

Artificial Intelligence and Art as a Teaching Tool in Business Training at the Pre-University Stage: A Comparative Study

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Abstract

This study asks whether the use of Artificial Intelligence (AI) both for the generation of texts and images, applied to teaching as a didactic tool, focused on a project of creation of a theoretical company in pre-university courses, are determinants in the development of the project in comparison with the traditional methodology with theoretical development and practical application without the support of this technology. In order to carry out this research, the same project has been compared in two different school years (2022-2023 and 2023-2024), in the same educational center of Compulsory Secondary Education (ESO), at the same educational levels, allowing one of the courses to use artificial intelligence both to generate content and as a learning tool.

The analysis of the results obtained has been carried out through Student's t-test, trying to locate significant differences in learning through various parameters.

The results show that the use of AI tools has substantially improved the learning results as well as the quality of the projects presented compared to those carried out by the control group, since their didactic methodology was more traditional as they did not use AI. Of the different parameters assessed, the improvements observed in the presentation and aesthetics of the project as well as in the accuracy of the content of the business documentation delivered stand out. However, it should be noted that no significant differences were found in the planning or organization of the work. Another parameter where the students who used AI stood out substantially compared to the control group was in terms of motivation and understanding of business concepts, where the students performed better in general.

This study aims to contribute to the use and promotion of AI applied in the classroom, betting on an improvement and reinforcement of the learning process. At the same time, the ethical implications and future challenges of implementing this technology in education are discussed, highlighting the importance of maintaining a balance between the use of this technology and traditional teaching.

Keywords

Artificial Intelligence, Education, Entrepreneurship, Innovation, Methodological comparison, Traditional education

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Introduction

Education today is characterised by continuous research in the search for active teaching methods that enhance learning and encourage student participation in class. In addition, the emergence of new technologies such as augmented reality, virtual reality, the possibility of using holograms in the classroom (Barkhaya and Abd, 2016), the metaverse or, more recently, artificial intelligence, is leading to a radical change in teaching and in the application of concepts that contribute to improving the teaching and learning process. Previous studies have already demonstrated the great capacity of the use of artificial intelligence

in the classroom (Zhai, 2022), as well as others, such as Tlili, et al. (2023), have demonstrated the priority need to develop curricula to improve the skills of both teachers and students to adapt to a continuous change of AI applied to education. In relation to these changes, the regulation itself already focuses not only on the development of basic knowledge, but that the acquisition of concepts and content cause a much more comprehensive and complete development, also acquiring key skills and competences for future life, for which innovative technological tools become the central axis to build this educational change (Zhang, et al., 2022).

This study focuses on the incorporation of AI and digital art as a didactic tool to enrich the didactic experience, trying to enhance and improve the learning of key concepts for the creation of a theoretical enterprise. This didactic methodology, based on the incorporation of innovative technologies, seeks to promote creativity, innovation and originality, as well as the quality of the projects created, thus increasing the students' motivation when dealing with such current topics as Artificial Intelligence.

Recent studies have focused their attention on artificial intelligence applied to education from different factors, but it is worth mentioning those carried out by Sallam (2023), where he measures the mutual cooperation that exists between artificial and human intelligence, the former providing precision and technique, and the latter providing emotional intelligence and adaptation to its innate creativity as well as the adaptability granted by its biological character. On the other hand, in terms of didactic methodology, the use of AI adapts the forms of teaching to the individual needs of the students. As described by Galindo (2023), this makes learning a personalised, generally interactive and highly motivating experience.

This paper analyses the use of artificial intelligence tools, such as chatbots or AI-based image generators, and tests their effectiveness against traditional teaching methods through a practical project in which pre-university students produce basic content for the development of a website linked to a theoretical mini-company, together with basic business documentation. This research was based on a comparative basis to check whether the quality of their projects and the learning process of the AI group was better than that of the control group.

The research was structured on the basis of an analytical study using Student's t-test, trying to find significant differences between the two groups, those who used the guide and those who followed the conventional method. The use of this statistical analysis tool made it possible to compare the results in an objective manner, thus contributing to the scientific community by providing relevant data.

1. Literature Review

Teaching for the promotion of entrepreneurial competence at all levels of education has become one of the major challenges for governments and institutions when designing policies and actions for the development of entrepreneurship in young people (Contreras and González, 2019). In order to prepare students for a constantly evolving labour market, where innovation and adaptability are crucial, the didactic strategy must integrate new technologies from a creative and innovative approach in the curriculum, providing added value to the educational development of young people.

