SEQUENCING BASIC KNOWLEDGE IN GEOGRAPHY AND HISTORY USING ARTIFICIAL INTELLIGENCE: NEW PEDAGOGICAL PERSPECTIVES FOR SECONDARY SCHOOL

SEQUENCIALIZANDO CONHECIMENTOS BÁSICOS EM GEOGRAFIA E HISTÓRIA USANDO INTELIGÊNCIA ARTIFICIAL: NOVAS PERSPECTIVAS PEDAGÓGICAS PARA O ENSINO MÉDIO

SECUENCIACIÓN DE LOS SABERES BÁSICOS DE GEOGRAFÍA E HISTORIA MEDIANTE INTELIGENCIA ARTIFICIAL: NUEVAS PERSPECTIVAS PEDAGÓGICAS PARA SECUNDARIA

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ABSTRACT

The article Sequencing the core contents of Geography and History using artificial intelligence analyzes how generative language models (LLMs) can be used to structure the secondary education curriculum, particularly in the subject of Geography and History. Its purpose is to compare the effectiveness of four models —ChatGPT, DeepSeek, Le Chat and Claude— in organizing and sequencing the core contents established in the Aragonese curriculum. The study was conducted using a methodology based on sequential prompts to interact with the LLMs. As a result, twelve thematic blocks were generated and later evaluated for their pedagogical progression, internal coherence, and epistemological orientation. The results show that, although all models use the same curricular corpus, they display significant differences in content structure, thematic hierarchy, conceptual depth, and terminological choices. Some models prioritize methodological competencies, while others focus on themes closer to students' experiences. The study concludes that these tools not only diversify the ways in which curricular content is represented but also facilitate more flexible, contextualized teaching planning aimed at developing critical citizenship. The research highlights the potential of LLMs to generate coherent sequences based on various pedagogical approaches. These proposals encourage teachers to reflect on how content is organized and how it can be adapted to diverse educational contexts.

Keywords: Curriculum Sequencing. Generative Language Models. Geography and History. Artificial Intelligence in Education. Pedagogical Approaches.

RESUMO

O artigo "Sequenciando o conhecimento básico de geografia e história usando inteligência artificial" analisa como modelos de linguagem generativa (LLM) podem ser usados para estruturar o currículo do ensino médio, particularmente nas disciplinas de geografia e história. Seu objetivo é comparar a eficácia de quatro modelos — ChatGPT, DeepSeek, Le Chat e Claude — na organização e sequenciamento do conhecimento básico estabelecido no currículo aragonês. O trabalho foi realizado utilizando uma metodologia que utilizou prompts sequenciais para interagir com os LLMs. Como resultado, foram gerados doze

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blocos temáticos, posteriormente avaliados quanto à sua progressão pedagógica, coerência interna e abordagem epistemológica. Os resultados mostram que, embora todos os modelos sejam baseados no mesmo corpus curricular, eles apresentam diferenças notáveis na estruturação do conteúdo, hierarquia temática, profundidade conceitual e escolha terminológica. Alguns priorizam habilidades metodológicas, enquanto outros se concentram em tópicos relevantes para a experiência dos alunos. O estudo conclui que essas ferramentas não apenas diversificam as formas de representação curricular, mas também facilitam um planejamento didático mais flexível e contextualizado, voltado para o desenvolvimento da cidadania crítica. A pesquisa destaca o potencial dos LLMs para gerar sequências coerentes a partir de diversas abordagens pedagógicas. Essas propostas estimulam os professores a refletir sobre a organização dos conteúdos e sua adaptação a diversos contextos educacionais.

Palavras-chave: Sequenciamento Curricular. Modelos de Linguagem Generativos. Geografia e História. Inteligência Artificial na Educação. Abordagens Pedagógicas.

RESUMEN

El artículo Secuenciación de los saberes básicos de Geografía e Historia mediante inteligencia artificial analiza cómo los modelos de lenguaje generativo (LLM) pueden utilizarse para estructurar el currículo de secundaria, en particular en la asignatura de Geografía e Historia. Su propósito es comparar la eficacia de cuatro modelos —ChatGPT, DeepSeek, Le Chat y Claude— en la organización y secuenciación de los saberes básicos establecidos en el currículo aragonés. El trabajo se ha llevado a cabo mediante una metodología que ha empleado prompts secuenciales para interactuar con los LLM. Como resultado, se han generado doce bloques temáticos, evaluados posteriormente por su progresión pedagógica, coherencia interna y enfoque epistemológico. Los resultados muestran que, aunque todos los modelos parten del mismo corpus curricular, presentan notables diferencias en la estructuración de contenidos, jerarquización temática, profundidad conceptual y elección terminológica. Algunos priorizan competencias metodológicas, mientras otros parten de temáticas próximas a la experiencia del alumnado. El estudio concluye que estas herramientas no solo diversifican las formas de representación curricular, sino que también facilitan una planificación didáctica más flexible, contextualizada y orientada al desarrollo de una ciudadanía crítica. La investigación pone de relieve el potencial de los LLM para generar secuencias coherentes desde diversos enfoques pedagógicos. Estas propuestas fomentan la reflexión docente sobre la organización de los contenidos y su adaptación a contextos educativos variados.

