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AI in Higher Education

Experiences from Environmental Communication education at SLU

Camilo Calderon, Malte Rödl & Alejandra Figueredo | Institutionen för stad och land

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Summary

The mainstreaming of Generative Artificial Intelligence (GenAI), exemplified by tools such as ChatGPT, has challenged conventional assumptions about authorship and academic integrity in Higher Education. This rapid advancement has highlighted the need for universities to integrate AI into their curricula while maintaining proactive critical oversight. While early discussions have primarily focused on concerns related to academic misconduct, less attention has been given to the pedagogical potential of GenAI.

GenAI tools, particularly those based on Large Language Models (LLMs), have the potential to support students in text-based tasks, such as summarisation, proofreading, and text generation. However, these tools operate through statistical pattern recognition (predictive models) rather than genuine comprehension or reasoning, raising concerns about their implications for learning outcomes in higher education. The Environmental Communication and Management (ECM) programme has thus sought to balance the opportunities presented by AI with the risks, ensuring that AI use aligns with the programme's core academic values.

This report summarises the efforts in this direction through the implementation of a pedagogical project aimed at exploring and integrating generative AI as a learning tool within the ECM programme. The two main objectives involved: (1) developing a programme-wide approach to generative AI through a policy with clear guidelines that distinguishes between different levels of use of GenAI; and (2) designing teaching and course activities that enable students to critically engage with AI-generated text while enhancing their digital literacy and professional skills.

The project's implementation consisted of three distinct phases. The first phase involved a desk study (September–November 2023) to examine the use of AI in higher education, reviewing AI policies from Swedish universities and international universities, as well as existing research on the application of AI in education. This phase also included participation in webinars, contributing to a broader understanding of best practices and challenges.

The second phase focused on developing AI usage guidelines tailored to the ECM programme. This process involved workshops with ECM teaching staff and discussions within the Department of Urban and Rural Development. The resulting ECM AI policy outlined clear expectations for the appropriate use of AI tools in coursework and assessments. The finalised policy was presented at a departmental seminar in October 2024, providing a platform for further dialogue and refinement.

An essential outcome of the developed policy refers to the identification of three interrelated stages as crucial for fully integrating AI as a pedagogical tool: (1) mitigating potential risks, (2) building AI literacy, and (3) following professional changes. While the project has not addressed all three stages equally and ongoing work

remains, this policy framework provides a solid foundation for structuring future efforts and expanding AI's role in education.

The third phase centered on designing Teaching and Learning Activities (TLAs) that integrate AI tools in a pedagogically meaningful manner. Three guiding principles emerged from prior stages: (1) *AI use should be explicitly linked to course learning objectives*; (2) *students should be required to critically assess AI-generated content* (»*AI oversight*«); and (3) *clear instructions should specify when and how AI tools can be used in assignments*. A dedicated workshop in December 2024 facilitated the development of TLAs for ECM courses, with some activities already being implemented in first-year course work.

The project has contributed to building the capacity of ECM teachers to engage with AI critically and productively. Thus, by proactively addressing AI's role in education, the ECM programme has established a framework for responsible AI integration, ensuring that students develop both digital literacy and critical reflection skills essential for their future professional careers. We expect the findings from this project to offer valuable insights for other higher education institutions seeking to navigate the evolving landscape of AI in academia.

Keywords: artificial intelligence, generative AI, AI pedagogy, AI literacy, AI policy.

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1. Introduction

1.1 Summary of the Pedagogical Project

The introduction of ChatGPT has challenged long-held assumptions about authorship in Higher Education. At the start of this pedagogical project, discussions on tools utilising Artificial Intelligence (AI) mainly focused on challenges to academic integrity in research and teaching. Less considered have been the potential applications of this new technology related to pedagogy and digital literacy. The purpose of this pedagogical project was to develop the use of generative AI – primarily using text generation, such as ChatGPT – as a pedagogical tool in the Environmental Communication and Management (ECM) programme in two main tasks:

1. Creating a programme approach to generative AI by developing guidelines specifying inappropriate, reasonable, and pedagogically-meaningful use, which could help ECM teachers to revise and develop course activities and assignments.
2. Developing course activities that help students productively use, reflect on, and critically interrogate AI-based text generation, which could be integrated and relate to the 1st year courses of the ECM programme.

The pedagogical project was also expected to help build teachers' capacity for critically adjusting to and productively engaging with generative AI. This report presents the main developments and results from the project, including information on the activities conducted and their expected outcomes, some of which are currently under implementation in the courses of the ECM programme.

1.2 Background of the Pedagogical Project

Technological advancements in the field of AI are progressing rapidly, and various tools have become increasingly relevant in educational and workspaces, given their ability to generate, process, and assess large amounts of data. With the increased relevance, it is important for us as an academic institution to critically approach and embrace AI in our education and teaching, incorporating it into our student's learning experience when necessary and guiding them in this process in order to support professionally relevant reflections and skills.

AI technology is diverse, yet it commonly refers to »computer systems that are able to perform tasks that *normally* require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages« (Joiner, 2018, p. 2). Amongst the most discussed tasks that AI technology can perform, and which is relevant for education, is to ›generate‹ new and innovative content, spanning from text to other forms of media (e.g. images or music). Hence the name *Generative AI (GenAI)*.

Currently, *ChatGPT* is the most prominent and accessible example of GenAI, although there is a wide variety of similar tools with differences in their main task and the type and scope of input provided by users. Some of these tools may serve for proofreading purposes and as writing assistants, including *Grammarly* or *DeepL*, which recommend (or make) grammar, spelling, or syntax corrections to the content provided by the user. Other tools – similar to ChatGPT – like *Copilot*, *Gemini*, *Chatsonic* or *Perplexity AI* focus on producing written content, whether it is summarising, transforming or generating new content in multiple formats. Most of these tools operate as a chatbot, simulating a human conversation in which outputs are based on responses to users' inputs or »prompts« in the form of questions or statements. The same applies to text-to-image generators like Dall-E, Firefly, or Midjourney, which create graphic outputs (i.e. images) based on users' textual prompts.

In the ECM programme, the most relevant GenAI tools that students are so far using are those aforementioned tools that transform or generate text. These are based on *Large Language Models (LLMs)*. These models transform one text (an input or prompt) into another (the output), with common applications being text generation, summaries, translation, proof reading, or text analysis; all of which can be useful to support ECM students' learning. These transformations are possible, because LLMs are trained on vast training datasets primarily taken from the internet and then »learn to predict the next word in a sentence and, from that, generate coherent and compelling human-like output in response to a question or statement« (Sabzalieva and Valentini, 2023, p. 5).

This way of operating also constitutes the main risk of using AI technology, as it means that current LLMs are mainly statistical machines, without comprehension or reasoning abilities. They generate plausible-sounding responses by identifying statistical patterns in their training data without contextualized, in-depth and critical understanding. The latter are, however, key academic components in and goals of education in the ECM programme and beyond.

During its implementation, this pedagogical project considered both the opportunities and risks introduced above.

2. Pedagogical Project Implementation

2.1 Stages of the Project

The project was developed in three different stages focused on:

1. a desk study on current developments in the use of AI/ChatGPT in higher education
2. developing guidelines specifying when and how AI/ChatGPT can be used as a learning aid, and when its use will be considered as inappropriate
3. designing teaching and learning activities (TLAs) with the use of AI/ ChatGPT related tools.

As originally planned, the different stages of the project comprised seminars and workshops with course leaders and assistants at the ECM programme. However, it also led to other activities reaching broader groups of teaching staff in the Department of Urban and Rural Development and the NJ Faculty (see more below).

2.1.1 Desk study on current developments in the use of AI/ ChatGPT in higher education

Between September and November of 2023, we conducted a desk study to inquire about the developments and advancements in the use of AI/ChatGPT-related tools in higher education. For this purpose, we reviewed the guidelines for the use of generative AI tools in 12 universities across Sweden, UK, US and Colombia, with the aim of reaching diverse experiences, and based on snowballed references from the »ChatGPT and artificial intelligence in higher education: quick start guide« published by UNESCO in 2023.
We also mapped relevant documentation (including grey literature) and current peer-reviewed research on the subject.
It should be noted that given the novelty of this phenomenon, the amount of published articles was somehow limited.

Moreover, some members of the pedagogical project team attended webinars about the use of AI in Education arranged by other universities and institutions focused on higher education, which took place between 2023 and 2024 (see details in Table 1).

