

## Research Article

# Use of Open Access AI in teaching classical antiquity. A methodological proposal

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### Abstract

The aim of this contribution is to present an innovative approach to the use of Open Access AI in teaching the Classical era at high school and university level. The paper first explains the growing interest in AI technology and its main applications in the subjects of philology, history and other related areas. The following sections show the different steps of the proposal, which uses the Midjourney program, as well as its pros and cons.

**Keywords:** Literature, Classics, AI technology, Digital Humanities, Midjourney

### Introduction

New technologies are transforming the way the classical era is taught. A good example is the use of virtualisation and 3D modelling of different archaeological sites and artifacts, thus bringing to the classroom materials that are often unreachable in person (Chapinal *et al.*, 2023a, 2023b). There are however very few cases of the use of artificial intelligence (AI) in high school and university teaching, although there are some interesting approaches in learning new languages (Nasimovna, 2022; Ross, 2023; Toksha *et al.*, 2022) and methodologies with e-Learning (Fahimirad, 2018; Garg and Sharma, 2020; Guan *et al.*, 2020; Jia and Zhang, 2021).<sup>1</sup>

The application of AI in History and Archaeology, specifically in Classical Antiquity, is very rare (Chapinal-Heras and Díaz-Sánchez, 2023). The usefulness of AI has been largely proved in other areas, such as the health sciences (Vaishya *et al.*, 2020), business (Jarrahi, 2018; Makridakis, 2017), and virtual environments (Kolve *et al.*, 2022). AI is seen as the future, the core of a new ‘industrial revolution’ (Makridakis, 2017). This potential is based on AI’s ability to interpret external data accurately, automatically learning from them and applying that knowledge to specific tasks (Bengio, 2009; García-Serrano and Menta Garuz, 2022). This self-learning process, known as deep learning, is one of the most usual mechanisms implemented in AI algorithms. The aim is to enable the ‘machine’ to think and learn as if it were human (Bengio *et al.*, 2021).

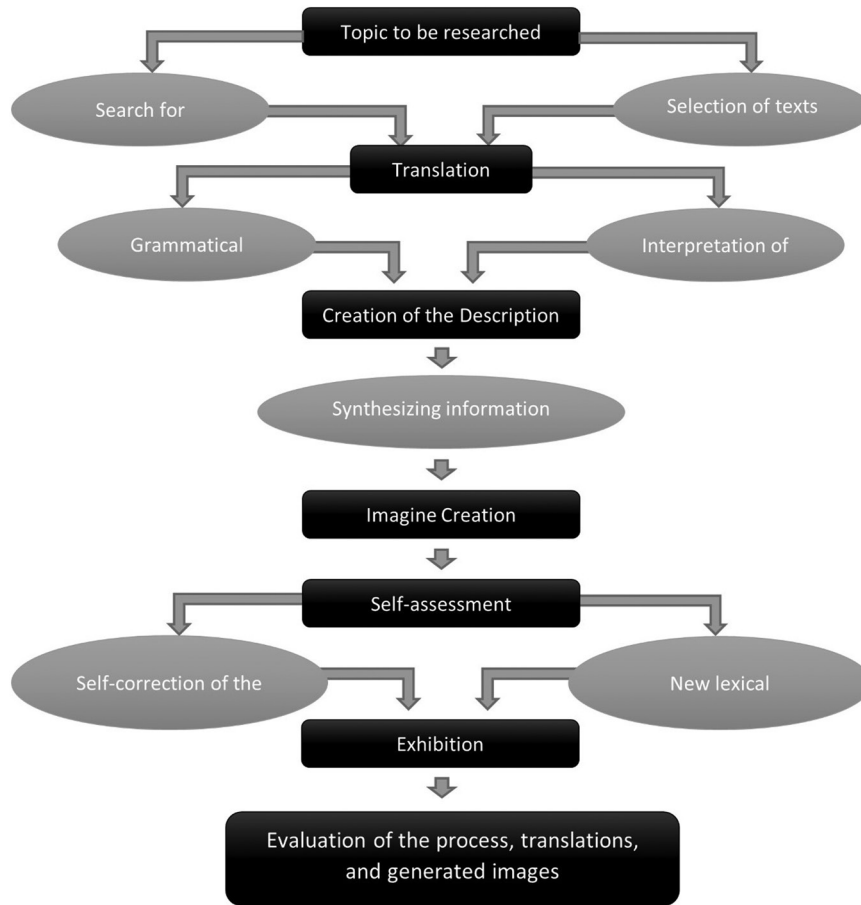
In the Humanities, AI is a useful resource for researchers who need to analyse data within the context of Big Data and Natural Language Processing (NLP) (García Serrano and Menta Garuz, 2022). We can observe some examples in literature, where AI is trained to examine and compare discourse or interpretative