Palabras clave: Secuenciación Curricular. Modelos de Lenguaje Generativo. Geografía e Historia. Inteligencia Artificial en Educación. Enfoques Pedagógicos.

1 INTRODUCTION

In the context of educational transformation promoted by reforms such as Organic Law 3/2020 (LOMLOE), of 29 December, amending the current Organic Law 2/2006 (LOE), of 3 May, on Education. (LOMLOE), generative language models, such as *the Generative Pre-trained Transformer* (GPT), are significantly changing the way secondary school teachers approach didactic programming. These tools not only expand the possibilities of personalization, creativity, and adaptation to the realities of the classroom, but also allow the role of the teacher as an autonomous agent in curriculum design to be reconfigured.

Traditionally, teachers have resorted to the textbook as the backbone of their planning, relying on it as a resource that interprets and specifies legislative guidelines. This editorial mediation has generated a dependence on closed and homogeneous materials, poorly adapted to the diversity of school contexts (Rodríguez et al., 2023; Suárez et al., 2020, Muñoz et al., 2025). However, large language models offer a powerful alternative: they allow direct access, interpretation and work with the content contained in educational legislation – skills, assessment criteria, basic knowledge – without the need for intermediaries. This enables, especially the most innovative teachers, to build their own programmes tailored to their students, without renouncing regulatory rigour or pedagogical coherence (De Lázaro-Torres, 2024, *Department for Education*, 2024).

These tools do not represent a threat to the teaching work; on the contrary, they reinforce their professionalism. They allow the design of dynamic didactic sequences, contextualized learning situations and favor the integration of active and interdisciplinary methodologies (Martínez-Hernández, 2025). This article discusses the potential of language models as catalysts for real transformation in secondary education, and contrasts their contributions with the limitations inherent in the traditional textbook.

This study aims to evaluate the efficiency of different GPTs in the development of the programming of the subject of Geography and History for the third year of secondary school, according to the Aragonese curriculum (Government of Aragon, 2024). Through a series of identical prompts, it will be analyzed which models are most effective in the organization of basic knowledge, focusing on their ability to optimize the time and effort of teachers. It is also intended to explore to what extent Large *Language Models* (LLMs) can contribute to a more flexible, contextualized curriculum planning aligned with active learning methodologies.

In addition, the research aims to provide evidence on the advantages and limitations of these tools in the teaching of Geography, contributing to the debate on their incorporation into the curricular design.

2 METHODOLOGY

Generative Artificial Intelligence (AGI) is a branch of artificial intelligence that, in addition to processing data, has the ability to generate new original content, such as texts, images, musical sequences or three-dimensional models. Its development is based on machine learning techniques, in particular in the training of deep neural networks. In the field of education, one of the most significant advances has been the incorporation of large language models (LLMs), trained with large volumes of textual data, which allow the generation of text in natural language with high levels of coherence, adequacy and fluency.

Among the most prominent educational applications of these technologies are conversational agents or chatbots, digital tools designed to interact with people through oral or written language. In teaching-learning environments, these systems can perform functions of personalized assistance, resolution of doubts or accompaniment in academic tasks. When based on LLM, chatbots generate contextualized responses adapted to the profile of the interlocutor, which enhances their pedagogical usefulness in both face-to-face and virtual or hybrid formats (Gimpel et al., 2023).

On the other hand, content sequencing is an essential aspect in curriculum planning, since it establishes the logical and pedagogical order in which topics and concepts are presented. This structuring has a direct impact on the progression of learning, since a well-organised design not only facilitates students' understanding, but also allows teachers to efficiently manage their teaching practice.

This section presents the methodology adopted for the development of the study, articulated in the following steps: choice of the language models used, establishment of the interaction framework with the IAG tools, design and development of the interactions using GPT models and, finally, processing, analysis and comparison of the results obtained.

2.1. CHOICE OF GENERATIVE LANGUAGE MODELS

The language models used to analyze, organize and sequence the basic knowledge of the curriculum have been: ChatGPT 4.5, DeepSeek, Le Chat and Claude 3.7. Each of them with its own characteristics according to the opinions collected in the weekly bulletins (De Haro, 2025) of the *ChatGPT-IA-edu Telegram group*.

2.2. DESIGN OF THE FRAMEWORK FOR INTERACTION WITH IAG TOOLS.

To work with different IAG models, it is necessary to have an interaction framework to communicate with them and provide the best possible responses. In this work, the R-I-T-A model proposed by De Haro (2024) has been used.