Table 1. AI related seminars attended during the pedagogical project

Webinar title	Organiser	Date
När, hur och varför passar AI i olika examinationsformer?	Universitets- och högskolerådet and Karlstad University	2023/09/15
How is AI changing the teaching and academic landscape?	Bristol University	2023/11/09
Guiding students and academics on the art of ChatGPT for research	Sage Campus and Lean Library	2024/04/17
AI in Education: Addressing Biases and Discrimination, Privacy & Surveillance	Center for Democracy & Technology (US-based NGO)	2024/05/22

Source: provided by the authors.

The results of this desk study were presented to and discussed with ECM teaching staff in a one-day workshop called »Embracing AI as pedagogical tools in the ECM programme«[1]. The workshop had three aims: 1) Provide the ECM teaching staff with an overall introduction to AI, including its definitions, principles and applications in learning and education; 2) Discuss potential uses and implications of (1) for the ECM programme; and 3) Discuss ways in which the use of AI could be regulated in ECM education, including some potential applications. Aims (2) and (3) are also connected to the goals of Stage 3 of the pedagogical project. The workshop took place on the 11th of December 2023, and had eight (8) participants from the Division of Environmental Communication. Most participants were staff responsible for courses of the ECM programme.

2.1.2 Developing guidelines specifying when and how AI/ChatGPT can be used as a learning aid, and when its use will be considered as inappropriate

Based on the information gathered through the desk study and the results of the workshop, the pedagogical project team started to develop the guidelines for using AI in the ECM programme. Inspired by the approach that other universities had to this issue, we decided to develop an AI policy that would be used by all ECM courses.

A first draft of the ECM AI policy was presented and discussed in a workshop titled »AI teaching policy – What is it and what can we do with it?«[2]. The workshop took place during the internal conference of the Department of Urban and Rural Development at Marholmen, giving us the opportunity to share and discuss the policy with other staff members interested in this topic. The workshop aimed at 1) discussing the progress of the ECM AI policy; 2) use the ECM AI policy as a base to discuss the need for and implementation of AI teaching policies across divisions and teaching programmes at the Department of

1 Slides from the workshop can be shared upon request. Email Camilo Calderon <Camilo.Calderon@slu.se> or Malte Rödl <malte.rodl@slu.se>

2 Same as previous footnote

Urban and Rural Development; and 3) discuss the implications that (2) would have for courses and teachers. The workshop took place on the 16th of May 2024, and had 14 participants from the divisions of Environmental Communication, Rural Development, and Landscape Architecture, as well as administrative staff from the Department of Urban and Rural Development working with education.

The workshop gave us insights on parts of the policy that needed to be developed or clarified. This input was used to develop the final version of the ECM AI policy. Our goal was to have the policy ready by the start of the 2024 academic year and begin using it in courses of period 1 from both the 1st and 2nd years of the ECM programme. Hence, such development was done in consultation with teachers from these courses.

The final version of the ECM AI policy was presented during a lunch seminar called »AI in Education: Presentation of the ECM AI policy«[3]. The aim of the seminar was to present the policy to ECM teaching staff that had not been involved in its development and to share the experiences of using it in the two courses from period 1. The seminar took place on the 15th of October 2024, and had 7 participants from the Division of Environmental Communication.

2.1.3 Designing teaching and learning activities (TLAs) with the use of AI/ChatGPT related tools.

The knowledge and experiences from the first two stages were valuable to start designing TLAs for specific courses. Three key insights from these stages, which became core principles guiding the development of the TLAs were (see details in Section 5):

1. To make students' use of AI linked to the learning goals of the course or of specific activity, instead of thinking that these activities need to focus on teaching students how to use AI. The latter is based on the fact that learning how to use AI is not explicitly included in the learning goals of the ECM courses but nevertheless considered part of professional development. Students will thus be able to gain some experiences of using AI, even if this is not the main focus of the TLAs.
2. To create TLAs with moments where students need to carry out »AI oversight«, which means to critically assess and engage with AI outputs in order to make them useful. This oversight needs to be done in correspondence with course topics, theories or concepts, hence providing students the opportunity develop and demonstrate their learnings from the course. Enabling intentional, course knowledge-based AI oversight (the action of overseeing something) is importat to prevent the all-too-common uncritical and problematic AI oversight (failure to notice wrong, or even problematic AI output)
3. In order to achieve (1) and (2), to develop TLA with an intended and clearly specified use of AI, stipulating which AI tools are allowed, and when and how it is allowed to use them.

Considering these principles, we carried

3 Same as previous footnote.

out a workshop titled »Designing Teaching and Learning Activities (TLAs) integrating AI«[4], to develop ideas on concrete TLAs that could be used in courses of the first year of the ECM programme. The aim of the workshop was to introduce the abovementioned principles and use them to develop TLAs for three courses. Given that two courses had already started to use the ECM AI policy and integrate it in concrete TLAs the workshop had some of these as a starting point for the discussion. For the third course, we focused on brainstorming ideas for TLAs that could potentially be developed. The seminar took place on the 11th of December 2024, and had eight (8) participants from the Division of Environmental Communication.

Between September and November of 2023, a desk study was conducted to inquire about the developments and advancements in the use of AI/ChatGPT-related tools in higher education. For this purpose, we reviewed the guidelines for the use of generative AI tools in 12 universities across Sweden, UK, US and Colombia, with the aim of reaching diverse experiences, and based on snowballed references from the »ChatGPT and artificial intelligence in higher education: quick start guide« published by UNESCO in 2023. We also mapped relevant documentation (including grey literature) and current peer-reviewed research on the subject. It should be noted that given the novelty of this phenomenon, the amount of published articles was somehow limited.

4 Slides from the workshop can be shared upon request. Email Camilo Calderon <Camilo.Calderon@slu.se> or Malte Rödl <malte.rodl@slu.se>

3. Results and Experiences

The results of the pedagogical project enabled us to achieve the expected outcomes outlined in the project's application. However and probably most importantly, the results have also allowed the teaching staff of the ECM programme to gain knowledge and insights about AI and start incorporating this in our education. This has allowed the ECM programme to become a front-runner in embracing AI in education. It has also allowed us to contribute to other programmes' work with AI as described in Section 5.

During the development of the pedagogical project, we identified three interrelated stages that we needed to work on, in order to truly embrace AI as a pedagogical tool in the ECM programme and beyond.

Although we have not worked with the three stages to the same degree during the pedagogical project, and there is still work to be done, they serve the project's results and experiences.

3.1 Mitigating potential risks

Mitigating potential risk, implies i) trying to maintain students' academic integrity during their education; ii) avoiding students' inappropriate use of AI tools that can result in cheating; iii) limiting student's possibilities to take shortcuts that can hinder their learning of both general academic skills and course topics and theories; and iv) encouraging students to interact with peers, teachers, and teaching material instead of with GenAI that is detached from the course.

The development of the ECM AI policy, including the establishment of explicit rules and guidelines for using AI in our education, was the main result of this stage. The policy aimed to give students and teachers certainty regarding the use of AI tools in the classroom. Importantly, the policy is not prescriptive but rather a guideline for various possible, plausible, or prohibited uses of AI tools, that provides advice on what to think about when applied to individual courses and TLAs, for both students and teachers.

FIGURE 1. KEY STAGES FOR EMBRACING AI AS A PEDAGOGICAL TOOL IN EDUCATION. DESIGNED BY THE AUTHORS.

The findings and discussions of the pedagogical project led us to focus on developing the following topics as components of the ECM AI Policy:

- General descriptions of AI technology, specifying which systems, tools and uses are relevant for ECM education.
- Specifying opportunities, limitations and risks of using AI in education
- General guidelines for students' responsible use of AI in education. This includes the importance of critical assessment of AI outputs in relation to course content and ethical questions.
- Specific guidelines for using AI, stipulating in which type of learning activities and/or assignments and learning moments AI is allowed and in which form.

The complete ECM AI policy with details of these components can be found in Appendix A. However, here it is important to emphasise that an AI policy for a different programme might need to be amended to the plausible and meaningful AI technologies and tools that are most relevant for this specific programme and its content.

In the case of the ECM programme, with its social science focus and extensive use of written assignments, this implied a focus on tools based on LLMs such as ChatGPT, Copilot, Gemini, Chatsonic or Perplexity AI that can generate plausible sounding text from their training data, but can also summarise, transform or provide alternative explanations of existing content. It also implied making explicit references to tools like Grammarly or DeepL, which are also LLM-based and are commonly used for grammar, spelling, or syntax corrections to content provided by users.

Considering this main use, we also saw the need to establish three different GenAI task categories, which ECM students can use in their education: Summarising, Transforming and Generating. We used these categories to distinguish opportunities, limitations and risks in the use of GenAI in our education and guide specific levels of use (see Table 2).

