

# Responsible use of Generative Artificial Intelligence

Working Group

4 July 2024



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# WARNING

In addition to the sources mentioned in the bibliographical notes and the exchanges between the parties involved in this document, the following generative AI tools were used in the design and writing of this document:

- DeepL for the translation of paragraphs from certain referenced articles to facilitate their understanding and use in this report.
- ChatGPT to propose alternative wording for a limited number of paragraphs; ChatGPT's proposals were then adapted to the style and spirit of this document.
- ChatGPT to formulate ideas which, once verified and documented, were submitted to the working group for consideration.
- The original version of this document is in French. The English translation was produced by DeepL.

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# PREAMBULE

At the end of December 2023, the Rectors' Council of UCLouvain set up a Working Group (WG) on the responsible use of generative Artificial Intelligence (generative AI). This document, the result of the WG's work, proposes recommendations for the ethical and responsible use of generative AI, both in teaching and research. The uses of generative AI for administrative work are not addressed. The document is intended to be succinct and concrete, and does not include a state-of-the-art review of all the work done on this subject. Furthermore, given the rapid and constant advances in generative AI, other opportunities or risks could quickly emerge. This document is therefore a snapshot that should be regularly updated.

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After a brief presentation of generative AI, this document looks at generative AI from the point of view of the student, the teacher and the researcher. For each of these views, a series of recommendations are proposed. There is, of course, some overlap between these views, which may lead to a degree of redundancy. This redundancy is acknowledged and allows each section to be read independently.

# **1 UCLOUVAIN AND GENERATIVE ARTIFICIAL INTELLIGENCE**

Generative AI and its associated tools offer more and more possibilities in the fields of teaching and research. Like many universities around the world, UCLouvain is open to the use of generative Artificial Intelligence technology in teaching and research. It encourages its students, teachers and researchers to use generative AI responsibly. This responsible use requires everyone to understand how generative AI works, its potential and its limitations, in order to guarantee the quality of our academic standards in both teaching and research.

## **1.1** GENERATIVE ARTIFICIAL INTELLIGENCE

Generative AI facilitates the generation of content and encourages new forms of interaction, even co-design and co-writing, between humans and machines. This means that scientific integrity standards need to be reviewed and clarified. The essential thing is for humans to remain in charge of the machine-assisted generation process and responsible for the results. It is therefore important to prepare students, teachers and researchers for new practices involving the use of generative AI.

## **1.2 HOW GENERATIVE AI WORKS**

Generative artificial intelligence is a branch of AI that covers new tools capable of generating content, such as text, images, music or even video. Numerous tools based on generative AI exist, such as ChatGPT, Gemini, Copilot, Jasper.ai, Copy.ai, Claude AI, and Chat Mistral for text generation, Elevenlabs and Natural Reader for speech synthesis, Dall-E and Midjourney for image generation, DeepL, Google Translate and Systran for translation, Perplexity and Bing for internet search, HeyGen, InvideoAI and Sora for video generation [7].

In simple terms, a text generative AI tool like ChatGPT is based on what is known as a language model (such as GPT4, LLaMa, LaMDA, *etc*). This model has been built from huge quantities of existing text (Web, books, Wikipedia, etc.). The aim of such a model is to predict the next most likely word given a sequence of previous words initiated by a query called prompt, based on its learning. The tool can thus generate a response to the initial prompt that is often conventional and general, but sometimes surprising. A precise and complete prompt leads to a more refined and specific response. In addition to language models,

*multimodal* models can be used to combine different modalities (text, image, video, sound) and use the same principle to generate the most likely images, videos or sounds based on a given input request.

When generating a response, the model does not normally access the Internet. However, these generative AIs are often already integrated into existing applications. Microsoft Bing, for example, integrates GPT-4 to summarise search results and offer conversational responses.

## **1.3** THE LIMITS AND RISKS OF GENERATIVE AI

Tools based on generative AI can be very powerful. However, the following limitations should not be overlooked:

- These tools are **not capable of understanding** either the questions or what is generated. They have no representation of the world and are not a knowledge base. As a result, the answers generated are not necessarily reliable, of high quality or accurate.
- These tools can have **biases**. What is generated by the model depends on the data used during training (reproduction of the biases present in the training data) and the way in which supervision has been carried out, as well as the rules imposed (reproduction of the biases and choices made by the model designers).
- The results and the generation process **cannot be explained** or documented. The models as such are unable to indicate the source of the content used to generate the response, and it is impossible to trace the results back to the premises and starting points (black box effect).
- The answers are derived from the data used during training and their **originality is therefore questionable**.

