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Can Generative AI reformulate students' educational experience in Higher Education?

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Can Generative AI reformulate students' educational experience in Higher Education?

Abstract. *Artificial Intelligence (AI) has increasingly been explored in a wide range of technological and other scientific fields, but it has only recently started to be carefully considered in education. The countless possibilities that this digital technology may offer schools and higher education appear inspiring and groundbreaking. However, there is also a need to study the initial uses students make of easily available generative AI technologies. This article describes a research study carried out at the Faculty of Psychology, Education and Sports Science Blanquerna (University Ramon Llull) and provides evidence on how, how much and why university students naturally and spontaneously use generative AI. Qualitative data was collected from two groups of students (Psychology and Education undergraduates) through questionnaires and was analysed via Discourse Analysis (DA). Some conclusions seem to align with the recent literature and show the need to provide university students with initial training on AI, as well as highlighting the ethical risks and the potential difficulties involved in obtaining reliable information using generative AI tools, among other issues. Potential approaches to redesigning higher education students' experiences are also explored.*

Keywords: *Artificial Intelligence; AI tools; higher education; students' experiences; teaching and learning.*

¿Puede la IA generativa reformular la experiencia educativa de los estudiantes en la educación superior?

Resumen. *La Inteligencia Artificial (IA) ha sido objeto de estudio en varias disciplinas tecnológicas y científicos, pero últimamente ha comenzado a investigarse en el campo de la educación. Las innumerables posibilidades que esta tecnología digital puede ofrecer a las escuelas y a la educación superior parecen ser inspiradoras e innovadoras. Sin embargo, también es necesario empezar a estudiar los usos iniciales que los estudiantes hacen de la fácilmente accesible IA generativa. Este artículo describe la investigación llevada a cabo en la Facultad de Psicología, Ciencias de la Educación y del Deporte Blanquerna (Universidad Ramon Llull) y proporciona evidencia sobre cómo, con qué frecuencia y por qué los estudiantes universitarios utilizan la IA generativa de forma natural y espontánea. Se recogieron datos cualitativos de dos grupos de estudiantes (grados de Psicología y Educación) a través de cuestionarios y se analizaron mediante Análisis del Discurso (DA). Algunas conclusiones parecen estar alineadas con la literatura reciente y muestran la necesidad de una formación previa o inicial de los estudiantes universitarios en IA generative, los riesgos éticos que el uso de las herramientas de IA conlleva y las potenciales dificultades para obtener información fiable. Se exploran también las potencialidades de rediseño de la experiencia de los estudiantes en la educación superior.*

Palabras clave: *Inteligencia Artificial; herramientas de IA; Educación Superior; Experiencias de los estudiantes; enseñanza y aprendizaje.*

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Introduction

Artificial intelligence (AI) is impacting all aspects of contemporary professions and lives, and higher education is no exception. One kind of AI takes the form of text-generative AI applications, such as Large Language Models (LLM). LLMs are a type of general-purpose application that are trained on vast amounts of data, while Generative Pre-trained Transformer (GPT) applications are pre-trained on an even larger amount of data (Holmes & Miao, 2023). In November 2022, as is well known, Open AI released a chatbot called Chat GPT (Generative Pre-trained Transformer), and a new scenario for students' educational experience in higher education immediately took shape.

Chat GPT emulates linguistic interaction and dialogical patterns and can be applied to tasks of academic relevance such as text summarization, language editing and translation, and dialog and interaction with a field of content. The model is constructed on the foundations of transformer technology, a form of neural network architecture that anticipates outcomes based on input data (Ooi et al., 2023). There are other similar conversational bots powered by LLM, such as DeepSeek, Bard, Magic Write, Eleven Labs and Writesonic. Of course, the emergence and easy access to this technology have affected the way people study and share knowledge. This technology has been gaining popularity in the education sector owing to its ability to generate human-like responses and summarize complex information (Pradana et al., 2023).

