Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Learning and Teaching in the Era of Advanced Artificial Intelligence Technology at Higher Education Institutions in India

Ragupathi Ramasamy

paperrrs@gmail.com

M.Kumarasamy College of Engineering

Charumathy T

Rajalakshmi Institute of Technology

Tharini C

Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology

Premkishor S K

Easwari Engineering College

Pavithra B

PSG College of Arts & Science

Padma Ragam

Vinayaka Mission's Research Foundation (DU)

Article

Keywords: Artificial intelligence tools, AI in higher educational institutions, AI literacy, Learning and Teaching, Twenty-first century

Posted Date: July 6th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9831985/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License

Additional Declarations: No competing interests reported.

Abstract

The present study examines practices involved in implementing Gen AI (Generative Artificial Intelligence) tools among engineering students and facilitators. Higher educational institutions promote AI tools to prepare students for industry ready graduand. However, a lack of knowledge in the use of AI tools to literate and educate at higher educational level exacerbates knowledge level of both college professors and students in academic success. In order to identify the applicability of AI Tools for learning and teaching, this study employed a quantitative study in which a survey was administered electronically through Google Forms aligned with emails with random samples of 77 college professors and 176 students. The present study is an attempt to fill the gap by exploring the need for AI Tools in HEIs and suggesting some useful AI- driven tools for personalized learning. This research reveals that ChatGPT is mostly used at higher education institutions. One-way ANOVA result showed that college students use limited AI Tools for preparation, compared to faculty members and their satisfaction level is lower than faculty members in terms of subscale (Students - [$F_{(2-148)}$ = 0.264; Faculty Members – [$F_{(2-74)}$ = 2.057].

1. Introduction

The emerging trends in technology and its implications in the field of education have led to sustainable growth and improvements in AI driven applications. Students and educators in HEI's (Higher Educational Institutions) can make use of AI-driven tools to integrate active learning and effective teaching to attain educational outcomes particularly independent learning, writing and evaluation as role of AI tools is pivotal in addressing diverse learning styles, offering time- efficient, engaging learners visually and offering consistent educational content. Holistic education is obtained from thorough knowledge and wisdom and comes from continuous learning and sharing of the learned information to a requisite but learners mostly do not volunteer to seek information and avoid approaching learned for clarification. As Gen AI offers required information to the needful with in no time privately (Adane, P. et al., 2026; Arpaci, I., Kuşci, I. & Gibreel, O, 2025; Kumar, A. et al., 2026; Liao, J., Wei, X., Sun, X. et al, 2025), learners utilize the sources available to respond to the current need and it neither expects nor evaluates outcome by sharing knowledge from the learners. Currently, the world of teaching and learning is looking for digital natives, who are familiar with digital technology and information communication technology (ICT) tools as learning material at higher education, (Goryunova, E., Jenkins, D., 2023; Varma, A., Sudarsanam, A., 2024), as internet-integrated machine learning and teaching are integral parts of innovative teaching (Yim, I.H.Y., Su, J., 2014; Lee, Daniel, et al. 2024) and learning (Ng, D.T.K. et al.,2023). It is necessary for a student, who takes a course in engineering, to attend classes at least with a mobile phone which runs on android operating system so that students can be assisted with online materials available so as to strengthen knowledge in their course of study. In the field of education, outcome-based education is the main focus (Trolian, T.L., Parker, E.T., 2022). In order to evaluate outcomes (Rao, N. J., 2020), it is essential to achieve course outcomes in accordance with programme outcomes. Artificial Intelligence platforms, in the name of AI tools have become an unavoidable assistance of every one's academic endeavors (Balabdaoui, F. et al., 2024), as they have become the reliable mentors in business communication (Hysaj, A et al., 2024). Rapid changes and improvements in Artificial Intelligence Technologies have resulted in significant transformations in the field of teaching and learning approaches (Ng, D.T.K., Lee, M., Tan, R.J.Y. et al. 2023; Ng, D.T.K. et al., 2023) and methods. In fact, changes in approaches and methods are necessary in the field of education, but rapid changes and advancements in technology may divert the field of learning and teaching in an

unprecedented world of education (Singh, M. N., 2021). There are many AI tools (Balabdaoui, F. et al.,2024) that have gained prominence within the professional community, and AI tools have become front-runners for both learners and teachers (Ng, D.T.K. et al.,2023) whenever academic communication is required.

Every lesson in educational set up is to be begun with monitoring of attendance and ended with grading the participants' knowledge gaining. AI can assist administrative work like recording attendance of the participants and also grading the participants based on their responses in different standards so that instructors can involve in preparation and facilitating students for their better understanding (Rodafinos, A., 2024). With the use of such AI Technology at higher educational institutions educators can spend their time in providing personalized attention to their students' progress towards learning since AI technology facilitates a classroom more interactive and keeps students engaged in activities for their better knowledge (Álvarez, I.M. et al., 2024). It is obvious that AI integrated technologies have transformed mode of education by empowering facilitators to offer a great support with updated information and they are able to keep hold of learning desire of students at higher education. AI can bridge the gap between students in rural or remote areas and access to quality education (Hung, CT. et al., 2024).