The prompts that have structured the work have been:

Prompt 01: You are an expert teacher in designing didactic programs for the subject of Geography and History in secondary education. You have the document "Knowledges básicos.txt" which contains all the basic knowledge for the subject Geography and History in the third year of secondary school. Carefully analyze all the basic knowledge of the document provided. Then, organize them into 12 coherent thematic blocks, making sure to include absolutely all the basic knowledge without leaving any unclassified. It is a work aimed at teachers who seek a clear and coherent structuring of the curriculum to implement it in their third year of secondary classes. Have you understood the task? If you need any clarification, please ask for it.

In the following prompts, the role and the audience are ignored by being established in the first one and continuing the interaction in the same chat.

Prompt 02: You have 12 blocks of basic knowledge that must be organized to structure the Geography and History program of the third year of secondary school. The objective is to establish a logical order in the sequencing of these blocks, considering criteria such as conceptual difficulty, the progressive introduction of new content and the deepening of the knowledge previously acquired. Sequencing must be aligned with the natural process of teaching and learning throughout the school year. Arrange the 12 blocks progressively, from the simplest to the most complex. 1) Justify in detail the reason why each block is located at that point in the sequence. Explain how each block facilitates the understanding of the next and how it contributes to the progression of learning. 2) If there are different ways to organize the sequence, indicate which one you have chosen and why it is the most appropriate. 3) Presents the answer in a structured and clear way for easy understanding and application in teaching planning.

Prompt 03: He gives me the complete list of blocks, in the proposed sequencing order, with this structure: title (bold), the explanation of its content (normal text), the basic knowledge that is included in it (bullets) and the "why here" (normal text).

Prompt 04: The number of teaching sessions needs to be distributed among the different content blocks of a course. Not all blocks should have the same number of sessions, as the distribution will depend on the amount of content and its level of difficulty. In addition: 1) A couple of weeks should be set aside in June to review everything seen and 2) If possible, the number of sessions assigned to each block should be a multiple of three. Determine the number of sessions to be dedicated to each block, justifying the distribution according to the length and difficulty of the contents. Make sure to optimize the time available and ensure an adequate balance in the workload.

Prompt 05: Review in detail the list of basic geography knowledge in each block. Analyze them carefully and tell me which key concepts or ideas are the most important for the overall understanding of the block. Give me a table with two columns: in the first column the title of the block and in the second the key concepts or most important ideas.

Prompt 06: You have a table with key concepts that must be organized in alphabetical order and defined in a clear and precise way. The definitions must be adapted to the level of understanding of a student in the third year of secondary school (15 years old). Each definition should include: 1) A clear and rigorous explanation of the concept and 2) An illustrative example that helps to understand its application. 1) Alphabetize all the concepts in the table. 2) Develop a clear and rigorous definition for each concept, ensuring academic accuracy. 3) Adapt the language to make it understandable for 15-year-old students, avoiding unnecessary technicalities. 4) Include an example that helps illustrate the meaning of the concept in a practical context. And 5) Present the information in a structured way, with each concept followed by its definition and its respective example. This work is aimed at **secondary school students** who need to understand these concepts in a clear and applied way. Definitions should be written in accessible language, maintaining academic rigor and providing relevant examples for learning.

2.3 IMPLEMENTATION OF INTERACTIONS USING GPT MODELS

Once the prompts that are going to be used in each step have been established, they are entered sequentially in each of the selected GPTs and their responses are analyzed. When these do not have the requested precision, they are itinerated with, as many times as necessary until the required information is obtained.

2.4 PROCESSING, ANALYSIS AND COMPARISON OF RESULTS

The two main blocks of information obtained have been, firstly, the grouping into blocks of the basic knowledge of the subject and its sequencing throughout the academic year, carried out by the four GPTs mentioned and, on the other hand, the list of the fundamental concepts of the subject, for each learning situation, with its definition and an explanatory example.

These results have been prepared in .txt format to be analyzed and compared by ChatGPT 4.5 based on the following prompts:

Prompt 07: You are an expert teacher in curriculum design and content organization in the subject of Geography for secondary education. You have the documents "Blocks of ChatGPT.txt", "Blocks of Le Chat.txt", "Blocks of Claude.txt" and "Blocks of DeepSeek.txt",

which present different ways of organizing the basic knowledge of the subject into thematic blocks. Carefully analyze the organization of knowledge in each of the documents, comparing their approaches, structures, and classification criteria. It examines the similarities and differences between them in terms of the progression of the contents, the thematic coherence, the interconnection between blocks and the pedagogical suitability for the teaching of Geography in secondary school. Prepare a detailed report with clear, formal and academic language, aimed at teachers who seek a clear and well-founded structuring of the curriculum. Be sure to present a comparative analysis that allows you to understand the advantages and limitations of each proposal and that guides teachers in selecting the most appropriate approach for their educational context. If you need any clarification about the task, ask for it before you begin.