The sophistication of the GPT tools means they are able to respond to text-based requests not only to answer content-related questions, but also to write essays or assist students with complex problems, and the associated problems are strongly affecting education (Lund & Wang, 2023, Tlili et al., 2023). Recent studies that have explored students' perceptions and experiences with ChatGPT in higher education have revealed both benefits and challenges. ChatGPT is perceived as a valuable tool for enhancing learning experiences, providing personalized tutoring, and offering immediate feedback (Kayali et al., 2023, Dikilitaş et al., 2024, Ngo, 2023). It can promote student engagement and accelerate access to information (Arista et al., 2023). However, concerns have been raised regarding potential risks, including privacy issues, ethical considerations and the provision of misleading information (Kayali et al., 2023, Arista et al., 2023). While ChatGPT shows promise in education, further research is needed to ensure its safe and effective integration into higher education settings (Kayali et al., 2023, Dikilitaş et al., 2024).

We are only beginning to see the impact of these technologies. There remains a clear need to grasp and understand students' natural and spontaneous use of these generative AI technologies. Students do not have enough formal training in this field, and teachers' use of the technology is sometimes unplanned and uneven. Amid this initial growth, it is potentially enriching to understand the uses or the problems that students foresee with regard to generative AI tools, and to investigate them in the students' own terms. It may be interesting, as in previous studies (Sila et al., 2023, Kayali et al., 2023, Ngo, 2023), to explore types and frequency of use, difficulties encountered and users' assessment of the tools. It may also be interesting to explore to what extent this technology use is motivated by behavioural intention, performance expectations, hedonic motivation or personal innovation, as was found in prior research (Strzelecki, 2023).

This kind of study is necessary and relevant because this technology is not an isolated phenomenon. The recent evolution of digital technologies in areas such as the use and analysis of massive data, the metaverse or virtual reality environments, robotics, and other artificial intelligence tools such as learning analytics systems for evaluation, among others, can also facilitate effective new educational resources in the already present scenario of the so-called and pervasive Industry 4.0.

Therefore, the university, with its responsibility of educating young people, must consider how to embrace the great digital iceberg at a time when we are only visualizing and becoming aware of its tip. The tip of this iceberg already brings with it significant challenges that will need to be addressed, but it also represents responsibility, optimism, and educational commitment to discovering opportunities. Therefore, it is very relevant to start seeking out responses to the question of the potentiality of generative AI to reformulate students' educational experiences in higher education.

Consequently, it is necessary to reflect on the new roles that teachers must take on, the methodological conditions that should frame higher education teaching, and the impact of AI on students' educational experience. In this article, we explore this latter point, and we argue for a positive complementarity between the opportunities that advances in digital technology can bring and the necessary social, transformative, and transforming experiences that arise from educational activities at the university.

Method

Research question

The purpose of this piece of research is to understand the use of generative AI by university students. Particularly, we have sought to study how students describe their experience with the use of generative AI (e.g., Chat GPT) in their day-to-day university work. Given the current state of our knowledge of the question, we have opted to collect the information in students' own words, gathering a description of the situation from their point of view (as was proposed by Cohen et al., 2007). This way of addressing the problem under study predisposed us to the use of a qualitative method.

Similarly to previous research, we were interested in finding out the students' answers to the following questions:

1. What use do students make of generative AI (Chat GPT) during their first semester at university?
2. What are the difficulties detected or encountered with the generative AI (Chat GPT) tool?
3. How frequent is the use of generative AI (Chat GPT)?
4. Which aspects do the students find valuable and appropriate when using generative AI (Chat GPT)?

It should be noted that we were asking these questions for students to explain their natural and not conditioned experience one year after the irruption of Chat GPT.

Method for analyzing data: Discourse Analysis

We approached the central questions of this study via Discourse Analysis (DA), a methodology that deals with language in use, that is, how individuals achieve personal and social projects through language. Language mediates and builds the understanding of reality and helps to understand "how people use language to create and represent identities and activities" (Starks & Brown, 2007, 1373).

ChatGPT has been used in Discourse Analysis and has shown proficiency in identifying topic structures in general-domain conversations (Fan & Jiang, 2023), performing reasonably well at semantically categorizing keywords (Curry et al., 2023). It can identify themes and link them to theories (Wachinger et al., 2024). However, researchers have reported difficulties with more specific domains and complex rhetorical structures (Fan & Jiang, 2023), raising concerns about repeatability and data integrity (Curry et al., 2023). Additionally, the tool's use in Critical Discourse Analysis has uncovered biases towards capitalist discourse and established knowledge, potentially influencing power and knowledge production (Ahmed & Mahmood, 2024). These investigations show the potential of ChatGPT to support Discourse Analysis, although it requires careful review (Wachinger et al., 2024).

