to do research in Computer Science Education, and implemented several changes at KTH inspired by Amherst College. For example he changed the KTH culture of not erasing the blackboard after each lecture, and he switched to holding one-hour instead of two-hour lectures (Kann, 2010).

Olle changed his research area to Technology Enhanced Learning. Together with Viggo, they founded Cerise[1], the CS Education research group. The sabbatical was a determining factor for the visiting scholarship at Stanford Graduate School of Education 2015-16. There he picked up the ideas on Question-Based Learning, later improved together with Ric to pure Question-Based Learning (Bälter et al., 2024).

Ric used the sabbatical to dive into learning science and the desirable and undesirable difficulties in learning. He was also able to reflect on other approaches to managing scale

[1] https://www.kth.se/cs/tcs/research/computer-science-education-1.694958

and quality against the rise of Gen-AI. This has led to a series of studies on how KTH might leverage AI to enhance our learning environment (e.g. Fayaz et al., 2025).

Emma's biggest takeaway was how working as a teaching team created a supportive work environment for instructors and teaching assistants while ensuring students across all course sections got a similar student experience. She also had the opportunity to collaborate on training for teaching assistants (ASU, 2025).

Besides teaching a new course, Tomas took the opportunity to sit in on several courses with different teachers. It was a privilege to have time for this, while also having time to reflect.

TAKE-HOME MESSAGE

(1) Go on exchanges and teach! If you can, bring the rest of the family; it is a wonderful adventure. (2) There is much more to a teaching sabbatical than teaching! Reach out to the local pedagogical developers and engage to help further develop your own pedagogy. (3) It is an opportunity to say 'yes'; to all the serendipitous meetings, seminars, and workshops that are a 'no' under the normal workload at home. (4) Absence makes the heart grow fonder! The grass may not be greener on the other side; however, having some distance from your typical environment can make you appreciate what you have and renew your efforts.

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KEYWORDS

Teaching sabbatical; International perspectives; Professional development

REFERENCES

Arizona State University, Ira Fulton Schools of Engineering, Learning and Teaching Hub, Teaching Assistants onboarding and beyond, URL: https://lth.engineering.asu.edu/reference-guide/teaching-assistants-onboarding-and-beyond/

Bälter, O., Glassey, R., Jemstedt, A., & Bosk, D. (2024). *Pure Question-Based Learning*. Education Sciences, 14(8). https://doi.org/10.3390/educsci14080882

Kann, V. (2010). *Kan kvalitet på ett elitcollege föras över till svenska förhållanden?* NU 2010. URL: https://suhf.se/static/2010/2010/konferensbidrag/Pass5_Kan_kvalitet_pa_ett_elitcollege_foras_over_till_svenska_forhallanden.pdf

Kang, B., & Miller, M. T. (1999). *An Overview of the Sabbatical Leave in Higher Education: A Synopsis of the Literature Base*.

The Swedish Foundation for International Cooperation in Research and Higher Education, STINT, Teaching sabbatical, URL: https://www.stint.se/en/program/teaching-sabbatical

Avid Fayaz, Richard Glassey and Alexander Baltatzis. 2025. Generating Personalized Assignments with Students in the Loop. In Proceedings of the 2025 on Innovation and Technology in Computer Science Education (ITiCSE 2025).