Prompt 08: Analyze separately these four files with definitions of the subject of Geography and History of the third year of secondary school. These are definitions of concepts that appear in the basic knowledge of this course. Once analyzed, give me a report on the quality of the definitions, according to these criteria. Remember that these are definitions for 15-year-old students. Criteria: 1. Precision and clarity - The definition must express the concept without ambiguity or vagueness. - Avoid the use of undefined or overly general terms. 2. Conciseness - It should be brief and to the point, without including unnecessary or redundant information. - Avoid excessively long or complex explanations. 3. Suitability to the context - The definition must conform to the disciplinary field in which the term is used. - It must be understandable to the target audience. 4. Linguistic correctness - The writing must comply with the grammatical and orthographic rules of the language. - It must not present syntax or punctuation errors. 5. Comprehensiveness and sufficiency – It should include all the essential elements of the concept, leaving no key aspects unmentioned. - It should be neither too general nor too specific. 6. Avoid tautology – The definition should not include the term you are defining or its derivatives. - You must provide new and useful information to understand the concept. 7. Logical coherence - The structure of the definition must be logical and orderly. - It must respect the relationship between the concept and its essential attributes. 8. Use of examples (when necessary) – In some cases, an example can help clarify the definition, but it should not replace it. - Examples must be representative of the defined concept.

3 RESULTS

3.1 REGROUPING BASIC KNOWLEDGE INTO CONTENT BLOCKS

Prompts 01 to 04 have provided four possible programming models in 12 blocks that can give rise to as many learning situations. The four models include the fundamental contents of Geography and History according to the secondary curriculum, but present significant differences in the organization, the thematic sequence, the methodological approach and the justification of the curricular order. However, all of them agree on the importance of the development of critical thinking, research through reliable historical and geographical sources, the responsible use of digital technologies, ethical and social awareness in the face of contemporary challenges and involvement in the Sustainable Development Goals.

The differences in the organization and sequencing of basic knowledge between the four proposals analyzed reflect different approaches in the teaching of Geography and History. ChatGPT and Claude structure the content starting with blocks dedicated to essential methodological tools, such as source management and critical analysis, prioritizing the development of instrumental skills. On the other hand, DeepSeek and Le Chat start with citizenship and human rights, seeking a greater connection with the students' daily experience and encouraging their civic involvement from the beginning (Table 1).

Table 1

Sequencing of basic knowledge

ChatGPT 4.5	DeepSeek	Le Chat	Claude
Research and historical awareness (9 sess.)	Citizenship and social participation (6 sess.)	Citizenship and Human Rights (9 *sessions)*	Tools of the Historian and Geography (9 sq.)
Digital Citizenship and the Information Society (6 sessions)	Human rights, justice and equality (12 sess.)	Sustainability and Environment (9 *sess.)*	From Subjects to Citizens: The Construction of the Contemporary World (12 sq.)
Environment, climate emergencies and sustainability (9 sessions)	Culture, heritage and diversity (9 sess.)	Information Technology and Society (9 *sessions)*	Global Economy: From Industrial Capitalism to Globalization (12 sessions)
Historical Transformations, Social Movements and Political Change (9 sessions)	Social Movements and Cultural Changes (6 sessions)	History and Historical Consciousness (12 *sq.)*	Social and Cultural Transformations: Identity and Change (9 sess.)

Human rights, equality and diversity (9 sess.)	Technology, information and digital society (9 sessions)	Economy and Globalization (9 *sess.)*	Conflicts and Cooperation in the International Order (12 sessions*)*
Citizenship, Participation and Democratic Values (9 sessions)	Education and methodologies (6 sessions)	Conflicts and Mediation (9 *sessions)*	Human Rights and Equality in Contemporary Society (9 sessions)
Globalisation, economy and the world of work (9 sessions)	History and Critical Thinking (15 sq.)	Heritage and Culture (6 *sess.)*	Participation and Coexistence in a Democratic Society (9 sessions)
International Relations, Peace and Conflict (9 sessions)	Globalization, geopolitics and conflicts (12 sessions)	Institutions and International Cooperation (9 *sess.)*	United Europe: European Integration and Citizenship (12 sessions)
Europe, institutions and integration (9 sessions)	Institutions and international cooperation (9 sess.)	Social and Cultural Transformations (9 *sess.)*	Climate crisis and sustainable development (6 *sess.)*
Heritage, culture and arts (6 sessions)	Economy and Development Models (9) ses.)	Geostrategy and International Politics (6 *sessions)*	Cultural heritage: diversity and identity (3 sess.)
Cultural diversity, identities and emotions (6 sess.)	Sustainability and climate emergency (6 sess.)	Innovation and Technological Transformation (6 *sessions)*	Digital Era: Communication and Responsible Citizenship (6 sessions)
Social transformations, demography and the ethical dimension of science (6 sessions)	Science, technology and ethics (3 sess.)	Social Engagement and Community Participation (3 *sessions)*	Challenges of the 21st century: towards a fairer world (3 sess.)
Final review (6 sessions)	Final review (0 sessions)	Final review (6 sessions)	Final review (0 sessions)
First trimester	Second trimester	Third trimester	

Source: The author.