It is also important to highlight the risks induced by tools based on generative AI [9, 12]:

- **Generation of inappropriate content**. The responses generated or the behaviour of these tools may be inadequate.
- Information chaos and misinformation. The increasingly blurred line between synthetic and authentic content is leading to greater informational confusion, reducing the ability of individuals and citizens to make informed and autonomous decisions.
- **Malicious use**. These tools can be used maliciously, to spread false information, to generate propaganda, influence, counterfeits, deepfakes, etc.
- **Security**. These tools can provide effective instructions as well as generating programs for amateur hackers.
- Ethics and copyright. The training for these tools is often based on protected works and authorisations for the training phase have often not been clearly obtained. In addition, the lack of explicability and documentation mentioned above means that it is not possible, for a given result, to identify whether content of this type has been used.
- Violation of data confidentiality. Not all tools guarantee the confidentiality of the questions asked or information about the user. Including personal, confidential or sensitive data in a prompt can therefore be risky.
- **Reproduction and amplification of discrimination and stereotypes**. The statistical biases in the training data can reinforce the stereotypes and discrimination that already exist in our society. The supervision of these models by a small number of private operators (mostly located on the West Coast of the United States) contributes to cultural homogenisation to the detriment of the diversity and richness of local cultures.
- **Reinforcing digital divides**. The use of these tools requires certain digital skills. Widespread use of such tools can reinforce the digital divide between citizens.
- **Concentration of players in generative AI**. The high cost of developing technological tools could concentrate power in the hands of a few large artificial intelligence companies, influencing prices,

technologies and research directions. This phenomenon could also skew technical, ethical and regulatory standards, increasing the risk of abuse of power.

• Environmental costs. The carbon footprint of these tools is currently deplorable. The computing power required to train the models is very high and proportional to their size (which tends to increase exponentially). Using a model to answer a question also generates an energy cost.

## **2** GENERATIVE ARTIFICIAL INTELLIGENCE FOR STUDENTS

#### 2.1 STUDENT TRAINING

Students are not currently trained in the proper and responsible use of generative AI tools. It is therefore essential that all students, at the start of their studies and whatever their course of study, receive training in how to use these tools effectively, ethically and responsibly. Basic training could also be made freely available to the entire community.

## 2.2 USING GENERATIVE AI TO HELP STUDENTS

Any use of generative AI to assist the student in her various tasks must be carefully thought through. If part of the task can be accomplished by the tool, it is essential that the result is reviewed and integrated into a personal approach. The student is called upon to take the necessary distance, particularly with regard to the limits and risks of these tools. It should also be pointed out that when a text is submitted to a generative AI, the latter may reuse it in its subsequent learning, which may raise problems of confidentiality and copyright.

Different categories of use can be distinguished:

#### **Editorial assistance**

- Correct spelling and grammar; improve style
- Translating into another language
- Summarising a text or an article

#### Research assistance

- Offer tools that integrate search engines and generative AI
- Conduct searches within a large predetermined set of documents or information

#### Study aid

- Generate review questions (using quizzes, flashcards, etc.)
- Propose subject summaries based on documents provided
- Offer tutoring or personalised learning paths
- Answer questions about a subject
- Plan and organise a suitable study timetable
- Adaptive, multimodal adjustment of study material to make it easier to understand

#### Helping creativity

- Formulating and organising ideas
- Suggest a draft
- Facilitating brainstorming
- Propose a drafting plan

• Illustrate by creating images

#### Help with specific skills

- Generate computer code
- Help with language learning (translation, conversation, pronunciation, corrective feedback, etc.)
- Simulating experiments
- Modelling complex problems

## 2.3 EXISTING AND AVAILABLE TOOLS

## Existing tools

The number of AI tools is enormous and growing by the day. The FutureTools website [10] currently brings together and organises more than 2,700 AI tools. On its site [8], Université Laval and the Centre Hospitalier de l'Université de Montréal offer summary sheets under a free licence (Creative Commons) describing almost 50 tools linked to generative AI for training and teaching. These tools are grouped into 5 categories, but some tools are included in different categories:

- Word processing
- Image processing
- Audio processing
- Video processing
- Presentation treatment

The Université du Québec à Chicoutimi (UQAC) presents summary sheets [8], under open licence, on 11 of the best-known generative AI tools in the academic context, presenting their strengths and weaknesses.