In the past, search engines helped students and teachers fetch information related to their queries, but at present Google has improved its service by suggesting with the help of AI Overview. AI Overview suggests much information along with additional links for more information. It is irrefutable fact that AI Technology has made significant changes in every field and education is no exception (Crompton, H., Burke, D, 2023). However, modern AI tools, now-a-days, serve as mentors (Daniel Lee, et al., 2024) by suggesting answers for a better understanding of the topics they ask for. Many of the users of ChatGPT attempt to obtain answers to the questions they need to answer without reading any texts related to the topics they need and they do not even take the received answers to peer discussions for accuracy. Recently, there have been numerous programmes on the use of AI tools (Friederich, S., Symons, J., 2023) in academic improvement, which has created the need to explore learners' perceptions of AI tools. These tools not only play a crucial role in the field of learning and teaching in the education domain but also become indispensable for tasks such as content creation. AI tools (Balabdaoui, F. et al., 2024) have emerged as companions for academic and professional growth, and it is necessary to understand how and why these tools should be utilized (Lee, Daniel, et.al. 2024). This perception is crucial in any academic discussion aimed at preparing students for future challenges. Educational institutions have been concentrating on integrating these tools into their curricula to foster a constructive environment that benefits stakeholders. This approach also ensures that institutions meet corporate expectations, as the effective use of modern tools is a key programme outcome in today's education system (Hysaj, A. et al., 2024). It is an irrefutable fact that even corporations expect employees to undergo training and enroll in some courses in demand to courses to qualify to become a member of a new project.

2. Methods

2.1 Research Design and Procedures

This study aims at understanding the factors contributed by Artificial Intelligence Technologies at higher education level in India. This study also investigates how AI technology enabled tools are utilized at the tertiary level in undergraduate colleges to empower teaching skills more effective as students are from schools with a practice of memorization skills. Within no time, do AI tools answer to the questions one asks but the A in the

ABC of communication is to be evaluated. This paper identifies some of the educational AI tools used by students and professors to strengthen their academic skills. It is a fact that use of AI tools has got increased in educational institutions (Balabdaoui, F. et al., 2024). Artificial Intelligence Tools have become a companion of students at the tertiary level as they keep students engaging and a ready man for all the questions one presumes for the course of study. This study is an attempt to answer the following research questions:

1. What are the potential AI tools available for adult learners in teaching and learning?
2. How familiar are students and professors with the use of AI tools for preparation, assessment and academic writing?
3. Why should AI tools be integrated into education?
4. What are the most commonly used AI tools at higher education at present in Tamilnadu?

The above research questions are answered by employing a quantitative study, which includes the collection of information from informants electronically through Google forms aligned with emails. The respondents for this study were both college professors and students. The researcher met 157 college professors and requested for the data by assuring them that the data were collected for the study. The respondents consented to give information through Google form. The survey was collected from 77 college professors, who are working in India and 176 students, who are doing second-year engineering studies, particularly at the undergraduate level in Tamilnadu, India. The Google form was sent to the professor to share the form to their students in order to study their knowledge in AI tools for their education. Informants were from different institutions. The study was done with limitation of survey, which was conducted from college professors and students. One Way ANOVA and F tests were used to find out the differences between students and faculty members in terms of modern tool usages at higher education level and satisfaction level in obtaining information for the questions they posted to AI Tools. The researchers administrated the scales among the respondents and collected data.

AI has revolutionized the way one learns and teaches by empowering technology. As innovation is required in order to engage digital natives and to keep hold their attention, the AI is the best option. Innovation includes use of technology, changes in pedagogy and nurturing a culture of creativity. Artificial Intelligence tools engage the user by providing expected information with in no time. Artificial Intelligence tools (Karampa, V., Paraskeva, F., 2024) can create a conducive environment, where both students and professors can have personalized learning experiences. AI tools provide information by doing analysis of the given data and comprehending learning patterns of the individual. AI algorithms are programmed to tailor contents, which are required for teachers and students, in order to meet their requirements. As AI tools learn the need of the users, it can provide information with the knowledge it has from the previous request. The information provided by AI tools can vary from user to user and it can strengthen the users both students and educators according to their knowledge. This enables facilitators and students to gain confidence in learning contents and they are able to focus on the areas they require. Innovation in learning and teaching, at present, travels together with technology. AI can help teachers deliver their ideas for the full attention of their students and students' retention on the topic. By embracing AI in education (Lee, Daniel, et al. 2024), professors can also equip students with the skills they need to flourish in the progressively advancing world.