After the pedagogical analysis of the curricular criteria used in the sequencing of basic knowledge by the four models examined, notable coincidences in their theoretical-methodological approaches are identified. Firstly, they all have a coherent and progressive learning structure, which progresses from the development of basic methodological skills or the internalisation of fundamental civic values, to the understanding of more complex topics such as international conflicts, the economy or sustainability. Secondly, a thematic and sequential interconnection is appreciated, since each block establishes explicit relationships

with the following ones, allowing an integrated and increasingly deeper understanding of the contents. Likewise, in all cases there is an orientation towards the formation of an active and socially committed citizenship, although the intensity and order of appearance of this dimension varies according to the model. Finally, the didactic proposal is based on an interdisciplinary logic, integrating historical, economic, social, ethical and environmental content in a way that enhances each other, favoring meaningful and contextualized learning.

Table 2

Comparative summary of the curriculum analysis

Aspects	ChatGPT	DeepSeek	Le Chat	Claude
Startup Sequence	Historical-geographical methodology	Citizenship and social participation	Citizenship and Human Rights	Historical-geographical methodology
Core focus	Initial Instrumental and Methodological	Initial sociocultural and participatory	Significant and Ethical Initial	Instrumental, emotional and humanistic
Citizenship and digital ethics	Early and clearly defined in a specific block	Intermediate after blocks on citizen participation	Early and strongly emphasized at the beginning	Late, a reflexive approach after history and economics
Emotional integration	Not very explicit, more methodological	Explicit en bloc on culture, heritage and diversity	Limited and distributed across blocks	Very explicit in a specific block on social and cultural transformations
Globalization and the economy	Subsequent to political history and citizenship	Media, after citizenship and human rights	Media-advanced, after citizenship and before conflicts	Early after historical-political framework
International conflicts	Advancing after economics and globalization	Half-final after history and economics	Advanced and post-economy	Advanced after economics, history and society
Sustainability and the environment	Advanced Finish After Economy and History	Final, as a multidisciplinary integrative synthesis	Post-economy intermediate	Final after economy and international institutions
Ethics and technology	Integrated End with Sustainability	Final with ethical reflection and foresight on technology	Distributed in technological blocks	End of the course integrating all previous learning on digital citizenship

Source: The author.

On the other hand, the four blocks of basic knowledge show different implicit educational theories that guide their curricular proposals. The ChatGPT document is based on constructivism and learning by instrumental competencies, prioritizing the development of methodological and analytical skills as a precondition for addressing complex thematic content. Le Chat is based on meaningful and experiential learning, based on topics close to the reality of the students (such as citizenship or digital ethics) in order to generate motivation and facilitate the progressive abstraction of the contents. In Claude, an integrative and humanistic approach is observed, which combines disciplinary methodologies with the incorporation of the emotional component in the learning process, promoting a systemic understanding of historical and social contents. Finally, DeepSeek responds to a sociocultural perspective inspired by Vygotsky, in which learning is situated and contextual, and is built on the basis of social interaction, active participation and thematic proximity to the students' living environment (Table 2).

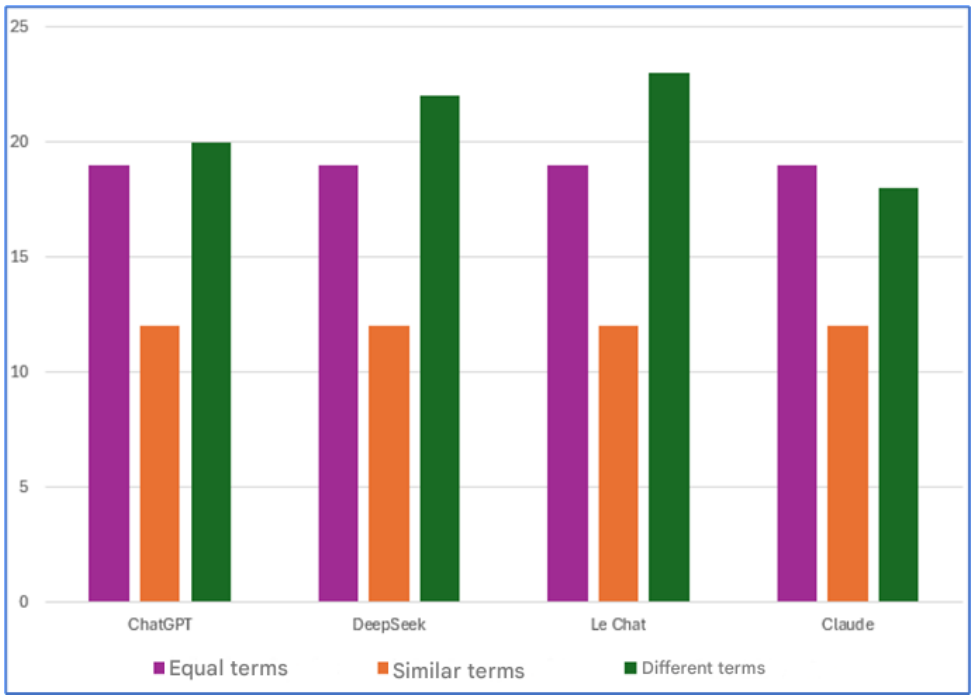
In order to make an appropriate choice between the different curricular sequences analysed (ChatGPT, DeepSeek, Le Chat and Claude), it should be considered that there is no single ideal or universally superior model for all educational contexts. The choice must be based on various factors, such as the specific profile of the students, the educational project of the school, the available resources, the predominant pedagogical orientation and the specific objectives defined for the teaching-learning of Geography and History.