In this piece of research, we have followed the stages suggested by Goodman (2017) to carry out the proposed DA-based method. Once the questions had been decided, we selected a sample of students and obtained their written answers. This corpus of data was analyzed, and the results were used to build the case to explain the findings. As the effective use of ChatGPT for DA is not totally established, we decided to monitor the whole process to assure a perfect match with a regular Discourse Analysis procedure. We decided to report the changes that we had to introduce to the automatic GPT-based application on Google Sheets to obtain a valid and reliable analysis for our purposes.

Sample

We selected students enrolled in the first semester of the academic year 23/24. We worked with two groups of students: one included students enrolled in the first year and the other included students in the fourth year, in two different undergraduate degree programs: Psychology and Education. Four Socratic seminar groups of 12-14 students were randomly selected. They had not received any formal training regarding the use of Generative AI tools. With the voluntary responses of these groups, we obtained and analysed the complete answers of 36 students.

Procedure

At the end of the first semester, the students filled in the following anonymous questionnaire via Google forms. The procedure was approved by the Ethics Committee of the Faculty.

Questionnaire:

- Describe in detail your use of generative AI (Chat GPT) during this first semester at university (answer honestly and thoroughly).
- Describe any difficulties you have detected or encountered with the Chat GPT tool.
- How often do you use Generative AI (Chat GPT)?
- Assess which aspects of Chat GPT you find useful.

Once the results were obtained, we created a procedure to analyze via DA the outputs using the "=GPT" function in Google Sheets as follows:

1. The instruction containing the prompt applied to each response was "=GPT("Describe the content with separated and numbered points"; [cell])". This allowed us to summarize each response in a series of different points, as list 1.
2. Then we merged all the points in the column for each participant and created a final cell using the CONCATENATE function separated by CHARACTER (10) to create a list with all the points presented by all the students.
3. The instruction =GPT ("form an only one list summarizing the different points denominated list 2", [cell]) was used.
4. Then, for each case, we concatenated the two lists (1 and 2) and compared the points of the response obtained in step 1 (list 1) with list 2 obtained in step 3. We used the instruction =GPT ("How many ideas on list 1 are on list 2 and what percentage it represents"; [cell]). Now we had for each response a percentage of content shared on the total list.

This procedure was applied to questions 1, 2, and 4. For question 3, the instruction was to allocate the response to one of several categories depending on the frequency of use. For that purpose, the corresponding GPT instruction with the prompt was "=GPT("Classify the response in one of the following categories: 1: Never or very rarely (1-2 times per month); 2: Little, not much (2-3 times per week); 3: Quite regularly (one time a day); 4: Very much, constantly (many times each day); 5: Not defined or not well understood"; [cell])". This formula was used in each cell.

We must mention that we had to refine the initial prompts to effectively carry out the automatic task. For

instance, we found repetition of words in list 2, and we had to ask more specifically for a list with no repetition of ideas. Finally, we constructed an automatic system of DA that fulfilled our purpose.

Results

Use of generative AI

The description of uses of Generative AI (mainly Chat GPT), with no repetition of ideas was:

Table 1. List of description of uses

1. Diverse use of tools, including Chat GPT, to filter and synthesize information for academic assignments, with an emphasis on manual research and information cross-referencing.
2. Perceived disadvantages of using tools that provide overly processed information.
3. Significant importance of critical reading and the need to cross-reference information using multiple sources.
4. Specific use of Chat GPT to navigate through incomprehensible assignments, identifying important themes, and with a moderate usage pattern.
5. Various utilities of artificial intelligence in university settings, including text translation and spell-checking.
6. Problems and solutions with AI, ranging from answering specific questions to using it as a last resort for complex issues.
7. Varied experiences with AI, with students recognizing its utility in different fields and a preference for resolving issues independently.
8. Varied use of Chat GPT, such as searching for topics, obtaining guidance for assignments, and resolving specific doubts.
9. AI (Chat GPT) used as a complement in research by asking questions to summarize and organize information.
10. General importance of information in various tasks, including the need to search for, select, and manage information.
11. Use of Chat GPT to generate ideas, requesting basic ideas and using it as support for creativity.
12. Personal experience with AI, highlighting its use for specific tasks, a lack of familiarity with the technology in recent years, and usage when having no ideas.
13. Little or very limited use of tools, only in specific situations.
14. Specific requests such as translations, synonyms, and text rewriting.
15. Use of Chat GPT to organize things like trips outside the university.