These premises of change in teaching methodology mean that the integration of AI into the educational framework is gradually becoming another tool that offers students more enriching learning experiences by adapting to their needs and learning rhythms. At the same time, art as a didactic tool, as expressed in studies such as Danipog and Ferido (2011), helps to improve the general understanding of concepts in different subjects and to better involve students in their learning process.

1.1. Artificial Intelligence in Education

The development of artificial intelligence is gradually covering different sectors, such as health (Xu, et al., 2021), commerce, industry and education (Zawacki, et al., 2019). In education, a clear example with excellent results is intelligent teaching systems (ITS), which can be used to simulate personalised and individualised tutoring, with a positive impact on academic outcomes (Lo, 2023).

AI, proposed and defined in the mid-twentieth century by McCarthy et al. (1955) as machines and processes that mimic human cognition and make decisions like humans, has revolutionised all sectors, allowing the automation of numerous tasks with their own decision-making capacity. This situation has led to an interesting and broad field of work in the educational field, with numerous actions to be developed to meet the needs of students and teachers.

The applications of artificial intelligence applied to education, Artificial Intelligence in Education (AIEd), improve learning by helping students to collaborate and increase their autonomy by personalising the process and allowing reflection on learning thanks to AI-assisted education (Ouyang and Jiao, 2021). Clear examples of the benefits of this technology include educational chatbots that provide instant help and feedback, or image generation tools that allow complex concepts to be visualised, develop creativity by allowing students to visualise what they are expressing, and facilitate a deeper understanding of any area of knowledge..

The benefits of this technology, such as chatbots in education, are the ability to provide help or instant feedback, or image creation tools that allow students to visualise the complex concepts in their heads by expressing them in a simple way. This can increase their creativity and ultimately allow them to better understand any area of knowledge.

However, the benefits of incorporating AI and the resulting academic performance are mixed. While more and more studies claim its positive impact (Khosravi et al., 2022), other authors argue that good educational outcomes and high quality of learning are not guaranteed by these new technologies (Castañeda and Selwyn, 2018).

On the other hand, there are several challenges and ethical issues related to privacy or security, authorship of productions or dependence on technology. However, these risks should not slow down technological progress or its implementation in any sector, but rather active guidelines should be given to support and enable the research and development of this tool in a controlled way (Holmes et al., 2022)

1.2. Art as a Teaching Tool

The incorporation of art as a didactic tool is supported by various learning theories as it fosters emotional, mental and communicative skills (Mundet, et al., 2015). Learning through experience enhances the educational process by transforming art into a vehicle through which concepts are reflected upon, experienced and ultimately expressed in visual form (Cobo, 2011).

Art, as Bachs (2019) advocates, should be a transversal tool in the learning and research process at every stage of education, as it allows concepts from different fields to be discovered in an enriching way, not only acquiring technical knowledge but also developing a deeper understanding. It also allows students to be creators of their own knowledge, encouraging active participation in their learning process.

Likewise, the implementation of art as an educational tool has diversified over time, as it has acquired a more relevant role than the mere fact of communicating an idea, but also as a means of protest and reflection of the artist's personal reality and emotions (Aguayo, 2011). In this regard, Moreno González (2010) links the artistic experience as a way for students to connect with their identity, providing autonomy and a critical perspective on their environment, while Lara and Cyrulnik (2009) or Piaget (1980) defend how arts education is fundamental in the development of cognitive, instrumental and socio-emotional skills, contributing to the integral formation of the individual.

In the field of business, recent studies such as Fanning's (2011) highlight the effectiveness of visual methods in business education, developing higher-order skills such as critical and creative thinking, which are essential skills for an entrepreneur to apply in different contexts, as well as providing a broad vision with innovation and communication skills, which are key factors in today's business world.

1.3. Entrepreneurship Education in the Pre-University Stage

The promotion of entrepreneurship education in pre-university students is a key and necessary factor in today's society, where, in addition, students with education in this area, as confirmed by Wu and Wu (2008), show a greater entrepreneurial intention, which has a clear impact on the choice of the degree to be developed. On the other hand, the decision to start a business results from the union of socio-demographic characteristics on the one hand and the conditions of the student's environment Contreras and González (2019). In this regard, the concepts acquired through the promotion of entrepreneurship are applicable to different situations of daily life, in addition to forming a basis as a starting point for any higher order study to be undertaken, in addition to considering entrepreneurship as a transversal competence (Miço and Cungu, 2023). On the other hand, entrepreneurship education is generally not addressed in most university degrees, since the curriculum is mostly made up of the specialisation of the subject itself, and therefore this knowledge leaves entrepreneurship education in the background, even though entrepreneurship is one of the main job opportunities after the educational stage.