By embodying artificial intelligence in the field of education at higher education, educators can enable students gain exposure to cutting edge technological requirements and students are able to develop required skills, which are the paramount importance to meet the job market (Perez-Alvarez et al., 2024). Engineering students

are required to develop skills required for industries so that they can brand themselves for better position. Both educators and students are required to gain knowledge to navigate and be skilled at utilizing all AI tools. This paves a way to retain their growth for the need of the present and future. It is fact the AI has significant role in every field progressively. AI tools have significant impact in fostering critical thinking among educators and students in higher educational institutions and strengthening problem solving skills by suggesting information from various sources (Yim, I.H.Y., Su, J., 2024). Students can fit into real world state of affairs and develop their technical skills by analyzing the suggested information by interacting with AI tools. Educators and students can face every situation positively with the help of AI tools, since it is programmed to interact by understanding individual learning patterns. One can interact with tailored questions to AI powered tools. Moreover, responses and suggestions are importantly satisfying. This personalized learning enables the user to make a further step to learn deeply on the content and consequently improves students to be skilled at problem solving and critical thinking (Karampa, V., Paraskeva, F., 2024). Faculty members expected students should meet for doubts and additional information on lessons but such AI powered tool plays an imperative part in absence of faculty members and provides exposure to advanced learning (Trolian, T.L., Parker, E.T., 2022).

3. Result and Findings

The concept of Smart Teaching and Evaluation is a new trend in order to ensure innovative teaching methods and creation of a smarter learning environment as advanced Artificial Intelligence Technologies are associated with recently developed pedagogical approaches (Karampa, V., Paraskeva, F., 2024). Engaging students in this technological era in traditional classrooms requires the use of some modern tools (Lee, Daniel, et al. 2024), which could help them acquire self-learning so that digital natives (Ng, W., 2012) are able to become involved by responding to learning materials with active participation. Some of the tools which would be helpful to teachers so as to maintain the retention level of students because students of this generation are very familiar with ICT tools and Internet usage at school education itself, as stated by Kolikant,Y.B.D. (Kolikant, Y. B. D., 2010).

The Fig.1 shows the data collected from 77 faculty members from nine districts so as to identify the technology tools used at higher education level by instructors in India, because instructors as facilitators must know the fundamentals of learning and also play a pivotal role in inculcating good attitudes among learners. Professors at the college level need to engage learners with good numbers of positive etiquette by offering conducive learning environments that realize the ethics of using Internet Enabled Tools as they follow in regular classes (Haleem, A., 2022).

The Fig.2 provides insights into the use of Artificial Intelligence tools for the preparation, assessment and writing of research papers by faculty members. It is an irrefutable fact that Artificial Intelligence has created a great challenge in the assessment of students' writing, reviewing the format of their academic communication, and there are opportunities to become a reverential reader as well. At present, most of the students prefer Large Language Models (LLM's) like ChatGPT to communicate academically as they are able to obtain the required information at no time (Mohamed, A.M., 2024; Yan, D., 2023), and faculty members are also required to invest great efforts in order to become efficient since college students copy from Large Language Model (LLM). Artificial Intelligence-driven tools are superhuman in many ways in terms of cognitive processing in producing texts on arbitrary titles (Friederich, S., Symons, J., 2023). In order to attain the skills to satisfy digital learners and sustain as professors in assessing students' writing, it is desideratum to focus on LLM-created

texts because students' writing is mostly a copy of AI produced texts. Unprecedented receptiveness is required to evaluate and identify students' writing as either copied or originally produced. As shown in Fig.2 and Fig. 3, it is apparent that relatively 64.5% and 87% of the faculty members use ChatGPT, respectively, but that 5 faculty members expressed that no AI tools were used. In fact, students at the tertiary level are much better at using AI tools. College professors are expected to align with the cognitive improvement of students and have collaborative learning discussions with professors and teachers on multiple pedagogical experiences and practices at all levels of education so as to approach students with innovative and resourceful felicitation and the professors are able to have their raison d'etre despite the mushroom development of superhuman Artificial Intelligence Technology in education (Yim, I.H.Y., Su, J., 2024).

The one way ANOVA value findings show the mean value of number of faculty members, who access websites or applications especially modern tool usages during their higher education as students and their experiences in using modern tools for learning purpose and also satisfaction responses on using AI Tools as educators.

Table -1 Standard Deviation and Mean on Faculty members' responses on Modern Tools Usages and Satisfaction level of Faculty Members on AI Tools.