frameworks (Cuéllar and Vega García-Luengos, 2023; DiMaggio *et al.*, 2013; Köntges, 2020; Schöch, 2017). Another area is the study of calligraphic *ductus*, in which computerised palaeography enables a stylometric analysis to be carried out using algorithms. This is very useful when attempting to identify handwriting in fields such as palaeography, epigraphy and diplomacy (Azmi *et al.*, 2011; Cuéllar, 2023; Sommerschild *et al.*, 2023; Wolf *et al.*, 2011). It can even transcribe documents, examining and comparing them to recognise their authorship (Kang, 2021; Meza-Lovn, 2012; Tuzzi and Cortelazzo, 2018). AI has been trained in different projects to aid researchers to process and interpret texts in Latin and Greek. Examples include APELLO (Roued-Cunliffe, 2010) and EAGLE (Amato *et al.*, 2016) aimed at identifying letter-cutters in Athenian inscriptions (Panagopoulos *et al.*, 2009; Tracy *et al.*, 2007), an attempt to decrypt Mycenaean Linear B and the Ugaritic script (Luo *et al.*, 2019), or even to partially or totally restore words and sentences through pattern recognition (Assael *et al.*, 2020; Ross, 2023). In addition, archaeological research has implemented several algorithms that have enabled programs to learn to identify settlement patterns, buildings and artifacts discovered through telematic prospections and drone flights (Argyrou and Agapiou, 2022; Berganzo-Besga *et al.*, 2021; Caspari and Crespo, 2019; Davis *et al.*, 2021; Orengo and Garcia-Molsosa, 2019).

Despite the most recent advances in AI in the Digital Humanities, this is neither an easy nor a common practice. Each project develops its own AI approach and trains it with a different software, although they usually function in a similar way to each other. The design of these AI algorithms, together with the creation or acquisition of the Big Data required to train it, is very expensive. Not many research groups, projects or scholars can afford to create their own software. For this reason, in this paper we present an activity using Open Access AI, a free methodology that can contribute to a new use of virtual resources in the high school and university teaching of the Classical era.

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**Cite this article:** Díaz-Sánchez C and Chapinal-Heras D (2024). Use of Open Access AI in teaching classical antiquity. A methodological proposal. *The Journal of Classics Teaching* 25, 17–21. <https://doi.org/10.1017/S2058631023000739>



**Figure 1.** Methodological approach. Stages and possibilities of the activity.

## Materials and methods

Our methodological approach consists of the application of Open Access AI to improve and strengthen the historical, archaeological and philological knowledge of classical antiquity. Students of this field can acquire and develop new skills to better understand and analyse literary sources. A frequent issue perceived in teaching is a lack of comprehension, synthesis and imagination to process the abstract concepts, landscapes and mythological figures that appear in the ancient accounts. The use of a resource that allows an image to be generated on the basis of a textual description can be very useful in helping students to improve their skills by means of self-assessment.