These various sheets, as well as the five guides on AI developed by the University of Cape Town [9] could be taken up and made available to the UCLouvain community.

## Tools available at UCLouvain

The use of a generative AI tool may be subject to a charge, free of charge, but with registration (with or without consent to the use of personal data), or requiring the installation of Open Source software.

To date, UCLouvain does not have a licence for students for generative AI tools. It is important to note that in teaching, only tools that comply with the RGPD can be imposed on students, which is not the case for most free generative AI tools.

If UCLouvain wishes to commit to the responsible use of generative AI, it must provide access to this type of tool for all members of the community, including students. There are two possible avenues in this respect.

- Subscribing to a generative AI tool offered and hosted by an external company, which complies with the RGPD and is financially accessible. On this point, we could consider upgrading our Microsoft Office 365 licences to include Copilot. Copilot offers generative AI tools such as text and image generation, as well as integration into a search engine. Costs are still unaffordable, but this could change rapidly. The choice must also take account of sustainable development aspects.
- 2. Use an instance of an Open Source generative AI tool, based on models such as LLaMa or Mistral. This instance could be installed on a UCLouvain server, or shared in synergy with our European partners, or shared by a consortium of universities and institutions.

Before any of these avenues are actually implemented, the choice of generative AI tools remains the responsibility of the user. Most free tools do not guarantee the confidentiality of questions asked, texts submitted or information about the user.

#### 2.4 GUIDELINES FOR THE RESPONSIBLE USE OF GENERATIVE AI FOR STUDENTS

The following guidelines<sup>1</sup> are aimed primarily at certificate examinations. In this context, various uses of generative AI are authorised, while others are prohibited. Among the authorised uses, some require explicit mention of the use of Generative AI.

#### **Basic principles**

There are three basic principles that apply to any aid, including generative AI, used in a certificate assessment:

- **Principle of responsibility**: Students are entirely responsible for the work they submit. They must be the result of a personal process.
- **Principle of transparency**: Where necessary, students must clearly indicate the aids and tools used. These uses must respect the principles of academic integrity.
- **Principle of authenticity**: Students must ensure that their work allows an assessment of the knowledge and skills they have authentically acquired. This principle applies both to the outcome of their work and to the process and method used to produce it.

To ensure that these principles are respected, students must take appropriate measures for each course or assignment. Different types of use are envisaged. If a use does not fall into any of these categories, it will respect the basic principles as far as possible. The rules described below obey the principle of subsidiarity: if there are specific rules or guidelines for a course or practical exercises, they take precedence over these general rules.

#### Authorised uses that do not require an AI tool to be indicated

- Use similar to that of a language assistant. Students are allowed to use language assistance functions, either from dedicated tools such as Grammarly or generic tools such as ChatGPT, without mentioning them. If the source text has been written by the student, an AI tool can be used to correct spelling, grammar, syntax, look up synonyms, etc. A tool such as A tool like DeepL can be used to produce a first version of a translation, for example of a text that the student has written in another language. The limit is that the tool does not add content that the student has not written. Writing tools (such as DeepL Write) can help students refine the quality of their texts in real time and in several languages (English and German for the moment; suggestions for terms and expressions, writing tone adapted to the type of audience, etc.).
- Use for exploration and ideation. Students are authorised to use AI tools, without citing them, for exploration purposes, to find their bearings on a subject or identify lines of thought, or even relevant sources (which will be facilitated by the integration of search tools with content-generating AI). This form of information gathering is similar to using a search engine such as Google, Bing or DuckDuckGo. This use is not considered problematic as long as the student checks the comments and references found, consults the sources identified and analyses them. Although the use of the tool does not have to be indicated in this case, students must of course correctly reference the sources consulted to which the tool gives access. More generally, it should be remembered that any source cited must have been checked and its quality assessed. It is not recommended, moreover, to limit oneself to sources identified using an AI tool. When the work requested requires bibliographic research, a documentary

<sup>&</sup>lt;sup>1</sup> The proposed guidelines are largely based on those drawn up by the Faculty of Law at UCLouvain.

search carried out according to the rules of the art using the relevant databases and library catalogues is still the best way to go.

#### Authorised uses requiring an indication that an AI tool has been used

• **Citations**. When the student uses certain outputs of an AI tool literally (for example, text, but also a graphic illustration produced by an image generator), these must be referenced. The text should be quoted in inverted commas and the tool referenced according to the citation rules [5, 6]. The APA format for such a reference, in a footnote or possibly in the bibliography, is as follows: Name of the company/creator of the generative AI tool. (Year). Name of the generative AI program (program model) [Large Language Model]. URL.