Subscale	Answer	N	Mean	Std. Deviations	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Are you able to get answer to all the questions you have submitted to the AI tools?	YES	43	1.02	.152	.023	.98	1.07	1	2
	NO	14	1.14	.363	.097	.93	1.35	1	2
	MAYBE	20	1.15	.366	.082	.98	1.32	1	2
	Total	77	1.08	.270	.031	1.02	1.14	1	2
Have you experienced any modern tool usage during your college education?	YES	53	1.23	.427	.065	1.10	1.36	1	2
	NO	24	1.43	.514	.137	1.13	1.73	1	2
	Total	77	1.32	.471	.054	1.22	1.43	1	2

Table 2 ANOVA results for Modern Tool Usage on Faculty responses in getting answer by using AI tools and their experience in using modern tools.

Usefulness		Sum of Squares	Degrees of freedom	Mean Square	F	Sig.
Are you able to get answer to all the questions you have submitted to the AI tools?	Between Groups	SSC=0.291	c-1=2	MSC = SSC/C-1=0.146	2.057	0.135
	Within Groups	SSE=5.241	N-c=74	MSE= SSE/N-c=0.071		
	Total	5.532	77			
Have you experienced any modern tool usage during your college education?	Between Groups	SSC=0.830	1	0.415	1.913	0.155
	Within Groups	SSE=16.053	75	0.217		
	Total	16.883	77			

*p=0.05

As illustrated in Table 1 & 2, ANOVA results revealed significant differences between the satisfaction level of faculty members in getting answers for the questions they submitted to AI Tools in terms of subscale [$F_{(2-74)}$=2.057; p<0.05] and significant level shows 0.135 and the experience of faculty members in using modern tools at their higher education during their studies in terms of subscale [$F_{(1-75)}$=1.913; p<0.05] and significant level shows 0.155.

Slido (Iio, J. (2022) is an interactive tool; when a class is online, it allows students to participate actively by giving their responses in the formats of multiple choice polls, rating polls, word clouds, open text polls, ranking polls, quizzes and surveys. It is integrated with PowerPoint, Google Slides, Microsoft Teams, WebEx and Zoom. This can be operated in three modes: Participant, Admin and Presentation. Socrative (Pratiwi, D.I. et al., 2024) is another interactive teaching tool, used to assess students' knowledge after a session is over. In this technological scenario, most technological tools have lost their applicability due to technological gaps and students have been more involved in learning through online applications than face-to-face in real-time classes (Hung, CT. et al., 2024), and their involvement in traditional classes has been diverted, as they believe that they need not depend on a real teacher (Álvarez, I.M. et al.,2024) because it is believed that they are better empowered in the asynchronous mode of class (Alzahrani, H.A. et al., 2023; Gribble, L., Wardrop, J., 2023). The theory of mind (AI) is an emerging concept that has been adopted to understand and comprehend the mental status of students and to analyze and predict as if a professor infers at the time of class. (Strachan, J.W.A. et al., 2024). Immediate feedback helps students gauge their own understanding and make corrections. Interactive learning engages students through gamified activities. Students can practice with any device (Fried, C. B., 2008). There are options for preparing quizzes by signing in as a teacher. Individual students' copy can be generated as a PDF file in addition to all the cumulative formats as Excel sheets.