The results for percent of coverage for each student of the total list resulted as follows:

Table 2. Indices of coverage

Number of ideas covered	Percent of students
0-1 (6%) Low	25%
2-4 (13-26%) Moderate	33,3%
5-7 (33-46%) Substantial	30,5%
8-10 (53-66%) High	11,1%

These categories were formed in light of the percentages. This procedure can easily transform each percentage into a grade D (Low), C (Moderate), B (Substantial), A (High), respectively. Notice that the detailed refinement in meanings of the list in Table 1 makes it difficult for a single student to cover a percentage over 70%. This is complementary proof that the system worked well.

Difficulties found using generative AI

Table 3 shows the difficulties that students identified with regard to their use of generative AI.

Here we can see how questions about precision appear in many instances. The students used a range of different terms to highlight the need for clarifying and being specific in the prompts used. This issue is implicit in points 2, 3, 4, 5, 6, 7, 7, 11, 13, accounting for more than 50% of the points and identified by around 70% of students, indicating that this is one of the main difficulties detected.

Table 3. List of difficulties, with percentages of students

Difficulties using generative AI	Percent
1. Accuracy Concerns: • Responses are not always 100% accurate. • Descriptions provided are not always coherent. • Some doubts about the reliability of the information.	28%
2. Basis of Information: • Uncertainty about the reliability of the information provided. • Difficulty in conveying instructions clearly to get the desired output.	5.5%
3. Language and Communication: • Performance varies with different languages. • Some difficulties in expressing queries clearly in Catalan. • Occasionally provides responses in a different manner than expected. • Issues with sentence construction and language correctness.	22%
4. Specificity and Understanding: • Requires specific and detailed questions for accurate responses. • Sometimes struggles with understanding simple queries. • Limited capacity to interpret information.	8.3%
5. Technical Issues: • Occasional technical glitches, freezing, or inability to provide exact answers. • Limited capability in interpreting ambiguous or complex information.	8.3%
6. User Learning Curve: • Users may initially struggle with formulating questions correctly. • Learning to be more specific in queries improves the interaction.	5.5%
7. Reliability and Trust: • Information may not always be reliable; verification is necessary. • Changes in sentence structure can yield different results.	11%
8. Information Retrieval: • Difficulty extracting information from specific articles or PDFs. • Responses may lack depth or accuracy.	5.5%
9. Date Sensitivity: • Not updated to provide information beyond 2022-2023.	2.8%
10. Usage Alternatives: • Some users resort to alternative tools like POPAI or BARD. • Some users face issues accessing AI.	5.5%
11. Subject Specificity: • Varied performance based on the subject matter of the query. • Inconsistencies in responses related to movies and television series.	5.5%
12. Limitations and Reliability: • Awareness of limitations, not entirely reliable. • Requires verification as it lacks internet access.	5.5%
13. User Experience: • Some users report no significant issues. • Concerns about clarity in responses if queries are not marked correctly.	5.5%
14. Format and Order: • Consistent use of formats and order in responses.	2.8%

Frequency of use of generative AI

Table 4 shows percentages of students for frequency of use.

Notice that 25% of students make intensive use of the technology, while as many as 73% make occasional use.

Assessing the usefulness of generative AI

The students assessed the usefulness of generative AI. Table 5 shows a description and a short explanation.