Example: Open IA (2024) *ChatGPT* (version of 3 March 2024) [Large language model], <u>https://chat.openai.com/chat</u>, used on 3 March 2024.

If the reference is included in the bibliography rather than as a footnote, the student should make sure that it is explicitly distinguished from other types of reference, particularly scientific references. For example, a section entitled "Tools" will include references to various tools, including generative AI.

Content generated by generative AI with acknowledgement of the source must remain incidental to the work considered in its entirety (in the same way that passages with quotations must remain proportionate to the size of an academic work).

• **Translations**. Where students take an automatically translated text from a source written in another language, they must indicate the source used (in its original language version) in accordance with the citation guide and indicate in addition: "translated into [language, e.g. French] using [Al tool, e.g. ChatGPT (used on 20 November 2023)]", unless they have substantially reworked the proposed translation (in the latter case, the tool is used as a mere linguistic assistant and is in the case of uses not requiring a reference).

#### Prohibited uses

- Non-compliance with instructions specific to the assignment. Any use incompatible with the instructions given for an assignment or in the description sheet for the teaching unit concerned is prohibited.
- Non-compliance with the principle of authenticity. Any use of the AI tool that prevents the examiner, even partially, from verifying and/or assessing the student's prior learning and personal skills, as well as the process and approach followed by the student, is prohibited.
- Unreferenced identical reproduction. Any type of verbatim reproduction of content generated by the AI tool without full citation of the source is prohibited (see above). Academic work requires that sources can be verified.

#### Final year work

The proposals described above also apply to final year dissertations (TFE). It would be useful for the student to insert an integrity statement at the beginning of the TFE explaining the use of generative AI tools and the referencing procedures. Such a statement could be composed of a (standard) text attesting to the respect of the rules of use of generative AI tools in the framework of a TFE, as well as a part describing the specific uses of such tools in the TFE.

#### Consequences of non-compliance with these guidelines

If the use of the AI tool is manifestly abusive, it may be considered as an irregularity under Section 7, articles 107 et seq. of the General Study and Examination Regulations (<u>RGEE</u>), with all the consequences that this entails, as set out in articles 111 et seq. of the RGEE.

If a teacher has doubts about a student's assessed skills, he/she should be able to supplement this assessment, for example by an additional oral interview.

## 2.5 **RECOMMENDATIONS**

All students should receive basic training in artificial intelligence and in the effective, ethical and responsible use of generative Al tools at the beginning of their studies at UCLouvain, whatever their course of study. It is preferable that this training be integrated into the disciplinary training.

**Recommendation 2.1:** Integrate basic training in artificial intelligence and in the effective, ethical and responsible use of generative AI tools into all student disciplines.

Sheets and guides (under free licence) on generative AI and its use in teaching, in particular in all student productions (report, TFE...) such as [7,8,9] should be made available to the UCLouvain community.

**Recommendation 2.2**: Make available to the UCLouvain community existing open-licensed resources related to generative AI and its use in teaching.

Institutional generative AI tools should be made available to give the whole community access to this technology.

**Recommendation 2.3**: Analyse the various avenues for ensuring access to generative AI tools for the entire UCLouvain community.

Students should include a statement on the generative AI tools used in their TFE.

**Recommendation 2.4**: In TFEs, systematically request a statement explaining the use of generative AI tools and the referencing procedures.

Guidelines for the responsible use of generative AI for certification assessments should be added to the General Study and Examination Regulations (RGEE).

**Recommendation 2.5**: Add the guidelines for the responsible use of generative AI for certification assessments to the appendix of the RGEE.

The possibility, in cases of doubt, of supplementing a certificate-based assessment with an additional oral interview should be included in the RGEE, for example in article 104.

**Recommendation 2.6**: Add to the RGEE the possibility of supplementing a certificate-based assessment with an oral interview when there are doubts about a student's assessed skills.

# **3 GENERATIVE ARTIFICIAL INTELLIGENCE FOR TEACHERS**

#### **3.1 TEACHER TRAINING**

Not all teachers are necessarily trained in the use of generative AI tools. They are sometimes confronted with students who have much greater expertise than they do on these subjects. It is important to offer

teachers training in both the challenges of generative AI tools and their practical use in teaching and the impact on the design of a teaching device.