Midjourney is the Open Access AI chosen for this teaching practice.<sup>2</sup> This software was developed by the autonomous team led by D. Holz and operates with the Discord application.<sup>3</sup> By installing a bot,<sup>4</sup> a person can interact using different commands. To begin with, it is necessary to enter the '/imagine prompt:' command and then insert the textual description to enable the program to generate an image related to that reference. The text is processed and transformed into a transliteration that enables the algorithm to learn to interpret it and create an image. The more it is trained in this task, the more it learns (NLP) (Pagé-Perron *et al.*, 2017). Our approach focuses on this method, using AI algorithms we believe can be of benefit to teaching, in place of the traditional master class.

## Approach

Our activity focuses on the ability to examine a topic mentioned in the ancient sources to work with the AI in relevant aspects within

high school and university studies of classical antiquity. In this process, which is conceptualised in Figure 1, the teacher or professor presents the subject, which can be a landscape, a beast or a real or mythological artifact. The students have to search for information in the ancient literary sources. By undertaking this research, they gain more practice in dealing with the different available sources.<sup>5</sup>

Once the passages have been selected, the students are required to translate them from the original Greek or Latin. In this way, they apply their knowledge of Greco-Latin vocabulary and grammar. If two or more students work with the same account, it is likely that each will present a unique translation, different from the others, with possible conceptual variations. Likewise, many of the translated passages are long and may contain rhetorical figures, such as sarcasm, alliterations or ironic references. These need to be transformed into more logical descriptions, since AI has issues when dealing with abstract texts. It is therefore crucial that the students fully understand the text they have translated, assimilated and synthesised, in order to be able to process the information it contains and thus offer a depiction that AI can process.

In the next step, the students have to access Midjourney and enter the '/imagine [Prompt: ]' command followed by their text. Based on this depiction, the AI will generate four images that contain the elements mentioned in the account. It is probable that the program will not depict certain specific details in the images, meaning the student will need to modify the description until Midjourney creates a more accurate depiction. This type of self-assessment allows the student to undertake a second translation (and others if necessary), seeking a more specific vocabulary to better define their study case.

When the final image is obtained, the students can show their work to their classmates, explaining the main features of the depictions, how they correspond to the textual description and the sources consulted to create it. This step encourages active participation in the classroom and leads to a better comprehension of the study case. The illustration generated by the AI enables a discussion as to whether it is reliable or not, based on its similitude to the literary reference, as well as whether the iconography used in the image is accurate.

Finally, the students submit their work to the teacher or professor. This work must be a compilation of accounts consulted, the different textual descriptions used and the image generated by Midjourney, with a brief description of the process. The mark obtained will also take into consideration the exhibition in the classroom.

### Pros and cons of applying this activity in high school and university teaching

The use of new technologies applied in teaching, in this case Open Access AI, can be a dynamic incentive that breaks with the traditional master classes that are common in classical antiquity studies.

The main benefits of our approach can be seen in the different steps, as summarised in Table 1. The first stage deals with the search for and analysis of information in the literary sources. The student improves their skill in identifying the texts considered to be the most appealing to proceed with the study of the topic suggested by the teacher or professor. This benefits the student’s initiative and autonomy. They themselves must research the literature and select the descriptions they consider most useful.

The second part of the activity is translation, focusing on the traditional approach to the ancient sources. The students must be able to translate texts. It is essential here that they are careful to use accurate vocabulary, since the varying meanings of certain terms and expressions can significantly alter the work of the AI, sometimes even making it impossible to process some idioms or sentences due to the use of irony or sarcasm. The students’ skill in interpreting these sources will determine the degree of success of their activity.

**Table 1.** Activity-benefit ratio of the approach

Activity	Benefits
Phase 1 Information Search	Correct use of classical texts Autonomy – self-sufficiency
Phase 2 Translation of selected texts	Active learning of grammar and vocabulary
Phase 3 Synthesis of texts and generation of a full description	Passive learning in the construction of the description
Phase 4 Use of AI to generate the image	Teaching ICT applied to classical studies
Phase 5 Correction and redesign of the description inserted in the AI	Improving learning capacity through self-assessment
Phase 6 Exhibition and display of results in class	Improved public speaking skills and advocacy in public
Phase 7 Handing over the completed process and work	Feedback from the teacher or professor

The third phase encourages the students to understand the sources and to synthesise the description. Open Access AI does not usually allow long descriptions to be used, normally a maximum of four lines. This selection should not include rhetorical figures, meaning that the students need to understand the text, learning and embracing the information found in the literary sources and thus being able to delve into the historical content. Through this synthesis, it is possible to develop certain abilities that will no doubt prove useful in the job market. The ability to process and select information, summarise it and reject superfluous elements is crucial.