Table 4. Descriptors of frequency and percent of students

Use and some examples in each category	Percent
1. **Category 1: Never or very few times (1-2 times per month)** • Sincerely, I use it quite rarely, if not almost never. Only for general aspects or structuring work sections (1). • About once a month, approximately (1). • I don't use it much, occasional moments (1). • Occasionally (1). • I haven't used it (1). • Occasionally, when needed for speed in a task or when I can't find a solution or want ideas. Let's say every 2/3 weeks I enter at some point (1). • Once or twice a semester for very specific things (1). • Very rarely, maybe once a month (1).	27%
2. **Category 2: Little, not much (2-3 times per week)** • 2-3 times a week (2). • Maybe once or twice a week, depending on the workload (2). • I consider that I don't use AI very often, only occasionally in some seminar assignments where I'm less familiar with the subject (2). • Regularly to obtain information (2). • Quite often (2). • In classes and occasionally at home (2). • Weekly (2). • I use Chat GPT quite a bit to understand concepts at the University. I open it two or three times a week. But for daily life, I don't like using it much since it generates texts where the information is not always true or appropriate. That's why I try to use Chat GPT with topics I already know, and if there's any incorrect information, I can detect and change it (2).	46%
3. **Category 3: Quite regularly (one time a day)** • Almost every day (3). • Quite often (3). • Fairly regularly (3). • Almost every day (3). • Daily (3).	16%
4. **Category 4: Very much, constantly (many times a day)** • I use it quite often as I see that many class assignments can be done faster. When it gives an answer that is sometimes not explained the same way on the internet, I understand it and can give my own explanation of the topic (4). • During times with many assignments, I could say daily, for anything (4). • In almost all assignments as a source of information (4). • 1 or 2 times a day to find information that the internet does not provide adequately or completely (4).	9%
5. **Category 5: Not defined or not well understood.** • Depends on the difficulty of the activity (5)	2%

Diverse meanings were captured here. We preserved all of the outputs of the analysis and confirmed that all the meanings were covered. The percentages do not add up to 100% because some students said that they used generative AI very rarely or responded with a general unspecific assessment.

Discussion

Discourse analysis (DA) can be carried out efficiently with Chat GPT using the "=GPT()" instruction in Google Sheets for an effectively large number of cases needing content or discourse analysis. The procedures created can serve to extract ideas from individual texts, create texts or lists with all the ideas of a group, and calculate percentages of the shared ideas based on each singular participant. This method can also be used to assess each participating student to a category (for instance A, B, C, D). Thus, Chat GPT has the potential to grade assignments thanks to its capacity to produce human-like responses to text inputs (Chiu, 2023). Nevertheless, for large-scale use, rigorous performance evaluation needs to be done before validating this tool (Holmes & Miao, 2023). In our case, we had to change the prompt used, undertaking a parallel conventional process of DA revision, before considering the representative list as reliable. In other cases, as in Table 5, the detail in which the AI was able to capture the meanings of the answers surprised researchers, and they did not have to create any additional prompts.

Table 5. Assessing usefulness description and percent of students

Description	Short explanation	Percent
1. Versatile Information Tool	ChatGPT is widely used for obtaining general information and serves as a guide for subsequent manual research.	2.5%
2. Limited for Complex Tasks	While effective for outlining ideas, it may not be suitable for highly developed tasks.	5%
3. Quick Information Access	Valued for its speed in providing detailed and ordered information.	5%
4. Versatile Tool with Caution	Recognized for its versatility but cautioned against misuse, especially in job-threatening contexts.	2.5%
5. Idea Generation and Project Organization	Helpful for generating ideas and organizing projects.	2.5%
6. Math Problem Assistance	Useful for overcoming obstacles in complex math problems.	2.5%
7. Doubt Resolution and Specific Queries	Effective for resolving specific doubts and targeted queries.	2.5%
8. Text Comprehension Aid	Helpful for understanding lengthy texts through visual summaries.	2.5%
9. Development of Known Topics	Useful for expanding on familiar topics.	2.5%
10. Initiating and Complementing Research	Valued at the start of a project and for complementing work post-completion.	7.5%
11. Extensive Research and Summarization	Useful for investigating broad topics with vast online information.	2.5%
12. Detailed and Ordered Information	Recognized for providing detailed, cited, and extensive information.	5%
13. Swift Research and Multiple Functions	Praised for facilitating fast research and serving various functions.	10%
14. Guidance, Not Replacement	Seen as a tool for guidance and support, not a substitute for personal effort in completing tasks.	2.5%
15. Simplified and Swift Responses	Appreciated for delivering quick, lengthy responses with multiple options.	2.5%
16. Useful in Education and Creativity	Recognized for theoretical information in university assignments, quick writing, and enhancing creativity.	2.5%
17. Versatile Use in Academia and Personal Contexts	Found useful in both academic and personal contexts.	2.5%
18. Improves Work Quality	Acts as a source of information and inspiration, enhancing the quality of work.	2.5%
19. Caution in Usage	Cautions against excessive use and emphasizes a limited, supportive role.	2.5%
20. Effective for Specific Solutions	Considered useful for obtaining precise solutions	2.5%

The uses identified coincide with the findings of previous research: generative AI provides easy access to information, serves as a virtual interactive tutor, offers personalized feedback, offers research assistance, and assists in academic writing (Ooi et al., 2023). Some uses like generating case scenarios were not found, probably because this task was not required in the educational setting studied here. Indirectly, this study can be used to assess the educational experience itself.