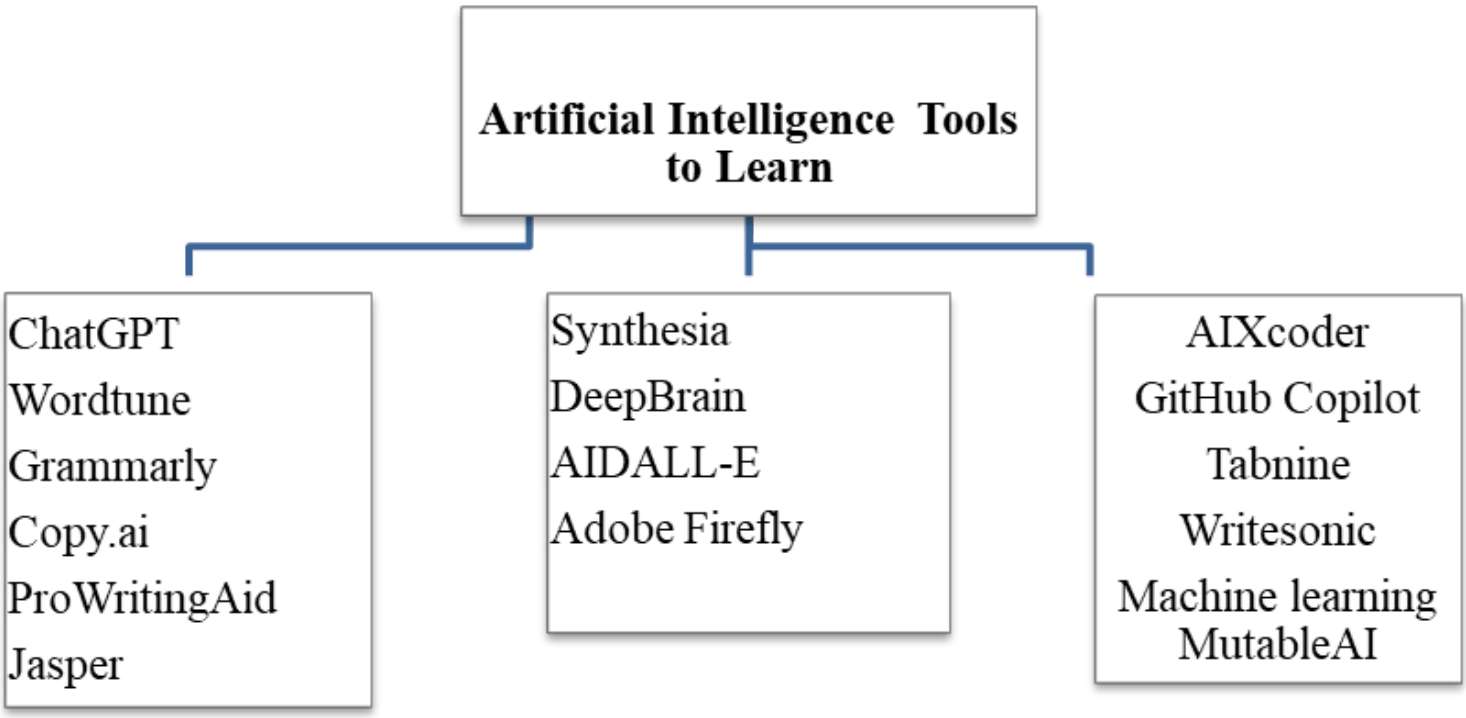
Among the AI powered tools available in the market, AI Tools, such as Gemeni ai, a chatbot like ChatGPT, DeepSeek, a user friendly conversing tool over ChatGPT, Together AI to access available AI powered tools,

Decktopus and Gamma for preparation of presentation, are very useful in preparing courses to grading students' responses in accordance with rubrics for evaluation. Educators use to prepare the list of courses to be offered to attain programme outcomes based on the curriculum developed and course outcomes decide syllabus of the course. Lessons are to be planned for the better delivery of the syllabus designed along with teaching and learning materials, plan for execution of lessons, tests and examinations, components of testing documents, rubrics for evaluation along with method of delivery and pedagogical implementation. These works can be completed with the assistance of AI powered tools and the evaluation part based on the rubrics can also be carried out successfully. These AI tools can suggest all kinds of information, which are to be carried out in the process of handling a course by an educator. AI tools have made tremendous change among learners particularly discussing for a smart idea and information. A learner can access AI tools to seek information and information suggested can be considered after careful analysis and scrutiny among educators. Every AI tool has its uniqueness in providing information. AI algorithm can provide and suggest information based on understanding of individual learning pattern (Varsha T. Lokare, Prakash M. Jadhav, 2024).

The concepts of synchronous and asynchronous (Alzahrani, H.A. et al., 2023) seem to be significant pedagogies, that lead to engaging students with lecture content given in face-to-face real classes (Hung, CT. et al., 2024) Asynchronous (Pickering, J.D., Quesnelle, K.M., 2022) is a mode of teaching in which content delivery is empowered with many affective domains of learners. Sometimes it is necessary to create a kind of environment, where students are able to recall and relearn the concept discussed in class because students now-a- days seem avoiding discussion after the lecture is over even though they have doubts among their peers; however with the help of Canvas LMS (Rodafinos, A., 2024) learners are able to increase their knowledge of the course in which they are enrolled. With a well-planned delivery design, a professor can empower students in courses in which the learners are enrolled and increase interest in the subjects while considering the level of the learners, facilitating the design of courses involving learners in discussions. Learners are self-interested in learning lessons when they are interested learning. The Canvas LMS offers a good number of facilities for learners to experience their learning by engaging in discussion just by sharing their learning, creating interest in reading and responding questions at their own pace, planning their learning, scheduling their lessons and so on.

Professors at the tertiary level are expected to use innovative teaching techniques to ensure the retention level of students in their classes provided that they are better empowered with the methods and approaches adopted to facilitate learners. The integration of AI Technologies in learning and teaching has materialized as an innovative approach promising for outcome-based education (Perez-Alvarez et.al., 2024). Researchers have started to research offering a better Artificial Intelligence Technology to promote creativity in teaching and learning in the education sector (A. Barella et al., 2009) despite the challenges that college professors and students face optimal use of technology.