3.2 The vocabularies of each content block

Firstly, it is found that all the models share a set of 19 identical terms, which constitutes the common basis of the vocabulary. They also share 12 terms that, although they are presented under different names, maintain an equivalent or very close meaning, such as "ecosocial awareness", "environmental ethics" and "ecosocial responsibility". However, the number of terms unique to each GPT varies: ChatGPT incorporates 20 unique terms, Claude 18, DeepSeek 22, and Le Chat 23 (Figure 1).

Figure 1

Distribution of the vocabulary terms analyzed



Source: The author.

This variation evidences the degree of conceptual specificity that each model has considered relevant, which is directly related to internal curricular decisions on which aspects to highlight, what connections to establish between contents, and what pedagogical approach to adopt.

The comparative analysis of the vocabularies developed by the different models reveals differentiated approaches in terms of style, conceptual depth and pedagogical adequacy, each with specific strengths and areas for improvement.

ChatGPT's vocabulary stands out for its terminological precision and clarity of presentation. The definitions are well structured, which makes them easier for secondary school students to understand. Its main virtue lies in the balance achieved between conciseness and essential content, since it avoids excesses of technicality without sacrificing conceptual rigor. The use of examples helps to clarify the terms, although in some cases a certain tautology is detected – that is, the repetition of the term in its own definition – which can reduce its explanatory value. Likewise, there is a lack of greater exhaustiveness in some entries that could delve into key aspects of the concept addressed.

DeepSeek's vocabulary is well suited to the educational level, with clear definitions and understandable language. One of its strengths is the systematic incorporation of examples, which help to situate terms in real or applied contexts. However, some definitions are excessively short, which limits conceptual depth and may lead to incomplete

interpretations. In addition, the repetition of the term defined within the definition is detected in several cases, which weakens its didactic effectiveness. Even so, its overall approach is coherent and relevant to the context of secondary education.

Le Chat's vocabulary is characterised by its conciseness, grammatical correctness and accessibility. It uses simple and direct language, which facilitates the immediate understanding of the terms by the students. However, this conciseness entails a loss of conceptual density in many definitions, which are presented in too general or superficial a way. Likewise, the scarce presence of examples limits the possibility of applying the concepts to specific situations, and in some cases problems of internal coherence are observed that affect the clarity of the content.

Finally, Claude's vocabulary stands out for its completeness and contextualization. The definitions are broad and detailed, providing a solid interpretive framework that facilitates the in-depth understanding of each term. In addition, the use of well-selected examples helps to anchor concepts in concrete situations. However, this richness of content translates into a length that, in some cases, can be excessive and make it difficult to read quickly. Terms or expressions are also identified that, due to their level of abstraction, can exceed the average reading competence of 15-year-old students. In this sense, a more careful synthesis would allow the conceptual richness to be maintained without compromising accessibility.

Despite starting from the same set of basic knowledge defined curricularly, the results obtained by ChatGPT, DeepSeek, Le Chat and Claude show a notable divergence in the selection of the vocabulary associated with these contents, a divergence that does not respond to errors or differences in the content itself, but to the way in which each model has organized, hierarchized and thematized said knowledge. Each GPT has structured the contents into different thematic blocks, which has conditioned the identification of certain terms as central and has relegated others to the background, despite sharing the same curricular base. This difference in the internal architecture of the blocks generates direct effects on the conceptual representation of the curriculum and explains why, from the same source, different vocabularies are obtained depending on the approach adopted by each model.

4 DISCUSSION OF RESULTS

4.1 THE BLOCKS OF BASIC KNOWLEDGE

The differences in content sequencing provided by GPTs suggest that there is no single optimal way to structure the curriculum, but that it depends on the specific pedagogical objectives.

One of the main discrepancies identified lies in the methodological approach of each model. While ChatGPT and Claude prioritize sequencing based on instrumental and methodological skills, Le Chat and DeepSeek emphasize more experiential learning, focused on citizen participation and the construction of knowledge from the social context of the students. This divergence is aligned with previous debates in the literature on secondary education, in which the need to find a balance between methodological and thematic approaches has been argued (Gallardo et al., 2004; Romero et al., 2020).