We also used the three categories as an important framework for mitigating risks, mainly regarding »AI hallucinations« where generated content contains false or misleading information that does not correspond to course content. A main logic in assessing this risk is whether a student (or the user of AI) has control over the information that AI uses in its outputs. Such control is mainly in the prompts that are given to the AI tools when asking it to perform a given task. As shown in Figure 2, the summarising and transforming tasks imply that students either provide the AI tools with content from the course literature they want to summarise or clarify, or they provide their own texts to be checked for spelling or grammar mistakes, or improved in terms of style, readability or argumentation. Control over input allow students to have greater opportunity to assess if the outputs produced by AI tools are true and relate to the topics, concepts, contexts, etc. of a given course.

Greater risk exists when asking AI tools to perform generating tasks with very little input or consisting of a simple question, e.g. »Explain what a constitutive perspective on communication is«. In this case, outputs are generated from what we call »the black box of training data«, which can easily lead to outputs or content unrelated to the course. Such outputs are more unpredictable and more likely to be wrong the less they are

represented in training data. Thus, they come with the most risks for specialised courses or courses with terminology used in specific ways that differ from ordinary uses of these terms. In some cases, outputs can also be problematic, biased, or unethical.

Table 2. GenAI tasks: Opportunities, limitations and risks.

Task category	Opportunities	Limitations	Risks
Summarizing, whereby the student provides content/text that should be summarized: includes reducing, clarifying, explaining, paraphrasing or providing alternative descriptions of texts in course material	Making course literature and content more accessible and easier to comprehend.	Limits students' ability to directly and on their own interpret, understand and explain original sources of knowledge.	Unlikely to be problematic as long as the student provides the actual text (e.g. a sentence or a paragraph) as input data, but likely resulting in »made up« responses or differences to the course content if the student only refers to the title of a text, its topic or a concept. Outputs can miss key ideas of the texts/course or contain oversimplified information.
Transforming, whereby the student provides content/text that should be changed and specifies what should happen: Includes spelling and grammar correction, but also major editing or translation of texts	Improve language, grammar and readability of students' texts. Develop writing skills and language knowledge if the student is attentive to common mistakes and how to address them.	Transformed text does not show students' real writing capacity and language knowledge, limiting the possibility of teachers to provide useful feedback. Some students may face challenges in non-written assignments or when AI use is limited or prohibited.	Simple tasks like spelling and grammar correction are unlikely to be problematic, although it might discourage students from becoming better at writing or expressing themselves. Major edits or translations of text risk losing key ideas of the student or transforming it into something that does not correspond to course content.
Generating, whereby the student requests producing specific output: Includes inspiration, ideation, brainstorming, outlining, but also generation of elaborated texts and answers to questions	Can produce plausible-sounding answers to any topic and is unique in every iteration (»generative« trait).	Limits students' ownership of ideas and capacity to demonstrate their own intellectual output. Can limit accuracy in students' tasks and assignments, as GenAI can formulate false/deceptive statements while still sounding truthful or can produce outcomes that do not correspond to what is instructed to do. Limits students' ability to detect or guarantee the accuracy of the sources of GenAI outputs (also considering that they can contain made-up references).	Risk of cheating or plagiarism. Compromises academic integrity. Failed assignments, as generated texts and ideas, can be incorrect, unreliable, or not solve the task. Outputs can also contain unethical or biased information, leading to discriminatory and unjust statements/ outcomes. Unfairness, as some students may have limited accessibility to GenAI tools, e.g. when related to subscription-based services.

Source: Appendix A. Designed by the authors.

Considering the above, the AI policy encourages ECM students to use GenAI mainly as a ›study buddy‹ that supports their understanding of course topics and content by providing interesting ideas, new perspectives or alternative explanations to what they are learning. However, the policy emphasises that students should always have in mind that, like any study buddy, GenAI is not always reliable. It may provide incorrect answers or explanations that do not correspond to course content. The policy also warns that GenAI can jeopardize students' ability to independently develop core academic skills, including thinking creatively, critically and originally, or

their ability to find and interpret sources. Hence, the policy encourages students to use GenAI only when support from teachers or classmates is not available. It also recommends students to be attentive to AI's limitations and risks (as described in Table 2), to always evaluate and be critical of GenAI-generated content, and to verify outputs against course material (see more on this in the next section).

Beyond these general recommendations, the ECM AI policy specifies five levels of AI use for specific learning activities and assignments (see Table 3). When deciding on the levels, we found important to distinguish between the use of AI 1) during preparations for learning activities or assignments allowing students to use AI as support for understanding course material, e.g.: summarising, clarifying, providing alternative descriptions of, texts in course material; and 2) during submission of learning activities or assignments meaning that students use AI in the preparation and development of outcomes that they are required to submit.

The ECM AI policy specifies that students should always check for the allowed GenAI use level. The level should be specified in the course, TLA or assignment instructions. Using GenAI in ways that are not specified in instructions can be considered as cheating/academic misconduct and can result in the student having to retake an assignment or a course. In all levels, simple transformation tasks such as spelling and grammar correction using tools like Grammarly or built-in writing assistants are allowed in TLAs or assignments, unless indicated otherwise by the teachers. Similarly, images generated by AI tools should always be acknowledged in Figure captions as part of the common practice of crediting the source of an image, regardless of the use level and even when citations of AI text content are not required.

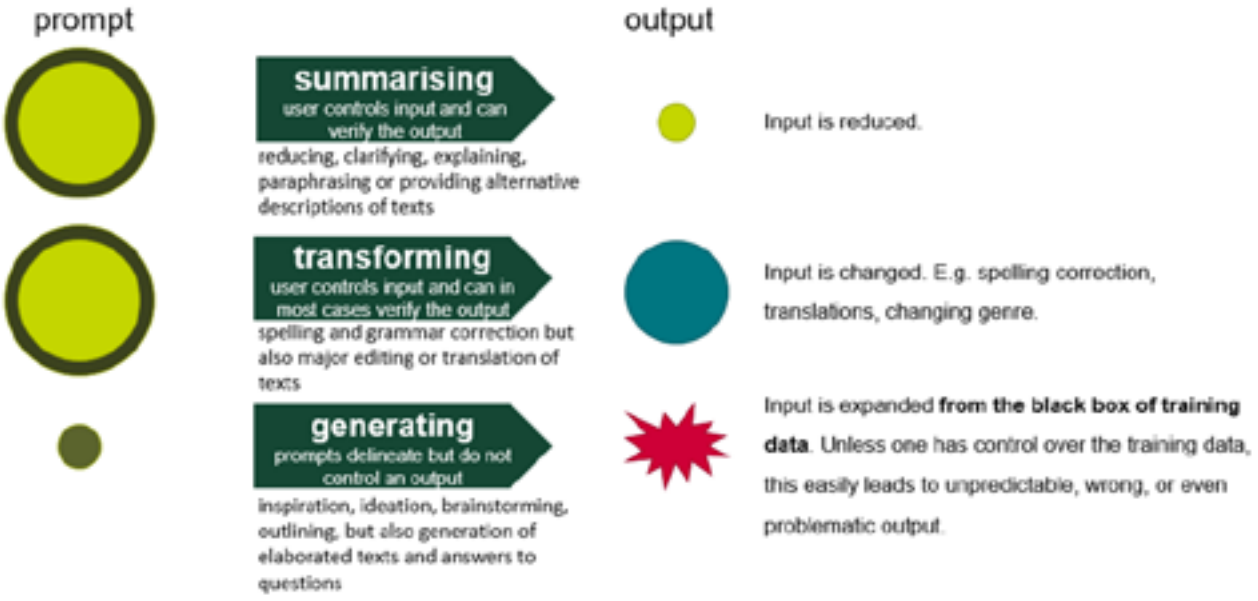

FIGURE 2. CATEGORIES OF GENAI TASKS. DESIGNED BY THE AUTHORS.

The policy also notes that teachers can adjust the levels, considering opportunities and limitations of implementation in a particular course. The policy also includes examples on how to cite AI-generated content and how to do AI disclosures as required at some levels (see more below).

The AI policy has been presented as a work in progress, which required continuous revision and development based on students and teachers' experiences when using it.