Table 3 AI Tools for Learners: Learners at Higher Education Mostly Prefer



The AI tools, which are given in table 3, can be used to learn necessary information and some of the tools can also be helpful to acquire knowledge on the basics of coding in software engineering (Ani, Z.C. et al., 2024), some AI- driven tools, such as AIDALL-E, allow students to be interested in artistic works by manipulating and creating visuals (Hutson, J et al., 2024), and with rapidly increasing use of AI tools with fast advancement in independent writing and evaluation, students are able to learn nuances of writing and make a good number of research reports and blogs as if they learned from a human teacher (Ding, L., Zou, D., 2024). There are many emerging AI powered educational tools for professors assisting them not only to prepare students to learn but also educate themselves to become a better researcher and writer. Tools such as researchkick, Scite Assistant, consensus, Semantic Scholar, Scinapse, Lumina, Evidence Hunt, System Pro, The Literature, Search Smart, OpenRead, Sourcely, Research Rabbit, Litmaps, Connected Papers, Inciteful, Dimensions, SciSpace, Elicit, R Discovery, Keenious, Scholarcy, SciSpace Copilot, JSTOR AI Research Tool, Jenni, Yomu, Unriddle, Paperpal, Scite, Julius are useful for different purposes but these tools are to be used as assistants.

Artificial Intelligence-driven tools have become indispensable entities in the education society now-a- days. AI tools are used as prime instructors in most fields and, in fact, in the education sector. In terms of infrastructure, no college is best without the use of AI tools (Lee, Daniel, et.al. 2024). One of the main challenges in education is catering to the diverse learning styles of students. The integration of AI in education is time saving, visual appeal, is well designed, allows visual engagement with full attention, is consistent, allows easy customization and professionalism, and mostly maintains the retention level of students.

The sample for this study included not only faculty members but also 176 student informants from various districts of Tamilnadu. The participants of this study revealed that most of them use AI-generated LLMs, such as ChatGPT, to prepare for classes. Additionally, Fig. 4 shows that Writing AI Tools such as copymatic, jenni AI, writesonic, copyai, and Grammarly are used on average by the minimum percentage of students. The informants used in this study are apparently able to understand AI tools, but they are not mostly involved in

writing research proposals and the need to check spelling and grammar (Wallwork, A., 2023) may not arise since faculty members play a pivotal role in their preparation.

Table 4 ANOVA results for Modern Tool Usage on students' responses in getting answer by using AI tools and their experience in using modern tools.

		Sum of Squares	df	Mean Square	F	Sig.
What are the tools you have been using to prepare for answer?	Between Groups	0.393	2	0.196	0.261	0.771
	Within Groups	98.451	131	.752		
	Total	98.843	133			
Are you able to get answer to all the questions you have submitted to AI Tools?	Between Groups	0.024	2	0.012	0.264	0.768
	Within Groups	6.652	148	0.045		
	Total	6.675	150			

*p=0.05

As can be found in Table 4, the result of ANOVA revealed statistically significant differences between the students' use of AI tools in terms of AI Tools for preparing answers at higher education level. The significant F value (0.261, $p<0.05$) obtained for AI Tools Variables demonstrated that the respondents (students) at college education use AI Tools to prepare answers for the questions. It is a fact that college students have inculcated to use AI Tools to prepare for their studies. The significant F value (0.264, $p<0.05$) revealed significant differences between the satisfaction level of students in getting answers for the questions they submitted to AI Tools.

The study has revealed that college students, who are taken for the study, have been using limited AI Tools for preparation, compared to faculty members and their satisfaction level is lower than faculty members in terms of subscale (Students - $[F_{(2\text{-}148)}=0.264$; Faculty Members – $[F_{(2\text{-}74)}=2.057]$. It is important to suggest educators and students some useful AI Tools and inculcate habit of using AI Tools to become knowledgeable.

Students can make use of AI tools such as DeepL to translate from one language to another, ATLAS.ti in order to analyze qualitative data, and write literature reviews for their projects Rayyan and Quillbot to paraphrase texts. In addition, TikZ, PyTorch, CUDA and BERT could be used for technical assistance. Some AI tools, such as PhotoMath and Wolfram Alpha, are useful for closely studying mathematics (Balabdaoui, F. et al.,2024). In any case, it is obvious that students at higher educational level are able to recognize the increasing use of Artificial Intelligence tools ostensibly in learning and developing a product. The kind of experience that students gain at the college level is important in realizing diversity-centered outcomes (Trolian, T.L., Parker, E.T.,2022).

4. Conclusion

Outcome-based education has resulted in a learning curve for students rather than the content they are taught; in addition, it may be termed student centered. When outcome-based education (OBE) is defined as knowledge gained at the end of the course, at the completion of the programme the ultimate outcome of learning provided that the strengthening objectives of learners resulted in attainment. There has been a significant shift from the traditional lecture delivery mode to the use of online tools, with self-learning tools emerging as Artificial Intelligence Technology.