Skills such as teamwork, decision making, improvisation, negotiation or simply economic management at different levels are transversal concepts that should not only focus on a business field, but are skills that shape the individual in a much more global scope, since business education is not only about teaching how to manage a company, but also about fostering creative thinking, among other values (Garavan and Barra, 1994).

For all of the above, education in aspects related to entrepreneurship education is part of the integral development of the student in the pre-university phase, although it does not stop there, as shown by recent research such as Fayolle (2018), where he confirms that the implementation of entrepreneurship education is a challenge for teachers.

1.4. Impact of AI and Art on Learning

Trying to define how Artificial Intelligence together with art and its generation of images can impact education is a complex situation, although authors such as Ke (2023) highlight several projects where the use of AI techniques to generate new artistic works or the transformation of images demonstrate the great potential of these tools in art education.

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However, Herrera Latorre, et al. (2024) highlight how the integration of AI in art education enhances the creativity of both students and teachers, providing an opportunity to develop different teaching styles, although they recognise the various challenges associated with the use of artificial intelligence, focusing on the loss of art-related jobs or data protection.

In short, education through art using AI as a tool allows the transmission of content (Arregui, 2015) and knowledge, as well as the promotion of a valuable culture in itself that modifies and changes social relations (Efland, et al., 2003).

2. Methodology

The aim of this research is to find out whether there are significant differences in learning between students who use Artificial Intelligence and a control group that does not use it, and therefore follows the traditional curriculum, in the development of a business product in Compulsory Secondary Education, a key pre-university stage in education.

For this study, carried out with students aged between 15 and 17 years, a comparison was made between the grades of the same course (4th year of ESO) and different school years (22-23 and 23-24), using different teaching methods, in which some followed the project in a traditional way, without access to Artificial Intelligence, while the 23-24 course could develop the project with AI for both text generation and image generation.

For the evaluation of the project, the same criteria and parameters were used in both academic years in order to make a fair comparison. Four key parameters were identified (P1, P2, P3, P4), whose evaluation instruments were rubrics on a Likert scale from 1-7, which were then weighted on a base of 10, giving a final average score for the four parameters (P5).

The evaluable parameters were:

- The design and presentation of the project (P1), scoring the visual aspect, the appropriate use of images, aesthetics and the form of presentation of the project.
- Creativity and originality (P2), valuing the innovative design, originality, surprise factor and impact.
- The planning and organization of the work (P3), including in this section the selection of the business theme, the structure and organization of the project and the daily planning for its elaboration.
- The content of the web page and business documentation (P4), where the relevance of the information shown, the variety of resources and the accuracy of the data are valued.

- Finally, in order to obtain a more standardized qualification, the same basic knowledge test (P6) was evaluated in relation to the entrepreneurial project to measure their theoretical learning.

In this way, each student would be assessed with six grades, making it possible to link the different assessments to evaluation criteria, references that indicate the level of performance expected from the students in the situations or activities to which the specific competences of each area refer, at a given moment in their learning process.

The data collection methodology consisted of tracking the grades awarded by the teacher during the two academic years compared (2022-2023 and 2023-2024). Project grades and deliverables were evaluated using evaluation rubrics, ensuring consistency and objectivity in the evaluation of the established parameters: project design and presentation, creativity and originality, planning and organization of the work, and content of the business documentation. For the analysis of the results, Google Sheets was used, complemented with the XLMiner Analysis ToolPak statistical calculation extension, which allowed Student's t-test to identify significant differences between groups.

In order to analyse the data collected, the Student's t-test was used, a statistical test that allows the comparison of two independent groups based on the Student's t-distribution, which is a probability distribution that approximates the normal distribution when the sample is small.

This method of statistical analysis allows us to test the hypothesis that students who use AI achieve better academic results than those who do not use AI and follow the traditional teaching system for the development of the business project.

The justification for the Student's t-test is based on the sample size, the size and nature of the data, and the possibility of determining whether there is a significant difference between the means of two groups by calculating a critical value with a predefined significance level (0.05). Thus, by obtaining the statistical value of the test, it can be concluded that there are or are not significant differences, rejecting the null hypothesis that the means are statistically equal.