Table 3. GenAI use levels, policy and requirements in the classroom

Level of use		Policy	Student Requirements
Level 1	No use	AI use is strictly prohibited in any form during assignment or TLA. AI use constitutes cheating.	- Although the format or aim of these activities will make it difficult to use AI tools, students should avoid AI use at all costs.
Level 2	Limited free use only during preparations; may not be used for submissions	Limited summarizing tasks can be used freely as support for understanding course material, e.g.: summarising, clarifying, providing alternative descriptions of, texts in course material. - Mainly used for assignments and for mitigating risks of cheating and plagiarism. Can also be used for TLA's.	- AI Disclosure included in submissions of assignments. - AI Disclosure for TLAs only if indicated by teacher.
Level 3	Limited free use during preparations and submissions	(Level 2 plus) limited transformation and generating tasks can be used freely as support for producing submissions e.g. inspiration, ideation, brainstorming, outlining, editing text.	- Demonstrate own intellectual output in submissions. - AI Disclosure included in submissions. - Citations of AI generated text/ideas included in submissions. - AI Disclosure and citation for TLAs only if indicated by teacher.
Level 4	Intended use according to specific instructions	Intentional use for summarizing, transforming and/or generating task according to when and how it is specified in instructions; cannot be used in any other way. - Mainly used for TLA's and assignments where AI is used to achieve particular learning outcomes.	- AI Disclosure and citation only if indicated by teacher.
Level 5	Full free use in preparations and/or submissions	Free use of summarizing, transforming and/or generating tasks at any stage. - Suggested to be used only for TLA's, not for assignments.	- Demonstrate own intellectual output in submissions. - AI Disclosure included in submissions. - Citations of AI generated text/ideas included in submissions.

Source: Appendix A. Designed by the authors.

3.2 Building AI Literacy

From our experiences and discussions in the pedagogical project, we have concluded that building AI literacy is not so much about learning about available AI tools and how they can be used. Instead, in an academic context like the ECM programme, it is to foster the capacity and skills to exert a critical approach towards using and assessing AI tools. This builds on the earlier mentioned principle of incorporating AI as part of existing learning goals of a course, and the fact that learning how to use AI is not one of these. As it will be explained below, this however does not mean that students do not get the opportunity to gain experiences and skills with using AI tools.

Critically assessing and engaging with AI generated content, is what we have called »AI oversight«. Developing skills and experiences that allow students to conduct oversight (the action of overseeing something) to prevent the all-too-common uncritical and problematic AI oversight (failure to notice wrong, or even problematic AI output) is a core component for building AI literacy. The main idea behind this is that in order to be able to use AI outputs in a responsible and productive manner, students need to be able to evaluate and critically engage with the usefulness of any output.

The pedagogical project has resulted in the development of general recommendations for carrying out such oversight. A key foundation for this is the abovementioned opportunities, limitations and risks included in the ECM AI policy, as well as its explanations on the way that risks correlate to how AI works. From this, we developed a set of general guidelines for using AI, included in the ECM AI policy, with recommendations for critically assessing and engaging with AI-generated content as follows (see detailed description in Appendix 1):

- Use GenAI to support your understanding of course material, not as a supplement to it
- Have control over input data
- Always evaluate GenAI-generated content and verify it against course material and other sources of information
- Always maintain and ensure your own intellectual effort and output
- Be attentive to biased, unethical, or unjust GenAI outputs
- Protect your and others' privacy and copyrights
- Embrace academic integrity, always indicating which ideas are your own and which are from AI sources
- Continuously reflect on your use of AI.

These concrete recommendations and instructions about AI oversight are also helpful to develop students' capacities for professional judgment in other teaching and learning activities. Below we present two concrete examples of these results showing different ways and degrees of oversight in ECM education. Two more advanced examples corresponding to course-based TLAs are presented in the next section, as they also relate to our third stage for embracing AI as a pedagogical tool in education i.e., following professional changes. All of these examples are considered as part of the outcomes that the pedagogical project aimed to

achieve concerning »course activities that help students productively use, reflect on, and critically interrogate AI-based text generation, which could be integrated and relate to the 1st year courses of the ECM programme«.

The first and simplest, although still very important, example of this oversight is the requirement for AI disclosures in assignments, which have used AI. Text Box 1 shows the instructions for such disclosures.

Teachers are allowed and encouraged to adapt these instructions to fit specific requirements of their TLAs or assignments and to developed them by adding concrete questions regarding course topics or content.

AI Disclosures:

AI disclosures are meant toprovide students the oportunity to embrace academic integrity, be transparent about their use of AI, avoid any suspicion of cheating or plagiarism and develop skills and experiences with assessing and critically engaging with AI generated content. The following points are recommended to be included in the AI disclosure:

- Declaring which AI tool(s) were used
- Explaining how and why it was used
- Explaining how the AI outputs were evaluated
- Indicating where the outputs were used in the TLA or assignment.

TEXT BOX 1. INSTRUCTIONS FOR AI DISCLOSURES. EXCERPT FROM ECM-COURSE INSTRUCTIONS, TRANSCRIBED BY THE AUTHORS.

Appendix 1: Use of Artificial Intelligence

During the writing process, I used the Artificial Intelligence ChatGPT several times.

- Asking for reformulation of paragraphs in which I lost my string of thought. None of them were used as ChatGPT did not provide the meaning to me that I intended to communicate. Nonetheless, I used them as an orientation when reformulating my thoughts.
- Asking for feedback on different occasions, e.g., if my report was according to the guidelines, if the report shows in-depth knowledge of communication theory, how I can engage more with the guiding questions.
- Asking for translation of Ulf Kristersson's Instagram post.
- Asking for synonyms of words on several occasions.
- Asking for code-name for the organization I worked with.
- Asking it for interpretation of Turner's definitions of institution. Nonetheless, I still didn't understand it (or maybe didn't trust the definition) and asked [the teacher] instead.

Nonetheless, the use of ChatGPT showed me the limits of using artificial intelligence for writing a personal report. Firstly, it didn't seem like ChatGPT could engage with thoughts around communication theory in an accurate way. Moreover, my experiences are deeply personal, and ChatGPT so far is not able to engage with my feelings in the way humans could.

TEXT BOX 2. EXAMPLE OF AI DISCLOSURE PRODUCED BY A STUDENT. EXCERPT TRANSCRIBED BY THE AUTHORS.

You are encouraged to read and understand the course literature on your own without the support of any AI tool. Doing so will enhance the development of core academic skills such as independent learning, creativity, originality and critical thinking. While GenAI tools can be seen as a "study buddy", that can provide e.g. clarifications of and alternative perspectives on the texts, we prefer that you use the members of your literature group as study buddies and collectively support each other in and enhance the understand of the texts. The tasks in the recommendations above are meant to do that.

Despite this recommendation, you may still want to use AI as support for understanding the texts. If that is the case, please follow the recommendations below as well as the general guidelines of the ECM AI policy document. Note that the members of your literature group can provide the same support that is described below.

1. Initial reading

- Read the texts of the course literature on your own without any support for AI.
- While reading try to identify the main ideas of the text using questions like: what are the analytical or practical problems that the text address? What solutions or suggestions does it offer? What are the key themes, arguments or concepts?

2. Using AI for support

- If you struggle to identify main ideas, themes, arguments, concepts, use a GenAI tool like ChatGPT, Quillbot or Scholarcy. Copy-paste a section of the text into the AI tool and ask questions similar to those in step 1.
- If there are parts of the text that you do not understand, ask a GenAI tool like ChatGPT to give you an explanation or example. If you don't understand a given concept or term, provide the passage where the concept/term is and ask for an explanation or example within the context of the passage.

3. Assess the AI's response

- Evaluate the GenAI generated content: Does it makes sense? Does it relate to the topics, concepts, contexts, etc. discussed in the text and in the course?
- Compare the GenAI answers with what you identified in your own reading; if there are differences, it doesn't mean that what you identified is wrong. Treat the GenAI answers as offering alternatives to what you found rather providing you with the only and correct understanding of the text.

4. Refine your understanding

- Use the comparison in step 3 to refine your identification and understanding of the main ideas, themes, arguments or concepts of each of the theoretical perspectives. Decide on what you (not AI) find more valuable for understanding the theoretical perspective.

5. Ask for summaries if short of time (only recommended for Supplementary Readings – SRs)

- In your literature studies, SRs are text that you need to read and use in assignments. Hence you might spend most of your literature studies time on reading them. If that is the case, but you still want to get quick insights into the content of SRs, you can use AI tools like ChatGPT or Quillbot.
- Use these summaries to determine if it is worth to spend some time on reading the full text. Note that you can achieve the same thing by reading the abstract of the text, its introduction or conclusion.
- Use the recommendations above if you decide to read the text and use AI as support.

Remember that GenAI tools are mainly statistical machines, without true comprehension or reasoning abilities and that its answers are generated from identifying statistical patterns in their training data. Accordingly, the responses can miss key ideas of the texts or contain oversimplified or wrong information (see more details in ECM AI policy document).