The results obtained from this work reveal that the way in which the curriculum is structured and sequenced can influence the way in which students acquire knowledge and develop skills. Curricular organization based on methodological skills, such as that proposed by ChatGPT and Claude, seems to favor structured and progressive learning, which facilitates the acquisition of analytical tools before addressing more complex topics. On the other hand, the organization focused on citizenship and the daily experience of students, present in Le Chat and DeepSeek, could generate greater initial motivation, by linking the contents with nearby realities.

These results have direct implications for teacher planning, as they suggest that the choice of curricular sequencing should be based on the specific needs of the students and the educational context in which they are inserted. Thus, while a methodological approach might be more appropriate for schools with students already familiar with historical and geographical analysis tools, a more contextual and experiential approach could be more effective in contexts where social engagement and active participation are sought.

From a theoretical point of view, this paper contributes to the discussion on curriculum planning in secondary education, by demonstrating that large language models can generate differentiated proposals based on different pedagogical traditions. This suggests that LLMs do not reproduce a single educational model, but can be adapted to diverse approaches depending on the type of instructions provided.

In practical terms, the results have significant implications for curriculum design and teaching planning. The ability of LLMs to generate multiple curricular sequences allows teachers to compare different approaches and select the one that best suits their students. In addition, the flexibility of these models can facilitate experimentation with hybrid methodologies, combining elements from different sequences to optimize teaching.

The results obtained open new lines of research in the use of artificial intelligence for curriculum planning. Among the outstanding issues are:

- To evaluate the effectiveness of each curricular model in practice, measuring its impact on student learning through empirical studies in the classroom.

- Explore how LLMs can be integrated with active methodologies, such as project-based learning or service-learning.
- To analyse the possibility of further customising the curricular sequences generated by the LLMs, adjusting them to specific characteristics of the students, such as their level of digital competence or their thematic interests.

The fact that the four proposals analyzed present different approaches shows that curricular sequencing is not a single and standardized process, but that it can be adapted to different pedagogical needs. In addition, the integration of artificial intelligence in this process allows us to explore hybrid approaches that combine elements of different methodologies, optimizing the teaching of Geography and History.

From a theoretical perspective, this work provides evidence on the capacity of large language models to generate differentiated curricular proposals. This confirms that LLMs do not simply replicate predefined structures, but can produce curricular sequences based on different pedagogical approaches, which opens up different possibilities for educational planning.

4.2 VOCABULARIES

Although the basic knowledge is common in all cases, their grouping into thematic blocks by each model has not followed a uniform pattern. ChatGPT, for example, opts for block sequencing that prioritizes technological, environmental, and methodological aspects, organizing content around nuclei such as historical research, digital citizenship, sustainability, and social movements. This leads it to more frequently incorporate terms such as "social networks", "digital ethics", "information culture", "historical awareness" or "disinformation". Claude, on the other hand, emphasises the social, ethical and legal dimension of citizenship, giving more weight to blocks related to human rights, equality, social justice and democratic construction. As a consequence, it selects terms such as "collective rights", "inclusion", "associationism", "gender equality" or "human dignity" that do not appear or appear more marginally in other vocabularies.

DeepSeek and Le Chat present a more structuralist, geographical and geopolitical organization, with blocks focused on the understanding of global dynamics, territorial conflicts, the world economy, power relations between states and the spatial transformation of the planet. This translates into more specialized terminology, with concepts such as "center-periphery," "spatial justice," "digital geography," "spatial capitalism" or "world order," which reflect an intention to conceptualize the world in a systemic and territorial key. These terminological choices do not contradict basic knowledge, but interpret them from a structural

and spatial logic different from Claude's ethical and civic logic or ChatGPT's informational and socio-ecological logic.

The choice of one term over another is also influenced by the level of abstraction and by the way in which each GPT decides to specify or define the concepts it uses. Some terms, although conceptually equivalent, are expressed with different degrees of generality. Thus, while Claude prefers terms such as "citizenship" or "values of Europeanism", DeepSeek opts for more analytical categories such as "geography of peace" or "territorial technology". This difference in formulation means that, in a quantitative analysis, the terms do not coincide exactly, although they may be linked to the same basic knowledge. In this sense, the selection of vocabulary is conditioned not only by the thematic content of the blocks, but also by the degree of specificity or generality with which each concept has been decided.

In short, although the basic knowledge is the same, the blocks of content built by each GPT respond to different pedagogical, epistemological and discursive decisions. These decisions determine which aspects of knowledge are considered central, how different topics relate to each other, and what terms are chosen to represent them. Therefore, differences in vocabulary do not indicate incoherence or contradiction with the curriculum, but rather a diverse – but legitimate – translation of the same content according to a certain didactic organization. This diversity in conceptual representation can be a richness, as long as it is recognized that each thematic grouping supposes a specific way of constructing meaning from the same curricular corpus.