Generative AI contributed, at least according to 25% of the students, to more dynamic, personalized, and interactive educational experiences (as Ooi et al. 2023 identified). But for many students it was still an underused tool (up to 73%).

On the other hand, many students refer, with different expressions, to the need to use critical thinking and reasoning as a prerequisite skill (as in Chiu, 2023), because they believe that disciplinary information needs to be critically evaluated and Chat GPT is not totally reliable in providing facts and knowledge. Many students are aware that generative AI may not deeply comprehend the meanings of the words it handles (as in Ooi et. al, 2023). Uses of the technology were often exploratory, with students employing it to get ideas and enhance their creativity, seek counselling and advice, have tailored learning experiences and create educational content (as identified Pradana et al., 2023), all done with a shared awareness that improves rather than hinders the learning process. Another identified use is for linguistic correction and editing of texts (as in Pradana et al., 2023).

Many difficulties were found in connection with the use of generative AI. Most frequently, students highlighted the need to confirm the accuracy and precision of generated answers (Pradana et al., 2023). Many students seemed aware of the consequences of incorrect answers. Another identified a difficulty, as found in the literature, in the production of responses that may be plausible but that are not correct, a phenomenon known as AI hallucination (Ooi et al., 2023).

Additionally, the need to be accurate in the writing process of prompts was implicitly detected. Students did not use the word "prompt" and the DA system found synonyms in its own terms. But the idea is the same as the one identified by Ooi et al (2023) namely, that users may not utilize the right text prompts to properly guide generative AI to provide the answers they want. Elsewhere, Holmes & Miao (2023) commented that prompt-engineering is most successful when the prompt articulates a coherent chain of reasoning centered on a particular problem or a chain of thought in a logical order. Some students were also aware of the limitation that Chat GPT-3 offers information only up to 2021 (Ooi et al., 2023).

With regard to students' assessment of the tool, it was surprising that there was no mention of ethical issues like avoiding prompts that may generate inappropriate, biased or harmful content (Holmes & Miao, 2023), or of potential bias in data and algorithms, which could inadvertently shape learning outcomes and perceptions (Ooi et al., 2023), or safety issues, as this technology has the potential to infringe upon the privacy of students (Ooi et al., 2023). Students may not be aware of the risks posed by these aspects. We agree with other researchers on the need for a course or module on this topic at the beginning of university programs. Students should be able to learn how to evaluate the information given by Chat GPT in a critical manner and begin to be aware and careful with the information, using critical reasoning and thinking skills in their learning process (Tlili et al., 2023, Chiu, 2023).

Some more general reflections can be provided to answer the initial question about the potentiality of generative AI to reformulate the students' educational experiences, as follows:

Generative AI and Artificial Intelligence in general hold the potential to transform some aspects of students' learning experience, affecting both the teaching-learning process and the way teachers work. Forbidding the use of the AI tools does not seem to be a reasonable option since students make a spontaneous and, in many cases (up to 25% in our study), intensive use. Used as a complementary tool in conjunction with other methods, it can, for example (Holmes et al., 2019; Pradana et al., 2023; Ooi et al., 2023):

- Help with personalized answers to students' or teachers' questions, thus promoting personalized learning and favouring customization.
- Find complementary explanations and additional resources for activities proposed with conventional methods, and work with real-time responses for both students and teachers, optimizing conventional methods.
- Provide access to information regardless of the remote location of learners, thereby promoting equity.
- Automate and simplify some tasks in both education planning and information management, saving time on administrative and management processes.
- Facilitate quick and accurate translations when working in different languages, providing a language support tool.

Some of these points were identified in our study.