3. Results

The results obtained after the statistical analysis of the data present interesting findings regarding the impact of the integration of Artificial Intelligence (AI) tools in pre-university business education. First, in order to give reliability to the data collected, they were evaluated using Cronbach's test, obtaining a coefficient of 0.85, which indicates excellent reliability according to Hair, et al. (1998). This high consistency supports that the items being assessed are correlated and measure the same construct, ensuring that the measurement tools are consistent and reliable for assessing learning outcomes.

The distribution of the sample of each course is quite similar, with the students of course 22-23 representing a total of 22 students (Mean (M) = 15.81 and Standard Deviation (SD) = 0.85) compared to 21 students of course 23-24 (M = 15.95 and SD = 0.86), as well as a similar distribution by gender, 68% male and 32% female in course 22-23 compared to 62% male and 38% female in course 23-24.

The calculated statistical values can be observed (table no. 1), comparing each of the parameters previously raised. The variables recorded are 22 and 21 respectively for each academic year (22-23 and 23-24), assuming that the degrees of freedom (df) are 41, and with an α of 0.05, the Student t-test gives a critical two-tailed t-value of 2.02. With these values obtained, the statistical table is structured to analyse and detail each of the fields compared.

Table no. 1. Statistical Analysis of Comparison of Means (Student's t-test)

Parameter	Mean (\bar{X}_{22-23} ; \bar{X}_{23-24}) / difference (V_{22-23} - V_{23-24})	Variance (V_{22-23} - V_{23-24})	Pooled Variance	t Stat	P(T<=t) two-tail
P1: Aesthetics, Presentation	4,19 ; 5,45 / 1,3	3,16 ; 3,54	3,35	-2,250	0,030
P2: Innovation, Originality	4,9 ; 5,18 / 0,3	4,79 ; 4,08	4,43	-0,430	0,668
P3: Structure, Planning	5,24 ; 4,77 / 0,5	3,59 ; 5,14	4,38	0,730	0,470

P4: Relevance, Accuracy	4,24 ; 5,44 / 1,2	3,79 ; 3,37	3,57	-2,080	0,044
P5: Overall Project Average	4,64 ; 5,19 / 0,6	0,7 ; 0,66	0,68	-2,170	0,036
P6: Knowledge, Theory	5,16 ; 6,74 / 1,6	1,1 ; 1,6	1,35	-4,430	0,00003

In general, it can be seen that there are significant differences between criteria P1 and P4, which correspond to the design and presentation of the project and the content of the website and the business documentation. In addition to the differences in the overall score of the project, there are also differences between the different teaching methods, highlighting the large difference in the learning of business concepts, where the average for one course was 5.16 compared to 6.74 for course 23-24 using Artificial Intelligence.

However, there are two parameters that are not far enough apart in their scores to be highlighted; however, it should be noted that one of them, P3, which assesses planning and organising work, the average score of the students decreased significantly from 5.24 to 4.77. Despite this difference, and stressing that it is not significant in terms of statistical analysis, it is commendable to note that the use of AI did not favour the development of this evaluable item.

In a more traditional analysis (table no. 2), it can be seen that the average grade tends to be higher in the 23-24 course using AI, as well as the percentage of passes, with an average of 65% of passes in the 23-24 course compared to 52% of passes in the 22-23 course. Also noteworthy is the percentage of passes in the concept test, which reaches 91% in the course using AI compared to 62% in the previous course, a representative sample of the great impact in terms of academic performance that the use of AI has.

Table no. 2. Summary of Academic Performance

Parameters	Mean	Number of approved	Percentage of approved	Range
P1: 22-23	4,19	7	33%	1 ; 7
P1: 23-24	5,45	13	59%	2 ; 9
P2: 22-23	4,90	11	52%	2 ; 9
P2: 23-24	5,18	12	55%	2 ; 9
P3: 22-23	5,24	13	62%	2 ; 8
P3: 23-24	4,77	12	55%	0 ; 8
P4: 22-23	4,24	11	52%	1 ; 8
P4: 23-24	5,44	15	68%	2 ; 9
P5: 22-23	4,64	10	48%	3 ; 6
P5: 23-24	5,21	14	64%	3 ; 7
P6: 22-23	5,16	13	62%	3 ; 6
P6: 23-24	6,74	20	91%	5 ; 9

Conclusions

After analysing the data collected in the different statistical tables, the research confirms the hypothesis that the use of artificial intelligence for both text and image generation improves learning outcomes in most of the parameters recorded in relation to business education in pre-university students. The use of AI enriches the learning process, leading to increased motivation and understanding of concepts, as well as retention of acquired knowledge. However, the use of this technology has reduced some of the evaluable parameters,

which leads to a reflection on its use and the ethical and professional controls exercised by the teacher in order not to lose educational potential and to control these aspects.