4.3 THE PROBABILISTIC GENERATION OF CONTENT

ChatGPT, DeepSeek, Le Chat and Claude, like other conversational agents, operate through a probabilistic approach based on the statistical analysis of large volumes of text. Their operation is based on predicting the most likely sequence of words (*tokens*) from a given context, which allows them to generate blocks of content and coherent, although not identical, vocabularies, even when they start from the same basic knowledge. Each model has been trained with different datasets and presents different prioritization biases, which influences the way they structure, hierarchize and thematically group knowledge. Decisions about which term to include, which concept to develop, or which structure to follow are not based on explicit pre-programmed curricular logic, but on patterns of language use that maximize contextual coherence and relevance according to the model's internal statistics. Thus, the sequence of blocks or the selection of definitions is the result of an emergent construction guided by the probability of the appearance of linguistic and thematic combinations.

For teachers, this way of operating offers a significant advantage: by not following a single rigid scheme, the models can generate multiple versions of the same curricular or conceptual proposal, adapted to different methodological approaches, levels of depth or writing styles. This probabilistic plasticity allows us to explore different configurations of content, which facilitates pedagogical reflection on the best way to present knowledge according to the group-class, the educational project or the competencies that we want to prioritize. In addition, the model's ability to maintain internal coherence despite the diversity of outputs generates consistent and contextualized didactic proposals, useful as a basis for teaching planning, the design of materials or the critical comparison between approaches.

5 CONCLUSIONS

From the comparative analysis of the curricular proposals developed by ChatGPT, DeepSeek, Le Chat and Claude, it is possible to draw a series of conclusions that allow us to assess both their coincidences and their divergences in the treatment of the basic knowledge of Geography and History for the secondary stage. These conclusions show not only different sequencing options, but also underlying pedagogical and epistemological orientations, which reflect different ways of understanding learning in the social sciences.

A first outstanding conclusion is the existence of a common basis in the selection and treatment of basic knowledge within the four documents analyzed. There is a marked agreement on the fundamental contents addressed, such as historical and geographical methodology, digital and ethical citizenship, human rights, environmental sustainability, the globalised economy, international conflicts and the role of European institutions. This similarity reflects that, regardless of the sequencing chosen, there is consensus on what content is essential for the education of students in Geography and History in the secondary stage, as established in the official curriculum.

A second relevant conclusion is the identification of two major differentiated methodological approaches in the organization of knowledge. The former, represented mainly by ChatGPT and Claude, follows a curricular model based on a progression that begins with the development of fundamental methodological skills before addressing specific content. This choice reveals a curricular conception based on constructivist theories, according to which instrumental skills must precede complex thematic learning to guarantee the significant and deep acquisition of knowledge. On the other hand, the Le Chat and DeepSeek documents prioritise an approach more focused on the social experience close to the students, starting from everyday contexts, such as citizen participation and human rights, towards more abstract and complex content. This second approach is based on socio-

constructivist theories of learning, arguing that the starting point close to the student generates a higher intrinsic motivation and facilitates greater cognitive involvement in later topics that are further away from their immediate reality.

Thirdly, it clearly highlights the importance attached to interdisciplinarity and integrated progression in all documents. Each explicitly justifies the blocs' position, emphasizing that learning is a cumulative and systemic process. Most of the curricular proposals highlight how the learning acquired in previous blocks serves to conceptually ground the understanding of subsequent blocks. In this sense, there is a clear attempt to avoid rigid compartmentalizations and to promote a holistic vision of the social sciences. This perspective reflects a contemporary educational vision that seeks to develop in students skills to understand and interact with a complex and globalized world.

The fourth conclusion, clearly observable in the documents, is the emphasis placed on active, critical and socially engaged citizenship. All the curricular blocks analysed show a clear interest in educating in social responsibility, respect for human rights and eco-social awareness, aligning with educational approaches focused on the comprehensive training of students as responsible citizens in the face of contemporary global challenges, such as sustainable development, social justice and the ethical management of information and technology.

Finally, it is concluded that curricular sequencing in Geography and History presents an explicit and remarkable consideration of the ethical and emotional dimension of learning. This is especially reflected in the Claude document, which explicitly incorporates the emotional dimension in its treatment of historical and cultural analysis. This curricular criterion highlights the fact that the educational process is not merely rational or cognitive, but also involves an emotional and ethical development essential for the comprehensive education of students. The documents, although to varying degrees, thus recognize that educating is not only about transmitting objective information, but also about developing an ethical and emotional awareness capable of facing contemporary dilemmas with responsibility and one's own criteria.

In short, the curricular proposals examined reflect different perspectives and methodological emphases that respond to contrasted and recognized educational theories, all oriented to the construction of a critical and committed citizenship, capable of facing present and future challenges through solid knowledge, well-developed methodological skills, ethical awareness and social and cultural sensitivity.

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