As the use of generative AI in educational activities is recent, it would be useful to pool experience and share different practices.

#### 3.2 GENERATIVE AI IN PROGRAMMES AND COURSES

#### Integration of new skills

Developments in generative AI are changing professional practices and require skills to be constantly updated. Programme committees and course teachers should be encouraged to consider the relevance of revising/adapting the competences set out in the learning outcomes in order to incorporate new competences and train them in the course. For example :

- Skills linked to the use of generative AI tools specific to professional practices linked to the programme
  of study (e.g. automatic translation tools for translators and interpreters, automatic code generation
  tools for computer scientists, medical image analysis tools in the health sector, standard document
  generation tools in the legal field, text generation tools in professions linked to content writing);
- Modification of skills linked to the existence of new generative AI tools;
- Skills related to the responsible, ethical and effective use of generative AI tools;
- Creativity and critical thinking skills ;
- Skills linked to an understanding of the fundamentals of AI and generative AI.

#### Ensuring pedagogical alignment

Pedagogical alignment aims to ensure coherence between the learning objectives of a course, the teaching methods used and the assessments put in place to measure the achievement of these objectives. Pedagogical alignment should be used as a criterion for assessing the relevance of integrating generative AI into learning [12], at different levels.

- Aligning learning objectives with the uses of generative AI tools in professional life;
- Aligning the use of generative AI in teaching methods and assessments with learning objectives.

#### Choice of an educational activity using generative AI

Where learning objectives are not explicitly linked to generative AI, teachers have the right to choose whether or not to integrate generative AI into their teaching practices, and to determine how they will use it, in accordance with the principle of academic freedom.

When a learning activity is proposed to students, it is important to be explicit about the possible use of generative AI tools.

- Are they permitted or prohibited?
- If permitted, what are the teacher's expectations? Are there any specific instructions?
- Is there a critical dimension to the use of such tools?

The following questions are relevant when choosing an educational activity using generative AI as well as when choosing the tool that will be used by students [11].

- Is this activity aligned with the learning objectives and content of the course?
- What is the added value compared with more traditional methods?
- Will this activity change the dynamics and interactions?
- Do students have the information they need to use the tools responsibly?
- Are there any plans for analysis and feedback?
- Is there a critical dimension to the use of such tools?
- Is the tool to be used free? Does it comply with the RGPD? What are its advantages and limitations?

## 3.3 GENERATIVE AI IN ASSESSMENTS

#### Generative AI detection tools

It is generally accepted within the academic community that detectors using generative AI tools are unreliable [9].

- There will always be a risk of wrongly accusing a student, as errors in detecting suspicious passages are inevitable;
- Productions can often be modified, automatically or manually, to fool the detector;
- The rapid development of generative AI tools means that detection tools are rapidly becoming obsolete;
- Using a detector may mean sharing the student's production with an external company, which can be ethically and legally risky.

Al detectors cannot therefore be used to determine precisely or give a definitive result as to whether a text is generated by an Al or by a human.

## Academic integrity strategies

Given the unreliability of generative AI detection tools, how can the academic integrity of certificate assessments be ensured? Various strategies can be envisaged [7, 9], some of which include the use of generative AI tools.

STRATEGY	APPROACH	CHALLENGES
Trusting students	Asking students not to use generative AI	No reliable means of verification
Avoiding the risks of generative AI	Revert to auditorium and computer-free assessments when the use of AI is not desired	Logistical challenges if the number of assessments requested is high
Surpassing the capabilities of generative AI	Designing an assessment that Al cannot do	AI is advancing rapidly and, given the time that elapses between setting up the assessment and carrying it out, AI may well be able to do the work as it is being done

Adopting generative AI and adapting assessments	Accept the use of generative AI, discuss with students the appropriate and responsible use	Reconciling the evaluation and use of generative AI with academic integrity is a challenge
	of generative AI	6, 6

**Exams**. If generative AI tools are to be excluded from an exam, the traditional audience-based exam format remains a practical solution. The "Avoid" strategy is therefore applicable.

**Practical work, projects or other work leading to a certificate**. The "Avoid" strategy is not necessarily applicable. The "Adopt and adapt" strategy is therefore interesting. It also enables students to develop new skills linked to the responsible use of generative AI.