TEXT BOX 3. RECOMMENDATIONS FOR USING AI SUPPORT DURING LITERATURE STUDIES. EXCERPT FROM ECM-COURSE INSTRUCTIONS, TRANSCRIBED BY THE AUTHORS.

AI disclosures have already been required in the final assignment of the Internship in Environmental Communication course. Text Box 2 shows an example of how a student used it and illustrates what it means to assess and critically engage with AI to produce content at its most basic level. Moreover, requiring this disclosure and emphasizing the need for AI oversight in this course led to an interesting discussion during the presentations of the final assignment, mainly focusing on how some students had experienced an uncritical and unreflective way of using AI in the workplace of their internships.

The second example, illustrating a more advance level of how to include oversight in EC education, can be seen in the recommendations that we developed for using AI during literature studies (see Text Box 3). These recommendations included the main ›study buddy‹ approach of the ECM AI policy, linked to its opportunities, limitations and risks.

It is important to mention that, based on the discussions and experiences that have taken place during the pedagogical project, we see the focus on oversight as a key element in embracing AI for pedagogical and learning purposes. In order to be able to carry out such oversight, students require course specific knowledge. Hence, oversight exercises, even regarding general reflections as the ones above, provide students with the opportunity to develop and demonstrate their learnings from the course. It also allows students to explore and be mindful of limitations, risks, ethical considerations when using AI, but also potential opportunities, all of which is part of building AI literacy.

Finally, building AI literacy was also accomplished amongst the teaching staff of the ECM programme through their participation in the workshops and seminars mentioned above. These activities allowed the participating teaching staff to not only understand and know about the available AI tools and their uses in education, but also foster the capacity and skills to judge how to use or prohibit AI tools in their courses. This will be shown in sections 4 and 5 when describing more advanced use of AI in two TLAs developed within the pedagogical project.

3.3 Following professional changes

Given the increased use of AI tools in EC-related practices, we considered that TLAs using AI should give students the opportunity to gain skills and test potential applications of AI in potential professional tasks. These opportunities would, of course, take into consideration the lessons and ideas presented in the two previous sections; particularly in terms of linking AI use to the learning goals of the course and focusing on AI oversight.

The pedagogical project has not systematically taken stock of how AI is being used in EC-related practices. From informal interaction and exchange with a few selected professionals, we however know that AI is already used frequently by EC professionals. Within these practices, professional skills are highly relevant to both conceiving solutions to their problems whose execution can be supported by GenAI, and to having oversight over any related AI-recommended outputs or texts. In the future, we intend to explore more systematically how EC professionals think of GenAI to further develop our use of AI in TLAs. The activities that we developed

include professional uses of AI based on these insights and with concrete inputs from students who carried out internships, but also identified during the different workshops of the project.

The developed TLAs are mainly workshops where students are instructed to use AI in a specific form and for a specific purpose. As such, they correspond to GenAI use Level 4 of the ECM AI policy, stipulating intended use according to specific instructions. We focused on workshops where students could use AI to become faster in producing part of the expected outcomes, either through brainstorming or generating content that they would later have to assess according to course specific content, corresponding to the abovementioned AI oversight. Oversight, and not the production of specific outcomes, was accordingly the main focus of the developed TLAs, linked to concrete course topics. While carrying out such tasks students would also have the opportunity to gain experience in using different AI tools, including how to prompt questions, for achieving concrete results. Guidance on how to this was also included in the instructions of the developed TLAs.

The first TLA was developed for a workshop of the Introduction to Environmental Communication course. This was an already existing workshop focusing on producing a communication artefact (e.g. Instagram post, Youtube video, magazine cover, poster, flyer or postcard) about an environmental theme targeting students' families. Students are expected to work in groups of interdisciplinary composition and diverse cultural backgrounds. This would imply that students would have to engage in a collective process of meaning-making, which is a main topic of the course, including discussing potential disciplinary and cultural differences in terms of which symbols, images, messages, etc., would be more meaningful or suitable for what the artefact wants to achieve and their target audience.

In a previous version of the workshop, students used a free online graphic design tool called Canva to produce the communication artefacts. We realised that Canva recently added an AI function called »Magic Design« to support the production of content. We know that Canva is commonly used in communication related-practices. Hence, we saw an opportunity to use this function as part of our efforts to embrace AI in our education following potential professional changes and uses. Figure 3 provides an overview on the parts of the workshop concerning AI.

The use of AI was only one of several steps and topics to consider in the workshop. Within these steps, students need to first brainstorm on their own ideas for the communication artefact and only after start using Canva's AI function. Comparing their ideas with AI's suggestions and reflecting on if and how the latter influences their final outcome is an important learning component of the activity. Text box 4 shows the instructions regarding how students should assess and critically engage with the AI output, connected to the above mentioned oversight and goal of building AI literacy[5].

5 The image on the right in Figure 3 shows what Canva can suggest using its AI and templates function. This implies a particular way of communicating about climate change, through the images, colours and words selected, which students should reflect about and discuss (as shown in the pink speech bubble that we added).

Canva's templates and AI features:

One of the main features of Canva is the predefined templates that users can choose from for creating graphics and visual communication artefacts of all kind. These templates are meant to serve as inspiration and suggest formats, colours, graphics, images and even text that it considers relevant for a certain topic. Recently Canva added a generative AI function called »Magic Design«, making its suggestions even more advanced and potentially increasing its influence on what is communicated about a certain topic and how. Canva's templates as well as its AI technology are based on large datasets, which it then uses to generate possible sounding or looking content for communicating about a topic. This content however is not always reliable. It can be false and contain biased information.

Considering this, we want you to always be attentive and reflective on how you use Canva; especially on how it can influence the production of your artefact, e.g. the choice of formats, content, images, text, etc. For this keep track of how you use the Canva templates and its Magic Design AI tool e.g. **was it for brainstorming, find inspiration, or outlining the design? For generating content? Which prompts did you use and what were the results? How did you evaluate Canva's suggestions/outputs? How did you use its output in the final product of your artefact? How did it change or affected the decisions that you made in Step 1?**

With questions like these, we hope you to be able to reflect on how your group's meaning making process, including the decisions that you made in the previous step, can be affected by the use of tools like Canva and AI technology. We believe that this is important in order to build AI literacy, not only in terms of how to use AI tools but also being reflective on the ideas, norms, values, communication practices that AI technology can reinforce (for better or worse).

TEXT BOX 4. SPECIFIC INSTRUCTIONS REGARDING USE AND OVERSIGHT OF CANVA AI TOOL IN THE INTRODUCTION TO EC COURSE WORKSHOP. EXCERPT TRANSCRIBED BY THE AUTHORS

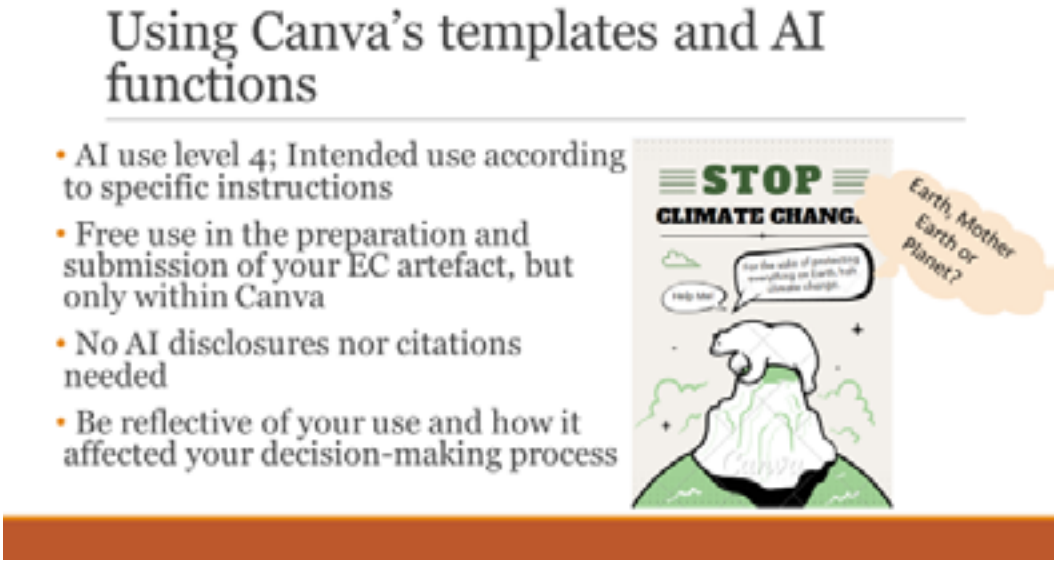

FIGURE 3. OVERALL INSTRUCTIONS AND APPROACH FOR USING AI IN EC INTRODUCTION COURSE WORKSHOP. SLIDE TAKEN FROM ECM-COURSE LECTURE.