This empirical research first explores the strengths and opportunities of employing AI tools in teaching and learning and further analyses knowledge and technical handling of AI tools for the purpose of imparting knowledge in the courses they enroll by creating a learning atmosphere to assimilate and fit in, so as to attain course outcomes. There is a need for college professors and students to be equipped with adequate technical and digital competencies in order to handle AI-driven educational applications. This article highlights some of the AI tools used to imbibe and impart knowledge among professors and students of higher educational institutions. The suggested AI tools engage both teachers and students to accumulate enough information to maintain the retention level of learners with the objective of empowering everyone involved in higher education.

Despite the challenges of using AI tools to literate and educate, such as unreliable suggestions, privacy concerns, financial investment and digital competences such as devices, and a lack of adequate internet connections, it is indispensable to integrate with new technologies tailoring the enhancement of personalised learning tools to meet the educational standards of digital natives, engage professional competencies and strengthen AI driven applications to assess and evaluate them. The users of the AI tools are expected to follow ethical implications so as to strengthen their knowledge for better deliberations.

The integration of Artificial Intelligence (AI) tools in higher education has ushered in a new era of learning and teaching, profoundly transforming traditional educational practices. This research has demonstrated that AI-driven tools play a crucial role in enhancing independent writing, evaluation and overall academic performance. By catering to diverse learning styles and providing personalized time-efficient and engaging content, these tools have become indispensable assets in the educational landscape. This study’s findings are supported by data from students’ academic preparation, and the role of faculty remains vital in guiding and assessing students. However, the full potential of AI in education can be realized only through careful and strategic integration into curricula, ensuring that technology complements and enhances traditional teaching methods. As AI continues to evolve, it is imperative for educational institutions to embrace these advancements, preparing students for the challenges of a rapidly changing academic and professional landscape. The future of education lies in the balance and thoughtful application of AI technologies, which ultimately leads to improved educational outcomes and a more adaptive learning environment.

Declarations

Ethical Approval Statement

This study was conducted in accordance with the Academic Integrity Code of Adult Education through Google form aligned with email.

The study was approved by the Department Review Board of M.Kumarasamy College of Engineering, Karur, and the requirement for written consent was waived by the institutional review board for the participants, who participated in the study through Google form.

Data Availability Statement

Respondent dataset 1

https://docs.google.com/forms/d/1NjeJIh_g8ruVpQAxwFM8N4SvBcaAoxFkamt7nj_hvZ4/edit#responses

Respondent dataset 2

https://docs.google.com/forms/d/1lM014fXKSqrJrLnsZnCCdVva2ydxO0LrlVN573vH4GA/edit#responses

Author Contribution

RR Conceptualized the research , collected data, analysed the data and wrote the main manuscript and CT and TC proof-read the article and All authors reviewed the manuscript. All authors commented on the first versions of the manuscript. All authors read and approved the final manuscript.

Data Availability

All data supporting the findings of this study are available within the paper and its Supplementary Information.

References

1. Barella A, Valero S, Carrascosa C (2009) JGOMAS: New Approach to AI Teaching. IEEE Trans Educ 52(2):228–235. 10.1109/TE.2008.925764
2. Adane P et al (2026) Gen AI Smart Assistant. In: Chaudri J, Mahalle PN, Perumal T, Joshi A (eds) ICT for Intelligent Systems. ICTIS 2025. Lecture Notes in Networks and Systems, vol 1519. Springer, Singapore. https://doi.org/10.1007/978-981-96-8901-9_22
3. Álvarez IM, Manero B, Romero-Hernández A et al (2024) Virtual reality platform for teacher training on classroom climate management: evaluating user acceptance. Virtual Reality 28:78. https://doi.org/10.1007/s10055-024-00973-6
4. Alzahrani HA, Shati AA, Bawahab MA et al (2023) Students' perception of asynchronous versus synchronous distance learning during COVID-19 pandemic in a medical college, southwestern region of Saudi Arabia. BMC Med Educ 23:53. https://doi.org/10.1186/s12909-023-04034-5
5. Ani ZC, Hamid ZA, Zhamri NN (2024) The Recent Trends of Research on GitHub Copilot: A Systematic Review. In: Zakaria NH, Mansor NS, Husni H, Mohammed F (eds) Computing and Informatics. ICOCI 2023. Communications in Computer and Information Science, vol 2001. Springer, Singapore. https://doi.org/10.1007/978-981-99-9589-9_27
6. Arpaci I, Kuşci I, Gibreel O (2025) The role of personality traits in predicting educational use of generative AI in higher education. *Sci Rep* 15, 30440 (2025). https://doi.org/10.1038/s41598-025-16339-0