**Formative activities or assessments.** The "Adopt and adapt" strategy is an interesting one. Here are three formative activities or assessments aimed at the objectives of analysis, evaluation and creation:

- Analysing: Thinking and reasoning critically in cognitive and affective terms, interpreting and reporting problems, making decisions and choices.
- Evaluate : Engaging in metacognitive reflection, evaluating the ethical consequences of different courses of action in a holistic way;
- Create: Formulate original solutions incorporating human judgement, collaborate spontaneously.

#### 3.4 Using generative AI to help teachers

Only uses specifically related to the teaching role are discussed in this section. More generic uses are described in section 2.2.

Whatever the use of generative AI by a teacher, it must follow the same standards as those required of students. This is a principle of transparency, exemplarity and isomorphism.

The uses of generative AI tools can be divided into different categories [3, 9, 11, 14].

#### Help with designing a course

- Synthesising a systematic review of the literature
- Propose a lesson plan and table of contents
- Propose learning objectives
- Helping to design or vary course-related activities
- Using generative AI for preparatory work leading to high-level reflection and analysis

#### Support for the production of teaching resources

- Generate transcriptions from an audio or video recording
- Generate interactive multimodal resources from an existing resource
- Generate examples and exercises
- Translating and producing resources in another language
- Helping to write resources
- Improving access to resources

#### Learning support

- Generate material for students to edit, correct, improve, add to or criticise
- Offer a learning path that adapts to students' individual needs and progress

• Develop a chatbot based on all the teaching resources in the course, which provides students with additional explanations, answers frequently asked questions and helps them to revise concepts.

Help with learning assessment

- Designing questions and quizzes
- Designing an adaptive revision path
- Testing an assessment or exam
- Propose a draft of individualised feedback
- Helping to design scoring headings and grids

Although generative AI tools can technically be used as an automatic correction tool for assessing open questions, this use is not recommended for certificate assessments.

#### **3.5** EXISTING AND AVAILABLE TOOLS

Various tools were presented in section 2.3. Only the generative AI tools specifically linked to teaching and available at UCLouvain are listed below.

**Gradescope**. Gradescope is software to help mark open-ended questions in written tests and exams, as well as written assignments. Gradescope offers an AI-based tool for grouping similar answers and evaluating them simultaneously.

**Wooclap** and **Wooflash**. Wooclap is an interactive televoting tool that facilitates participation and interaction with students, who answer multiple-choice questions proposed by the teacher in real time and ask questions via their smartphone or computer during the lesson. Wooflash, Wooclap's little brother, offers a series of questions to review the course material, with an emphasis on repetition and regular revision. Wooclap and Wooflash offer, in beta mode, a generative AI tool that produces questions (MCQs or open-ended) based on a document, a web link or a video.

**Compilatio**. Compilatio is software that detects plagiarism. It now offers a tool for analysing suspect passages. The tool detects a percentage of texts that are stylistically close to a text generated by an AI. This rate is an indicator, not proof. It is advisable to question the student about these passages to check whether or not they have mastered the points concerned.

Furthermore, the avenues presented in section 2.3 for making tools available at institutional level would also benefit teachers. Before any of these avenues are actually implemented, the choice of generative AI tools remains the responsibility of the user. Most free tools do not guarantee the confidentiality of questions asked, texts submitted or information about the user.

#### **3.6 RECOMMENDATIONS**

It is important to be able to train teachers both in the challenges of generative AI and in its use in teaching. This is part of developing teachers' digital skills.

**Recommendation 3.1**: Develop and offer training for teachers on the challenges of generative AI and the use of generative AI tools in teaching.

**Recommendation 3.2**: Organise within the teaching community the pooling of experience and the sharing of different practices (what works, and perhaps above all what doesn't) in relation to generative AI.

The learning outcomes of programmes and certain learning units should be adapted to incorporate the uses of generative AI.

**Recommendation 3.3**: Invite the Programme Commissions to modify the learning outcomes of their programmes in order to integrate the new competences relating to the use of generative AI tools in professional practice. Modify the learning outcomes of certain learning units, or insert new units in order to meet these new skills.

Teachers are invited to reflect on the learning outcomes of their courses impacted by generative AI, to analyse the use of generative AI within their courses, and to introduce relevant activities on generative AI without waiting for curricula to be modified. These activities must ensure pedagogical alignment.

**Recommendation 3.4**: Encourage teachers, where appropriate, to adapt their courses to the professional uses of generative AI tools, to their responsible and ethical use, and to creativity and critical thinking.

**Recommendation 3.5**: Suggest to teachers, where relevant, that they integrate generative AI into certain teaching activities. These activities should be aligned with learning objectives and assessments.