To prevent students from merely copying the explanations provided by generative AI, it is important to implement strategies that promote active learning and deep understanding. These strategies may include encouraging reflection and discussion, using AI as a tool for research, fostering creativity and innovation with responses that encourage the development of one's own ideas, using generative AI responses as a starting point to provide additional context for better understanding, and including practical and application-based activities in the curriculum, among others. Ultimately, generative AI can help to present situations and problems that add value to learning, and by saving time, make it possible to dedicate more time and effort to higher-level modalities of thinking (Almirall, 2023; for modalities of thinking see Gallifa, 2019). As can be deduced from the results of the study, students must take joint responsibility for their learning, personal development, ethical behaviour, academic community, and physical and mental health. By doing so, they will make the most of their university experience and prepare themselves for a successful future.

The educational experience is the result of aligning the institutional functions of the university, the functions of faculty and staff, and the students' roles. All of them can keep their essence but need to be developed

in the transformative new context of the new generation of digital technologies. Teachers must become designers and facilitators of learning experiences, and students must take on a more proactive and committed role. They cannot continue in a conservative-passive role, which is perhaps more comfortable but is completely inconsistent with an engaging academic experience (Pardo & Cobo, 2020; Scott, 2015).

The possibilities offered by the latest generative digital tools may require the teacher to be capable of the following:

- "Challenging" the student through problems, cases, or challenges that need to be solved, focusing on the process followed to solve them. This process is an opportunity for continuous monitoring, reviewing students' needs and potentials, and promoting improvement through feedback. Metacognition will become more prominent because there will be more time and resources to develop it more deeply, and formative assessment will become more meaningful in a continuous and teacher-led process (Scott, 2015).
- Selecting good examples of best practices so that students have models and can identify the reasons why they are good examples. In this way, the purpose of the assigned task will be to develop reasoning and critical thinking skills, using the corresponding framework provided by literature and the teacher. It may also be necessary to provide other less successful examples to detect shortcomings and suggest improvements.
- Taking advantage of the vast resources that can now be immediately available through new tools, with a very high level of specificity. For example, generating an infographic with the key aspects of a session or unit, a concept map, a rubric, a study or work guide with various perspectives, or a glossary of key concepts will be common practices in planning the learning experience that the teacher will need to design (Pardo & Cobo, 2020).
- Using the methodological diversity that can be identified and selected from digital tools, with their varying strategies and purposes, to ensure effective and appropriate teaching practices based on students' needs. This aspect may provide more opportunities for reviewing one's teaching practice. However, it might be necessary to consider the added value that peer review provides, from face-to-face interactions, opportunities to share lived experiences, testimony, and emotions.
- Collaborating intensely and continuously with other teachers who work with the same group of students to share designs of learning experiences, considering the entire educational ecosystem available to the university community and society as a whole (Gallifa, 2018). The learning experience will be eco-systemic, or it will not be at all. *Learning communities* provide a sense of belonging and shared growth while increasing the potential of each member (Brown, 1992). This also guarantees the personalisation and humanisation of the learning experience at the university (EUA, 2021). If the teacher is an agent in this community, the students will learn through coherence and examples.

However, the student will need to take on responsibility (Klemenčič, 2017). On the one hand, students will need to make their first professional decision: to initiate a process with commitment and effort to acquire the necessary competencies to become good professionals. This process demands both academic and personal involvement. The student's attention and participation will become more visible in face-to-face or synchronous virtual sessions, but it will especially be complemented by the student's autonomous work, which until now has been underestimated and frequently invisible. This will be essential so that the new ways of looking at in-person interaction become truly experiential and meaningful. This autonomous work, more or less supervised, individual or collaborative, synchronous or asynchronous, will benefit from the new advances in digital technology. The design of the educational experience becomes paramount again. In this way, the student, as we evidenced in our analysis, can search for information on specific topics by posing good questions to generative AI tools, which can also clarify concepts, suggest more or less analogical complementary resources, or help with the writing process; however, the answers should be carefully selected because, although they can be precise and reliable, they may need to be analyzed to provide what is truly sought from the search. Likewise, students can improve their collaborative autonomous work by using generative artificial intelligence to discuss topics, divide tasks, collaborate in real time, or jointly review and correct their tasks. Autonomous work will need to become much more visible in the student's academic schedule. It is in this academic schedule outside of face-to-face sessions where the university should ensure that the student wants to be present in the physical spaces of the campus.