At the same time, and in relation to the aesthetic, creative and emotional aspect of artistic and visual education, it should be noted that although the aesthetics of the product or project has been significantly improved by using professional technology (AI) with specific learning on the subject, offering mostly technically perfect results, creativity, innovation or originality have not suffered significant improvements, which denotes that there is a qualitative and more human component that requires an emotional reflection, intrinsic and unique to each individual when making any artistic image. Therefore, artistic and visual education should promote aspects such as creativity, innovation and originality, relying on technology to improve the aesthetics of productions, without replacing human creative capacity.

On the other hand, this study is limited by the size of the sample and its focus on a single educational centre. These limitations reinforce the idea of further research and invite other teachers to carry out these studies in order to validate and improve the learning process of future entrepreneurs.

References

- Arregui Pradas, R., 2015. *Aprendiendo a través del arte*. [online] Available at: <
<https://repositorioinstitucional.ceu.es/bitstream/10637/6908/1/arregui%2061-71%2012.pdf>
> [Accessed 7 April 2024].
- Bachs, E.P., 2019. El arte como herramienta transversal en la escuela. *Aula de innovación educativa*, (283), pp.24-28.
- Barkhaya, N.M.M. and Abd Halim, N.D., 2016. A review of application of 3D hologram in education: A meta-analysis. In: *2016 IEEE 8th International Conference on Engineering Education (ICEED)*. [online] Kuala Lumpur: IEEE. pp.257–260. <https://doi.org/10.1109/ICEED.2016.7856083>.
- Castañeda, L. and Selwyn, N., 2018. More than tools? Making sense of the ongoing digitizations of higher education. *International Journal of Educational Technology in Higher Education*, [online] 15(1), pp.22, s41239-018-0109-y. <https://doi.org/10.1186/s41239-018-0109-y>.
- Cobo, A.A., 2011. Historia del arte y método iconológico. Trocadero. *Revista del Departamento de Historia Moderna, Contemporánea, de América y del Arte*, (23), pp.107–126.
- Contreras Cueva, A.B. and González-Morales, O., 2019. La influencia de la educación y otras variables relevantes en la decisión de emprender: Dos casos de estudio comparados de estudiantes universitarios de Ciencias Sociales y Jurídicas de España y México. *Educación XXI*, [online] 22(2). <https://doi.org/10.5944/educxx1.22665>.
- Danipog, D.L. and Ferido, M.B., 2011. Using Art-Based Chemistry Activities To Improve Students' Conceptual Understanding in Chemistry. *Journal of Chemical Education*, [online] 88(12), pp.1610–1615. <https://doi.org/10.1021/ed100009a>.
- Efland, A.D., Freedman, K. and Stuhr, P., 2003. *La educación en el arte posmoderno*. Barcelona: Paidós.
- Fanning, S., 2011. Visual methodologies: Photo-elicitation in the university classroom. In: *The Proceedings of the 10th European Conference on Research Methodology for Business and Management Studies*. Available at: <
<https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=d7088e7fe9f2832c32f0ae7d23abb979de5b1597>
> [Accessed 7 April 2024].
- Fayolle, A., 2018. Personal views on the future of entrepreneurship education. In: A. Fayolle, ed. *A Research Agenda for Entrepreneurship Education*. [online] Edward Elgar Publishing. <https://doi.org/10.4337/9781786432919.00013>.
- Galindo Durán, A., 2023. Integración de la inteligencia artificial en la enseñanza de las artes plásticas. *Revista De Ciencias Sociales*, [online] 29(4), pp.17-29. <https://doi.org/10.31876/rcs.v29i4.41256>.
- Garavan, T.N. and O'Conneide, B., 1994. Entrepreneurship Education and Training Programmes: A Review and Evaluation – Part 2. *Journal of European Industrial Training*, [online] 18(11), pp.13–21. <https://doi.org/10.1108/03090599410073505>.
- Herrera Latorre, P.D., Orozco Poma, R.D., Núñez Sánchez, W.P. and Avalos Espinoza, P.A., 2023. Inteligencia artificial en la educación artística: Retos y perspectivas. *Revista Imaginario Social*, [online] 7(2). <https://doi.org/10.59155/is.v7i2.170>.

- Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Shum, S.B., Santos, O.C., Rodrigo, M.T., Cukurova, M., Bittencourt, I.I. and Koedinger, K.R., 2022. Ethics of AI in Education: Towards a Community-Wide Framework. *International Journal of Artificial Intelligence in Education*, [online] 32(3), pp.504–526. <https://doi.org/10.1007/s40593-021-00239-1>.
- Ke, M.F., 2023. Applications and Challenges of Artificial Intelligence in the Future of Art Education. *Pacific International Journal*, 6(3), pp.61-65.
- Khosravi, H., Shum, S.B., Chen, G., Conati, C., Tsai, Y.-S., Kay, J., Knight, S., Martinez-Maldonado, R., Sadiq, S. and Gašević, D., 2022. Explainable Artificial Intelligence in education. *Computers and Education: Artificial Intelligence*, [online] 3, p.100074. <https://doi.org/10.1016/j.caeai.2022.100074>.
- Lara, L. and Cyrulnik, B., 2009. Boris Cyrulnik: "vencer el trauma por el arte". *Cuadernos de pedagogía*, (393), pp.42-47.
- Lo, C.K., 2023. What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature. *Education Sciences*, [online] 13(4), p.410. <https://doi.org/10.3390/educsci13040410>.
- Miço, H. and Cungu, J., 2023. Entrepreneurship Education, a Challenging Learning Process towards Entrepreneurial Competence in Education. *Administrative Sciences*, [online] 13(1), p.22. <https://doi.org/10.3390/admsci13010022>.
- Moreno González, A., 2010. La mediación artística: un modelo de educación artística para la intervención social a través del arte. *Revista Iberoamericana de Educación*, [online] 52(2), pp.1–9. <https://doi.org/10.35362/rie5221797>.
- Mundet Bolós, A., Beltrán Hernández, A.M. and Moreno González, A., 2015. Arte como herramienta social y educativa. *Revista Complutense de Educación*, [online] 26(2), pp.315–329. https://doi.org/10.5209/rev_RCED.2015.v26.n2.43060.
- Ouyang, F. and Jiao, P., 2021. Artificial intelligence in education: The three paradigms. *Computers and Education: Artificial Intelligence*, [online] 2, p.100020. <https://doi.org/10.1016/j.caeai.2021.100020>.
- Piaget, J.E.A.N., 1980. Teoría del desarrollo cognitivo de Piaget. *Creative Commons Attribution-Share Alike*, 3(1), pp.1-13.
- Sallam, M., 2023. ChatGPT Utility in Healthcare Education, Research, and Practice: Systematic Review on the Promising Perspectives and Valid Concerns. *Healthcare*, [online] 11(6), p.887. <https://doi.org/10.3390/healthcare11060887>.
- Tlili, A., Shehata, B., Adarkwah, M.A., Bozkurt, A., Hickey, D.T., Huang, R. and Agyemang, B., 2023. What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, [online] 10(1), p.15. <https://doi.org/10.1186/s40561-023-00237-x>.
- Wu, S. and Wu, L., 2008. The impact of higher education on entrepreneurial intentions of university students in China. *Journal of Small Business and Enterprise Development*, 15(4), pp.752-774.
- Xu, L., Sanders, L., Li, K. and Chow, J.C.L., 2021. Chatbot for Health Care and Oncology Applications Using Artificial Intelligence and Machine Learning: Systematic Review. *JMIR Cancer*, [online] 7(4), p.e27850. <https://doi.org/10.2196/27850>.
- Zawacki-Richter, O., Marín, V.I., Bond, M. and Gouverneur, F., 2019. Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, [online] 16(1), p.39. <https://doi.org/10.1186/s41239-019-0171-0>.
- Zhai, X., 2022. ChatGPT User Experience: Implications for Education. *SSRN Electronic Journal*. [online] <https://doi.org/10.2139/ssrn.4312418>.
- Zhang, X., Chen, Y., Hu, L. and Wang, Y., 2022. The metaverse in education: Definition, framework, features, potential applications, challenges, and future research topics. *Frontiers in Psychology*, [online] 13, p.1016300. <https://doi.org/10.3389/fpsyg.2022.1016300>.