The second TLA was developed for a workshop of the Communication Theory and Strategy course. This was a new workshop with the intention to try out different communication strategies outlined in the course literature (e.g., informative, persuasive, promise-reward, rational, emotional) to influence changes in a sceptical uncle's thoughts on the climate crisis. Students were instructed to first come up with messages that they considered the most appropriate following assumptions of what would best work for their sceptical uncle and different strategies learned in the course. They were later asked to engage with ChatGPT or any other LLM tool to produce additional messages and compare the two outcomes.

Following concrete reflection questions, the comparison allowed students to assess and critically engage with the AI generated content focusing on preconditions or assumptions that the AI tool might consider when producing their outcomes—and how these differ from the students' assumptions. The comparison also allowed students to see other potential interpretations and applications of communication strategies as understood by AI. Furthermore, there was a learning moment in breaking down a complex idea into a brief explanation to be used in the prompt; for this aim, an example prompt was provided that required students to fill in certain details based on their own understanding. The focus on preconditions, assumptions and different types of communication strategies are key topics of the course, as the exercise supports students in developing and demonstrating their knowledge of these topics. Text box 5 shows extracts from the workshop instructions including examples of prompts that can be given to the AI tool. The latter is also expected to allow students to develop skills and experience of using AI tools.

Task: Communication as Influence — Workshop on Message Strategies

For as many of the message strategies as you have time for, in your preferred order, complete the following steps:

1. Brainstorm and write down two different messages (one or two sentences each) that might convincw someone (e.g., your uncle) who does not consider the climate crisis as affecting them and being affected by them.
2. Reflect on if and under what circumstances these messages might be successful. What kind of person (e.g., preconceptions, background, profession, feelings, worries, identity) would be the ideal »target«?
3. Reflect further on additional factors that might be influential, such as your »ideal« relationship with that person or the »ideal« situation in which the message is inserted.
4. Repeat step 1 using ChatGPT or another LLM of your choice by generating further potential messages for this message strategy (see the tips below for a suggested prompt). How do these suggestions compare to your and to how you understand the situation and the message strategy? Do they have other preconditions? (If so: why?)
    - You can read again about the message strategies and the contextual factors in which they make sense in Werder (2014), pages 272–274.
    - For task 4, we suggest to use ChatGPT in an anonymous browser window without logging in. One potential prompt for task 4, with you filling in a brief instruction how you understand a strategy, could be: »Generate messages that I could tell my uncle who does not believe in climate change, which I think is a problem. Each message should be one or two sentences long. Return five messages for each of the [informative/persuasive/promise-reward/…] message strategy, which [focuses on information and rationality/appeals to emotions and values/…]«

TEXT BOX 5. INSTRUCTIONS FOR AI BASED WORKSHOP IN THE COMMUNICATION THEORY AND STRATEGY COURSE. EXCERPT TRANSCRIBED BY THE AUTHORS.

An important component in the design of these two TLAs is that there are no significant risks for students' learning process if the AI outcomes are false, wrong, biased or unethical. In other words, students are not asking for outputs that are supposed to be real or related to course topics, theories or ideas. Asking for those could be problematic, as AI responses might not correspond to what is being taught in the course. Instead, the outputs are meant to be hypothetical and provide alternatives to what they themselves consider meaningful and effective communication. Being able to compare the two, and assess if what AI suggested is something they find valuable or shows a different perspective from their own ideas provide an important input to the learning process. Thus, AI provides opportunities for reflections and discussions about the topics of the TLAs that can also emerge even if the AI outputs are completely wrong or useless, as we have experienced.

Both workshop instructions were discussed and further developed in the final workshop of the pedagogical project: »Designing Teaching and Learning Activities (TLAs) integrating AI«. During this workshop, we also brainstormed and discussed other TLAs that could be developed in the Conflict, Democracy and Facilitation course. The results of the brainstorming exercise included:

- Asking AI to create hypothetical conflict cases that could be analysed based on course topics
- Ask AI to help develop characters for a role-play regarding a conflict situation.
- Use AI to brainstorm on potential ideas for designing a facilitated process.
- Asking AI to facilitate a conflict between two opposing parties to see if ideas about conflict resolution that are taught in the course are used.

The discussions of the workshop and the resulting brainstorming ideas will be considered in the planning of future courses.

4 Impact of the Project on future courses and teaching activities

The impact of the project can already be seen beyond its original focus on the ECM programme. Interest and early effects of its results can also be seen in the programmes of the Department of Urban and Rural Development and in some programmes and teaching forums at the NJ Faculty and SLU. We outline them in the following sections.

4.1 Impact within the ECM programme

As already implied in this report, the pedagogical project is already having a significant impact in the courses of the ECM programme. All ECM courses are at least using the ECM AI policy to guide students in their use of AI including:

- For individual studies, by using the general guidelines for using AI of the AI policy or the recommendations for using AI in literature studies.
- In assignments, through specifications of which GenAI use level is allowed, including requirements for AI disclosures and in some cases providing recommendations on how to do this
- In individual TLA of some courses, such as the examples provided in Section 4.1

This has been possible thanks to the active participation and engagement in the workshops and seminars of the pedagogical project of most of the ECM teaching staff responsible for courses.

The results and experiences from the pedagogical project will continue to be developed both at the programme level, through discussions of the experiences of using the ECM AI policy, and in courses through the new and further development of AI related TLAs. Hence, it is expected that the findings and experiences from the pedagogical project will continue having an impact in the future.

4.2 Impact at the Department of Urban and Rural Development

Beyond the ECM programme, the pedagogical project has received great interest and attention at the department. This has been thanks to the participation of teaching staff from other department programmes at the project's workshop during the department's internal conference at Marholmen, as well as the

involvement of the department's director of undergraduate studies Helen Arvidsson in both formal and informal discussions of the project. The progress and results of the pedagogical project have also been presented and discussed several times in the department's collegium for directors of studies, comprising directors of studies from the Rural Development and Landscape Architecture MSc programmes, as well as the Agronomy, Political Science and Landscape Architecture undergraduate programmes.

As a result of these different activities and discussions, all of the department's programmes are now in the process of developing their own AI policies. In this process, the ECM AI policy resulting from this pedagogical project is used as a template to be tailored to the specific content, pedagogies, and potential use of AI in these programmes. As part of this work, the ECM AI policy has also been translated into Swedish in order to use it at the undergraduate level. Members of this pedagogical project will provide support in the development of such programme-specific policies, based on the experiences and lessons gathered during the last year. Furthermore, the Rural Development and Agronomy study director has asked a member of the pedagogical project to join a teachers' meeting next year to discuss potential ideas for incorporating AI in the courses of these programmes.

4.3 Impact at NJ Faculty and SLU

Members of the pedagogical project have also been active in sharing its progress and results at different activities of the NJ faculty and teaching forums at SLU. This comprises the presentation that one of the project's team members did during SLU's 2024 Pedagogical Conference organised by the SLU's Division of Pedagogical Development (EPU). The presentation was titled »AI in the classroom: a workshop on policy, pedagogy, and literacy«[6]. It took place on the 21st of August, 2024 and was attended by approximately 60 participants from a wide range of programmes at SLU. In developing this workshop, we focused on what knowledge or insights from our project were transferable to other programmes, and how we could provide starting points for such adaptation. The overall framing of the report follows ideas developed for and in response to the workshop, including Figures 1 and 2, and sought to motivate participants to engage with AI by investigating potential risks, building shared AI literacy, and following professional changes. Connections to pedagogy, pedagogical choices, and the role of teaching and learning at the university were discussed.

Based on this presentation, the same project member was invited to the Department of Energy and Technology to carry out a workshop going deeper into what was presented at the EPU conference for the teacher collegium of that department. The workshop took place

6 Slides from the presentation can be shared upon request. Email Camilo Calderon <Camilo.Calderon@slu.se> or Malte Rödl <malte.rodl@slu.se>

on the 25th of September, 2024 and was attended by approximately 10 participants from the department.

The results and experiences have also been discussed at SLU's Distinguished University Teachers' (Excellenta Lärare) collegium. Based on this discussion, the chair of this forum in agreement with its members decided that the next meeting of this forum in January 2025 would focus on AI in SLU's education and the role that excellent teachers play in developing this. The results of the pedagogical project were presented during this meeting and served as a base for the discussion.