The availability of generative AI tools means that certain learning and assessment activities need to be reviewed, especially when they are carried out autonomously. Detection tools cannot reliably detect the use of generative AI.

**Recommendation 3.6**: Discourage the use of AI detectors to determine whether a text is generated by an AI or by a human.

**Recommendation 3.7**: Adapt assessments to take account of the generative AI tools available to students. Assessments will be aligned with learning objectives.

Generative AI offers many tools and opportunities to help teachers. Whatever the use, it must obviously follow the same standards as those required of students. This is a principle of transparency, exemplarity and isomorphism.

**Recommendation 3.8**: When teachers use generative AI tools, these uses must follow the same standards and requirements as those required of students. Transparency and exemplarity must be implemented.

# 4 GENERATIVE ARTIFICIAL INTELLIGENCE FOR RESEARCHERS

#### 4.1 TRAINING FOR RESEARCHERS

Artificial intelligence is changing the nature and method of scientific research [19]. Not all researchers are necessarily trained in the uses of generative AI tools and their potential for research. It is therefore important to train them both in the challenges of generative AI tools and in their practical, responsible and ethical use in research.

Although this report focuses on generative AI, it should be noted that non-generative AI has been used for many years in a wide range of research fields.

#### 4.2 USING GENERATIVE AI TO HELP RESEARCHERS

Fortunately, scientific publishers refuse to allow a generative AI tool to be the author or co-author of a scientific article because it cannot be held responsible for the results [9]. However, these tools can be used to improve the quality and readability of the text. However, any such use must be clearly explained in an appropriate section.

In addition to writing assistance, generative AI can be used at various stages of the research process [1,4,15,17].

## Help with drafting

- Improving a text
- Propose a first draft based on a list of bullet points
- Organising the structure of an article
- Transcribing or summarising interviews
- Translate your article into different languages to facilitate distribution
- Reformatting quotations and references

#### Help with data collection and analysis

- Generate summary data
- Helping to design experiences
- Explore existing data (archives, datasets)
- Analysing data
- Visualising and presenting data and results

#### Design assistance

- Generate ideas, brainstorming tool
- Generate models
- Interaction with a body of knowledge
- Propose a literature review on a given subject
- Exploring a particular corpus
- Translating an article written in a language in which you have no command
- Summarising an article
- Analysing references

## Interaction with a body of knowledge

- Propose a literature review on a given subject
- Exploring a particular corpus
- Translating an article written in a language in which you have no command
- Summarise one or more articles
- Analysis of references

#### Support for the development of software tools

- Writing code
- Generate tests
- Debugging and correcting code
- Optimising code
- Suggest the use of libraries

- Restructuring code
- Documenting a programme

#### Help with peer reviewing

Generative AI has no understanding of the texts processed or the texts generated. The tools cannot therefore perceive the complexity of scientific research, its innovative aspect or its accuracy. At this stage, generative AI tools cannot replace humans when it comes to proofreading a scientific article. They can, however, provide some assistance.

- Propose a state of the art allowing a comparison
- Identify certain grammatical errors, technical inconsistencies and formatting errors in the article to be analysed
- Improving the form and style of proofreading
- Comment on the proportion of references in relation to specific time zones (e.g. percentage of references from the last x years)

#### 4.3 EXISTING AND AVAILABLE TOOLS

Various tools were presented in section 2.3. Specific research tools are described in references [9, 10, 16, 18].

CISM (Computing and Mass Storage) is offering access to the Whisper generative AI tool. Whisper is an Open Source speech recognition tool that automatically transcribes interviews. UCLouvain does not have any other generative AI tools specifically for research, but the avenues presented in section 2.3 for making such tools available should also be considered in the context of research support tools. Before any of these options are actually implemented, the choice of generative AI tools remains the responsibility of the user. Most free tools do not guarantee the confidentiality of questions asked, texts submitted or information about the user. This can be particularly sensitive in the case of scientific data or articles under development.

#### 4.4 GUIDELINES FOR THE RESPONSIBLE USE OF GENERATIVE AI FOR RESEARCHERS

The following recommendations support the responsible use of generative AI for research [1, 15].