The fourth and fifth steps deal with the interaction with Midjourney. The communication between the students and the AI helps facilitate the reprocessing of the data contained in the textual descriptions. The AI algorithm itself generates a representation based on the concepts contained in the command by establishing a sort of categorisation of the aforementioned concepts. For this reason, the images produced may focus more on certain elements than on others, which means the students have to reformulate the textual description to allow the AI to take into account some previously rejected details. This means of self-assessment has a clear aim: for the students to improve their information processing and presentation skills.

In the last stage, the students have to show their work to their classmates. This activity improves their oral and rhetorical skills. They need to explain the different steps they have undertaken, defending the results obtained by linking the images generated by Midjourney to the textual descriptions they prepared.

There are however some issues regarding the application of AI in the classroom. The main one is its accessibility, since the Deep Learning mechanism and the number of users of the software may have a powerful – and negative – influence on the results. For example, the iconography of an image about ancient Rome in the Republican period may contain Christian elements. The AI bases its depiction on what users ask for and is sometimes unable to avoid anachronisms. For this reason, it is essential for the students to be able to modify their textual descriptions to ensure that the representation prepared by Midjourney is as reliable as possible, although it may lose its visual appeal.

Another disadvantage is censorship. The programming of this sort of AI does not allow the use of certain expressions and terms that can be deemed discriminatory, derogatory or untrue within sensitive subjects. For example, terms such as ‘bust’, ‘phallus’ and ‘bacchanal’ are not taken into account by the AI due to their sexual connotations, whereas in the context of Classics they may not refer to situations related to that sphere.

Despite these disadvantages, we consider Midjourney, and Open Access AI in general, a very useful resource for an alternative way of teaching Classical Antiquity in both high schools and universities.

### Conclusions

The increasing interest in new technologies in teaching is positive. However, it is important to be aware that these tools are not a way of replacing the teacher or professor, but of enhancing the teaching methodology. The activity proposed here aims to be an example of this reasoning. The versatility of AI provides an effective and dynamic resource for the learning process of the student body. The interaction between the software and the student enables both the correction of mistakes deriving from an erroneous translation and the skill of synthesising the content of the accounts. Likewise, the autonomy of the activity allows the students to develop their skills



themselves, allowing them to select a topic, search for its literary references, translate and interpret the texts, and present them.

## Notes

- 1 Apart from the university sphere, it is worth mentioning some educational applications in pedagogy: Ali and Abdel-Haq, 2020; Arshad Khan *et al.*, 2022; Chiu, 2021; Kit Ng *et al.*, 2022; Tonic, 2020.
- 2 <https://www.midjourney.com/home/?callbackUrl=%2Fapp%2F> [last entry on 27 March 2023].
- 3 <https://discord.com/> [last entry on 27 March 2023].
- 4 The bot must be downloaded from the official Midjourney website (<https://www.midjourney.com/home/?callbackUrl=%2Fapp%2F> [last entry on 27 March 2023]). Once it is downloaded, it will automatically be installed on the Discord server. In order to undertake the task, it is necessary to connect with the AI as a Discord contact; therefore only students who are invited to the conversation can use it.
- 5 In the case of high school teaching, where students may have less experience in working with the sources, the teacher should guide them and provide them with useful tools for compiling information from ancient literature. In this respect, a good tool would be the Perseus Project (<http://www.perseus.tufts.edu/hopper/> [last entry on 27 March 2023]).

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