EPU has also been very interested in the project and arranged a workshop based on the results from this pedagogical project on the 12th of May, 2025. The workshop was titled »Generative AI in higher education? On AI guidelines and pedagogy«. During the workshop, participants explored similarities and differences of the ECM experiences with AI to their own teaching through a series of exercises touching upon topics like examinations and academic integrity, guidelines for using AI in and outside the classroom, links between AI and development of generic academic competences, when and how to use generative AI in teaching, and what to look out for in the future. This provided opportunities for discussing the pedagogical project and its results with teachers and relevant actors across SLU.

5 Conclusions

The pedagogical project proved to be a timely and impactful endeavour. Timely, since it has allowed teachers of the ECM programme to be proactive and start addressing, in an informed manner, potential challenges to academic integrity caused by generative AI. Moreover, it has allowed teachers and courses to be upfront and transparent about which AI tools are allowed, and when and how it is allowed to use them, reducing uncertainty among students. Before the project, we felt that a big and scary AI wave was going to slam us, and we were not prepared. We now believe that the project enabled us to catch the wave at the right time and, without hesitation, ride it – not with complete certainty, but with a measure of control.

The project has also had an impact beyond the one that we initially intended and hoped for. The attention and interest on the progress of the project and its results at the EC division, the Department of Urban and Rural development, and SLU, show its current and future relevance for pedagogy and education.

Beyond the actual results in terms of the ECM AI policy and the design of particular TLAs, the project has given us the time to have important, and at times difficult, discussions on the role of the university and educational development as well as reflections of our own pedagogy in terms of what it means to embrace AI as pedagogical tools. Important to highlight here is that:

- AI has, indeed, a role to play in education and pedagogy if appropriately embraced. However, that role is still a minor one compared to existing pedagogy. The value that contact and interactions with teachers and fellow students has for learning and for developing core academic skills should still be prioritised while adapting to new technologies.
- To effectively embrace AI as a pedagogical tool in education, universities must adopt a strategic approach consisting of three interconnected stages:
  1) mitigating potential risks,
  2) building AI literacy, and
  3) following professional changes.
- AI is indeed a challenge to academic integrity, and universities must take measures to mitigate potential risks. This includes providing students with information and guidelines to avoid their inappropriate use of AI tools or prevent them from taking shortcuts that can hinder their learning.
- Despite a growing deflation of the GenAI hype bubble, AI tools will increasingly be used in professional life. Universities need to be able to follow professional changes and adapt to them.
- Universities can and need to play an important role in building AI literacy. Building AI literacy is not merely about teaching students how to use available AI tools. Rather, it focuses on equipping students with the knowledge and skills to critically evaluate and engage with AI outputs. We call this »AI Oversight«.

- AI oversight is key to ensure that AI is utilized responsibly and effectively, maximising its opportunities. Designing learning and teaching activities to develop students' knowledge and skills for performing AI oversight, is of key importance.
- A strategic approach to embracing AI in education requires a continuous cycle of testing, evaluating, and refining new methods for incorporating AI into teaching practices. Involvement and collaboration among teachers, students, education administrators, and professionals are crucial to ensure the successful and sustainable implementation of the approach.

Appendix A

ECM AI Policy

The development and use of Artificial Intelligence is expanding quickly. Different AI tools are increasingly becoming relevant in education and practice. Accordingly, at the Environmental Communication and Management (ECM) programme we believe that it is important to approach and embrace AI in our teaching.

This policy document provides information on how AI is incorporated into the ECM programme. It includes basic explanations of AI, its opportunities, limitations and risks, as well as general guidelines and levels of AI use in teaching and learning activities (TLAs) and assignments. This policy is a work in progress. Teachers and students are encouraged to continuously discuss its appropriateness in a collaborative manner, based on try-outs and feedback, so that it can be updated.

What do we mean by artificial intelligence? What type of AI are we using in our classrooms?

AI technology is diverse, yet it commonly refers to »computer systems that are able to perform tasks that *normally* require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages« (Joiner, 2018).

In our education, the most relevant AI technology so far is *Generative AI (GenAI)* and particularly *Large Language Models (LLMs)*. *GenAI* refers to artificial intelligence systems and tools that have the ability to »generate« (thus its name) new and innovative content, spanning from text to other forms of media (e.g. images or music). *Large Language Models (LLMs)* transform one text (an input or prompt) into another (the output), with common applications being text generation, summaries, translation, proof reading, or text analysis; all of these can be useful to support ECM students' learning. These transformations are possible, because LLMs are trained on vast training datasets primarily taken from the internet and then »learn to predict the next word in a sentence and, from that, generate coherent and compelling human-like output in response to a question or statement« (Sabzalieva and Valentini, 2023). Thus, **LLMs are mainly statistical machines, without true comprehension or reasoning abilities**. They generate plausible sounding responses by identifying statistical patterns in their training data, without contextualized, in-depth and critical understanding. The latter are, however, key academic components in and goals of ECM education.

There is a wide variety of GenAI and LLM tools with differences on their main task and the type and scope of input provided by users. For example, some

proofreading and writing assistants rely on LLMs, including *Grammarly* or *DeepL*, which recommend (or make) grammar, spelling, or syntax corrections to the content provided by the user. Other tools, such as *ChatGPT, Copilot, Gemini, Chatsonic* or *Perplexity AI* focus on the production of written content, whether it is summarising, transforming or generating new content in multiple formats. Most of these tools operate as a *chatbot,* simulating a human conversation in which outputs are based on responses to users' inputs or »prompts« in the form of questions or statements; while some do this exclusively based on the training data, others can summarize online search results. The same applies to text-to-image generators like *Dall-E*, *Firefly,* or *Midjourney,* which create graphic outputs (i.e. images) based on users´ textual prompts.

What are the opportunities, limitations and risks of using GenAI in education?

In the ECM programme we establish three different GenAI task categories which can be used by our students in their education; Summarising, Transforming and Generating. We used these categories to distinguish opportunities, limitations and risks in the use GenAI in our education (see Table. 1). With this, we want to encourage our students to mainly use GenAI as a ›study buddy‹ that support their understanding of course topics and content by providing interesting ideas, new perspectives or alternative explanations to what they are learning. However, it is important to always have in mind that, like any study buddy, GenAI is not always reliable. It may provide incorrect answers or explanations that do not correspond to course content. Moreover, GenAI can jeopardize your ability to independently develop core academic skills, including thinking creatively, critically and originally, or your ability to find and interpret sources. Hence, we encourage students to use GenAI only when support from your teachers or classmates is not available. When using GenAI's support, students should be attentive to its limitations and risks (as described in Table 1), always evaluate and be critical to GenAI-generated content, and verify it against course material. More information on how to mitigate risk and limitations of using GenAI is provided in the next section.

General guidelines for using GenAI in ECM education

Considering the abovementioned opportunities, limitations and risks, we have established some general guidelines that students should follow disregard of which task is used. These are:

- **Use GenAI to support your understanding of course material not as a supplement to it**. You are encouraged to first read course texts and other original sources and, if needed, only use GenAI as a support to understand these. If you struggle with course contents or tasks and are relying too much on GenAI's support, it is more advisable to speak to a teacher or fellow student.
- **Have control over input data**. This means providing GenAI with course content/texts (and not only with bibliographic information or abstracts) when asking it to perform a task. Do not rely on GenAI to generate new information or ideas or explain course topics/concepts from scratch or in isolation from course material or content.

Table A1. GenAI tasks: Opportunities, limitations and risks.

Task category	Opportunities	Limitations	Risks
Summarizing, whereby the student provides content/text that should be summarized: includes reducing, clarifying, explaining, paraphrasing or providing alternative descriptions of texts in course material	Making course literature and content more accessible and easier to comprehend.	Limits students' ability to directly and on their own interpret, understand and explain original sources of knowledge.	Unlikely to be problematic as long as the student provides the actual text (e.g. a sentence or a paragraph) as input data, but likely resulting in "made up" responses or differences to the course content if the student only refers to the title of a text, its topic or a concept. Outputs can miss key ideas of the texts/course or contain oversimplified information.
Transforming, whereby the student provides content/ text that should be changed and specifies what should happen: Includes spelling and grammar correction but also major editing or translation of texts	Improve language, grammar and readability of students' texts. Develop writing skills and language knowledge if student is attentive to common mistakes and how to address them.	Transformed text does not show students' real writing capacity and language knowledge, limiting possibility of teachers to provide useful feedback. Some students may face challenges in non-written assignments or when AI use is limited or prohibited.	Simple tasks like spelling and grammar correction are unlikely to be problematic, although it might discourage students from becoming better at writing or expressing themselves. Major edits or translations of text risk losing key ideas of the student or transforming it into something that does not correspond to course content.
Generating, whereby the student requests producing specific output: Includes inspiration, ideation, brainstorming, outlining, but also generation of elaborated texts and answers to questions	Can produce plausible-sounding answers to any topic and is unique in every iteration (»generative« trait).	Limits students' ownership of ideas and capacity to demonstrate own intellectual output. Can limit accuracy in student's tasks and assignments, as GenAI can formulate false/deceptive statements while still sounding truthful or can produce outcomes that do not correspond to what is instructed to do. Limits students' ability to detect or guarantee accuracy of the sources of GenAI outputs (also considering that they can contain made-up references).	Risk of cheating or plagiarism. Compromises academic integrity. Failed assignments as generated texts and ideas can be incorrect, unreliable, or not solve the task. Outputs can also contain unethical or biased information, leading to discriminatory and unjust statements/ outcomes. Unfairness as some students may have limited accessibility to GenAI tools, e.g. when related to subscription-based services.