- Respect the key principles of research integrity.
- Remain ultimately responsible for scientific results.
- Use generative AI transparently.
- Be aware of different biases, such as the over-representation of certain fields or languages depending on the field.
- When sharing sensitive or protected information with generative AI tools, pay particular attention to issues relating to privacy, confidentiality and intellectual property rights.
- When using generative AI, respect applicable national, European and international legislation, as in their usual research activities.
- Continuously learn how to use generative AI tools correctly in order to maximise their benefits, in particular by attending training courses.
- Refrain from using generative AI tools substantially in sensitive activities that could have an impact on other researchers or organisations (e.g. peer review, evaluation of research proposals, etc.).
- Respect the rules for the use of generative AI set out by the journal, publisher or funding body.
- Ensure the coherence, explicability and reproducibility of the results produced with the help of generative AI. The Open Science principles of reproducibility should be adopted.

## 4.5 **RECOMMENDATIONS**

Researchers need to be trained in the challenges of generative AI, the tools available and how to use them in research. This training should be offered to all categories of researchers, from the youngest to the most experienced.

**Recommendation 4.1**: Develop and offer training courses for researchers on the challenges of generative AI, the tools available and their use in research.

The university should incorporate guidelines on the use of generative AI into its general guidelines on good practice and research ethics.

**Recommendation 4.2**: Establish guidelines for the responsible use of generative AI and integrate them into good practice and research ethics.

# 5 CONCLUSION

#### 5.1 TOWARDS RESPONSIBLE USE OF GENERATIVE AI

The principles of responsible use of generative AI can be summarised as follows [1,15].

- **Responsibility** of users. Students, teachers and researchers are responsible for the correct use of generative AI tools and for the results used. This responsible attitude must be exercised in the design of the prompts submitted to the AI as well as in the verification of the accuracy of the results generated by these tools, ensuring that any sources used or referenced are correct.
- **Transparency** on the use of generative AI. Any use of a generative AI tool that has a significant impact on the work and output of a member of the academic community must be explicit and comply with any specific requirements set out for different usage scenarios.
- **Respect for** material protected by copyright, personal data and confidential information. Such data and information may not be submitted to tools that do not offer a sufficient guarantee of confidentiality.

#### 5.2 **RECOMMENDATIONS**

Recommendations for the responsible use of generative AI have been developed along three complementary dimensions: for students, for teachers and for researchers. More general recommendations are proposed below.

Consideration should be given to making generative AI tools available at institutional level, in order to support the responsible use of generative AI by everyone in the UCLouvain community. These generative AI tools should cover teaching and research needs; they could be commercial tools such as Microsoft Copilot or DeepL, or tools based on Open Source models. Before any of these avenues are actually implemented, the choice of generative AI tools remains the responsibility of the user. Most free tools do not guarantee the confidentiality of questions asked, texts submitted or information about the user.

**Recommendation 5.1**: Analyse the various avenues for making generative AI tools available to the UCLouvain community for teaching and research.

Many are stronger than one. It would be useful to integrate UCLouvain into a more global movement including various players in teaching and research. For example, creation of an IA generation WG at CREF,

discussion within The Guild and the EUA, synergy with the Circle U. IA chair, collaboration within the Louvain cluster, collaboration with partners in secondary education, etc.

**Recommendation 5.2**: Work in synergy with UCLouvain's various partners and in compliance with national and European policies.

What will be the future of generative AI at UCLouvain? What follow-up should be given to this paper? The discussion must continue, and it must remain cross-disciplinary in nature. However, it should be accompanied by more practical help in the responsible use of generative AI tools. This could involve recommending tools and sharing practices.

**Recommendation 5.3**: Continue the work begun with this note on generative AI at UCLouvain. For example, in the form of a cross-disciplinary group enabling further reflection, the sharing of practices and the recommendation of tools and their use.

This note focuses on the teaching and research missions of UCLouvain. But UCLouvain also includes administrative services for which it is also necessary to define the right uses of generative AI. The potential benefits of generative AI are, in this context, quite similar to those for businesses or government departments. However, the issues are different. It is important not to superimpose this reflection on that of teaching and research. The reflection on generative AI for the administrative dimension of generative AI must involve the administrative players and must lead to concrete proposals as well as tools made available.

**Recommendation 5.4**: Launch a parallel study, involving players from the administration, on the responsible use of generative AI in jobs related to the administration of UCLouvain.

Finally, it would be useful if this note could be widely distributed and accessible outside UCLouvain in order to contribute to the existing global movement of reflection on the responsible use of generative AI. This note could be presented to the Academic Council and put under a Creative Commons CC-BY licence to ensure its distribution and reuse.

**Recommendation 5.5**: Distribute this document. Present it to the Academic Board, and place it under a Creative Commons CC-BY licence.

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