On the other hand, during their years at university, students will be making more decisions; some of these will allow them to advance towards obtaining a degree, but many others will also enable them to trace a unique itinerary that will make them stand out as a person and as a professional. Digitalization must support this personalization of itineraries (on the need for personalization, see Hu & Kuh, 2003; Patrick et al., 2013; Basham et al., 2016; Kumar, 2019). The university will need to provide this personalization, not only in the curriculum, but also through other extracurricular initiatives of extension courses, exposure, creative expression, solidarity, leisure, participation, and entrepreneurship, among others. The "Real Decreto 822/2021" already hints at a way to collect and provide evidence of the students' journey throughout their years at university, with the European Diploma Supplement (SET), but it will be necessary to ensure, more than ever, the validation of the formative itinerary that each student will have followed through a document

or portfolio that collects their *Personal Itinerary of Professional Identity*.

Universities are among the most prestigious institutions in society. They have a promising future, as long as they are aware of their mission and take advantage of the new generation of technologies to transform it. Generative AI can indeed be a powerful tool, providing ideas and expanding possibilities, as we found in our study, much as Google or Wikipedia already did when they appeared. However, the final creative and innovative genius, the voice that speaks and consciously takes responsibility, and the reflective mind must be that of the learning person, of the student. As we have shown, many students are aware of this need for authorship in academic work. And responsibility is not just a technological-scientific issue, but depends on human values, intertwined with motivations, emotions and experiences. Additionally, aspects that may have been overlooked, such as orality, which is so central to human anthropology, can also be recovered.

All these initiatives and proposals can be understood as initial attempts to respond to the potentiality of generative AI tools to restructure students' educational experience.

Conclusions

This qualitative study allows us to understand the discourse about the uses of generative AI in higher education on the part of students in their informal, not pretrained, use. A limitation of this work is that its exploratory character does not allow for a generalization of results. The sample size or the possible biases in terms of study programs, socio-cultural background of students, etc. might have interfered in the final results. Nevertheless, the analysis provides meanings in terms of the expression of students and can serve as a basis for prospective, more representative, studies. For example, based on the data here, one could create a questionnaire that could serve to test the findings with more statistical representativity.

The uses reported are similar to those identified in the previous and recent literature, as are the difficulties. Some students (at least 25%) are very conscious of the possibilities and difficulties connected with generative AI tools. They identify in their own terms the same problems identified in the literature, especially the need to be careful with the information obtained and to use appropriate prompts and be critical. They say it in their own words because they have not had any special training on specific AI vocabulary. A weakness was detected: the students seemed unaware of the potential ethical risks. This led us to conclude that there is a need for an initial course on generative AI at the beginning of the educational experience.

We implemented a DA system using Chat GPT. After different trials, we found a reasonably valid way of automatically obtaining an analysis of the data to meet the objective of summarising the ideas in the discourse in the terms of the students.

Technology can also help manage, evaluate, and analyze information more effectively to achieve the goals of personalized education. It can, therefore, amplify the possibilities of personalized learning. However, the design of the varied learning situations of students will continue to be teachers' responsibility. They will have to face more complex tasks. They will have more instruments at their disposal, but there will also be new challenges to be met, with or without technology. The university is undoubtedly better equipped to do this than other societal institutions. There is a need for a transformed university, one that purposefully places the students' experience at the centre, promotes integral education and, in this way, contributes to human development. A student-experience-centred university should not only educate intellectually, but also for a successful and joyful life. And generative AI can be purposefully aligned with these meaningful higher education objectives.

Ethics compliance

This piece of research was part of a broader research on the use of IA in Education approved by the Ethical Committee of the FPCEE Blanquerna-URL.

Informed consent was required to participants explaining to them that "The personal data that may be provided in the questionnaire will be anonymized and treated in accordance with Organic Law 3/2018, of December 5, on the Protection of Personal Data and Guarantee of Digital Rights (LOPDGDD) and Regulation (EU) 2016/679, on general data protection (RGPD)".

After the description of the study, the participants were required to give informed consent to the sentence: "I agree to participate in this research study".

Author Disclosure Statement

There are no conflicting interests

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