Source: Designed by the authors.

- **Always evaluate GenAI generated content and verify it against course material and other sources of information.** Consider for example if the output makes sense, connects with your input/question or whether it relates to the concepts and topics discussed in the course.
- **Always maintain and ensure your own intellectual effort and output.** Avoid using GenAI for major *summarising, transforming* or *generating* tasks. Use AI for specific and limited tasks rather than entire projects. Do key intellectual work on yourself e.g. developing arguments, analyzing data or drawing conclusions. Ask GenAI for feedback or suggestions rather than asking it to do the work for you. The latter would be the equivalent of asking someone else to carry out your studies or assignments. Similarly, refrain from directly copy-pasting GenAI-generated text under any circumstances, as it could result in cheating or plagiarism.

- **Be attentive to biased, unethical, or unjust GenAI outputs.** Assess critically the reliability and implications of GenAI outputs watching out for inaccurate, misleading, and unethical information that can have impact on any given societal group or the environment.
- **Protect your and others' privacy and copyrights**. Many GenAI platforms store your conversations and input data, so avoid sharing any personal, sensitive or confidential information about yourself or others. We also recommend using tools that do not require registration, as they better protect your privacy. Similarly, respect copyright laws by not uploading documents or copying full texts that are not publicly available. Instead use short excerpts when needed.
- **Embrace academic integrity, always indicating which ideas are your own and which are from AI sources.** In TLAs and assignments, this can require adding *AI disclosures,* citations of AI generated content and submitting copies of transcripts from AI tools. Teachers should specify if any of this is required and provide instructions following the information in Appendix 1.
- **Continuously reflect on your use of AI.** Ask yourself questions like: Am I using AI to enhance my thinking/work or to avoid/take shortcuts in thinking/doing the work? Would I be able to explain the process and result of my work if asked about it? Am I developing or diminishing my own learning process and academic abilities through my use of AI? Would I be comfortable openly discussing my AI use with my teachers?

Levels of GenAI use in ECM education

Beyond these general guidelines, students should make use of AI according to the five levels in Table 2. Students should always check for the allowed level. The level should be specified in course, TLA or assignment instructions. Using GenAI in ways that are not specified in instructions can be considered as cheating/academic misconduct and can result in the student having to retake an assignment or a course. In all levels, simple transformation tasks such spelling and grammar correction using tools like Grammarly or built-in writing assistants are allowed in TLAs or assignments, unless indicated otherwise by the teachers. Similarly, images generated by AI tools should always be acknowledged in Figure captions (see details in Appendix 2), disregard of the use level and even when citations of AI text content are not required.

Note that teachers can adjust the levels, their policy and requirements considering opportunities and limitations of implementation in a particular course.

Table A2. GenAI use levels, policy and requirements in the classroom

Level of use		Policy	Student Requirements
Level 1	No use	AI use is strictly prohibited in any form during assignment or TLA. AI use constitutes cheating.	- Although the format or aim of these activities will make it difficult to use AI tools, students should avoid AI use at all costs.
Level 2	Limited free use only during preparations; may not be used for submissions	Limited summarizing tasks can be used freely as support for understanding course material, e.g.: summarising, clarifying, providing alternative descriptions of, texts in course material. - Mainly used for assignments and for mitigating risks of cheating and plagiarism. Can also be used for TLA's.	- AI Disclosure included in submissions of assignments. - AI Disclosure for TLAs only if indicated by teacher.
Level 3	Limited free use during preparations and submissions	(Level 2 plus) limited transformation and generating tasks can be used freely as support for producing submissions e.g. inspiration, ideation, brainstorming, outlining, editing text.	- Demonstrate own intellectual output in submissions. - AI Disclosure included in submissions. - Citations of AI generated text/ideas included in submissions. - AI Disclosure and citation for TLAs only if indicated by teacher.
Level 4	Intended use according to specific instructions	Intentional use for summarizing, transforming and/or generating task according to when and how it is specified in instructions; cannot be used in any other way. - Mainly used for TLA's and assignments where AI is used to achieve particular learning outcomes.	- AI Disclosure and citation only if indicated by teacher.
Level 5	Full free use in preparations and/ or submissions	Free use of summarizing, transforming and/or generating tasks at any stage. - Suggested to be used only for TLA's, not for assignments.	- Demonstrate own intellectual output in submissions. - AI Disclosure included in submissions. - Citations of AI generated text/ideas included in submissions.

Source: Designed by the authors.

Appendix B

Instructions for AI Disclosures and citing AI produced content

Note: Teachers can adapt these instructions to fit specific requirements of their TLAs or assignments.

AI Disclosures: AI disclosures are meant to provide students the opportunity to embrace academic integrity, be transparent about their use of AI, and avoid any suspicion of cheating or plagiarism. The following points are recommended to be included in the AI disclosure:

- Declaring which AI tool(s) were used
- Explaining how and why it was used
- Explaining how the AI outputs were evaluated.
- Indicating where the outputs were used in the TLA or assignment.

Below is an example of the disclosure. Students should place their AI disclosures at the start of their essays or before their answers to assignment questions, so that examiners become aware of the AI use.

*AI Transcripts***:** AI disclosures may also require submitting the transcripts of the interactions that students had with an AI, including students' prompts/questions and the answer(s) provided by the AI tool. The transcripts should screen shot or print screen images of the interaction and should be included as an appendix in the submission. The transcripts should be referenced in in the AI disclosure (see example below). If there are several interactions/transcripts regarding different topics/questions, these should be differentiated by adding numbers to each screen short/print screen image.

The text of the disclosure and the transcripts is not counted in the word limit of the assignment.

Example of AI Disclosure (students should write a similar text for all different topics/questions/interactions)

I asked ChatGPT to provide alternative explanations of several paragraphs in Hallgren's (2016) text. I was unsure of some of the ideas that were presented in these texts and wanted them to be explained in a different way. To evaluate the AI outputs, I compared them with my notes from Hallgren's lectures and my reading group's literature studies to see if the AI's explanation were true and made sense. AI's explanation gave me insights that I used in the second paragraph of Q2. My prompts and AI's answers are show in transcript number 3 in the appendix.

TEXT BOX B1. EXAMPLE OF AI DISCLOSURE WRITTEN BY STUDENT.

Citing AI generated text content: If AI citations are required in a TLA or assignment, students must refer to AI generated text content or ideas as a secondary source. The way this is done depends on whether the AI output that students are referring to is retrievable (i.e. anyone can access it via a link) or non-retrievable.

If the AI output is retrievable then reference it as a website. For example:

- In-text citations: According to ChatGPT (2023) ... ; or … (ChatGPT, 2023)
- In the reference list: ChatGPT, 2023. Why is citing and referencing your sources important? [Online]. San Francisco, Calif.: OpenAI. Available from: ttps://chat.openai.com/share/782cb099-a0dc-45b1-8da4-0e99713f2d45 [Accessed 4 September 2023].

If the content is non-retrievable then save a copy of the transcript (as specified above), reference it as personal communication and include the reference as a footnote.

For example:

- In-text citations: According to Google Bard AI[1]
- In the footnote: [1] Google Bard AI (pers. comm.) 22 August 2023.

Disregard of whether it is retrievable or not, you should always acknowledge the use of AI generated content in the same way that you acknowledge using other authors' work. Make sure to include quotation marks (" ") if you are making direct quotes from texts generated by AI, or always use references (as described above) when summarizing or paraphrasing its responses.

Similar instructions regarding retrievable or no-retrievable AI outputs apply when using images generated by AI.

Citing AI generated image content: When using images generated by an AI tool, these should always be acknowledged in Figure captions underneath the image. This should be done disregard of the GenAI use level and even when citations of AI text content are not required. For example:

FIGURE B1. STUDENTS IN A UNIVERSITY CLASSROOM. SOURCE: CRAIYON, AI IMAGE GENERATOR.

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