7. Balabdaoui F, Dittmann-Domenichini N, Grosse H et al (2024) A survey on students' use of AI at a technical university. Discov Educ 3:51. https://doi.org/10.1007/s44217-024-00136-4
8. Crompton H, Burke D (2023) Artificial intelligence in higher education: the state of the field. Int J Educ Technol High Educ 20:22. https://doi.org/10.1186/s41239-023-00392-8
9. Daniel Lee et al (2024) The impact of generative AI on higher education learning and teaching: A study of educators' perspectives. Computers Education: Artif Intell. https://doi.org/10.1016/j.caeai.2024.100221
10. Ding L, Zou D (2024) Automated writing evaluation systems: A systematic review of Grammarly, Pigai, and Criterion with a perspective on future directions in the age of generative artificial intelligence. Educ Inf Technol. https://doi.org/10.1007/s10639-023-12402-3
11. Fried CB (2008) In-class laptop use and its effects on student learning. Comput Educ 50(3):906–914
12. Friederich S, Symons J (2023) Norms for Academic Writing in the Era of Advanced Artificial Intelligence. DISO 2, 48. https://doi.org/10.1007/s44206-023-00079-7
13. Goryunova E, Jenkins D (2023) Digital Natives. In: Dhiman SK, Marques J, Schmieder-Ramirez J, Malakyan PG (eds) Handbook of Global Leadership and Followership. Springer, Cham. https://doi.org/10.1007/978-3-030-75831-8_22-1
14. Gribble L, Wardrop J (2023) Exploring Social Learning Theory in Synchronous Design for Engagement in Online Learning. In: Kumar P, Eisenberg J (eds) Synchronous and Asynchronous Approaches to Teaching. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-17841-2_2
15. Haleem A, Javaid M, Qadri MA, Suman R (2022) Understanding the role of digital technologies in education: A review. Sustainable Oper computers 3:275–285
16. Hung CT, Wu SE, Chen YH et al (2024) The evaluation of synchronous and asynchronous online learning: student experience, learning outcomes, and cognitive load. BMC Med Educ 24:326. https://doi.org/10.1186/s12909-024-05311-7
17. Hutson J, Lively J, Robertson B, Cotroneo P, Lang M (2024) Expanding Horizons: AI Tools and Workflows in Art Practice. Creative Convergence. Springer Series on Cultural Computing. Springer, Cham. https://doi.org/10.1007/978-3-031-45127-0_5
18. Hysaj A, Freeman M, Hamam D (2024) Using AI Tools to Enhance Academic Writing and Maintain Academic Integrity. In: Coman A, Vasilache S (eds) Social Computing and Social Media. HCII 2024. Lecture Notes in Computer Science, vol 14704. Springer, Cham. https://doi.org/10.1007/978-3-031-61305-0_4
19. Iio J (2022) Development of an Event Program Organizer with a Question Answering System. In: Barolli L, Chen HC, Enokido T (eds) Advances in Networked-Based Information Systems. NBiS 2021. Lecture Notes in Networks and Systems, vol 313. Springer, Cham. https://doi.org/10.1007/978-3-030-84913-9_34
20. Karampa V, Paraskeva F (2024) Smart Learning Affordances of Web Technologies from Future ICT Teachers' Perspectives. In: Rocha A, Adeli H, Dzemyda G, Moreira F, Colla V (eds) Information Systems and Technologies. WorldCIST 2023. Lecture Notes in Networks and Systems, vol 800. Springer, Cham. https://doi.org/10.1007/978-3-031-45645-9_48
21. Kolikant YBD (2010) Digital natives, better learners? Students' beliefs about how the Internet influenced their ability to learn. Comput Hum Behav 26(6):1384–1391
22. Kumar A et al (2026) Revolutionizing Education Practices Through Gen-AI to Achieve Personalization. In: Swaroop, A., Kansal, V., Hassanien, A.E. (eds) Proceedings of Sixth Doctoral Symposium on Computational

Intelligence. DoSCI 2025. Lecture Notes in Networks and Systems, vol 1496. Springer, Singapore. https://doi.org/10.1007/978-981-96-8107-5_14

23. Lee D, Arnold M, Srivastava A, Plastow K, Strelan P, Ploeckl, Florian, Lekkas, Dimitra, Palmer E (2024) The Impact of Generative AI on Higher Education Learning and Teaching: A Study of Educators' Perspectives. Computers and Education: Artificial Intelligence. 6. 100221. 10.1016/j.caeai.2024.100221
24. Liao J, Wei X, Sun X et al (2025) Parental and peer phubbing and college students' gen AI dependency: the mediating roles of loneliness and self-efficacy and the moderating role of perception of gen AI. Curr Psychol 44:9151–9164. https://doi.org/10.1007/s12144-025-07748-5
25. Mohamed AM (2024) Exploring the potential of an AI-based Chatbot (ChatGPT) in enhancing English as a Foreign Language (EFL) teaching: perceptions of EFL Faculty Members. Educ Inf Technol 29:3195–3217. https://doi.org/10.1007/s10639-023-11917-z
26. Ng DTK, Lee M, Tan RJY et al (2023) A review of AI teaching and learning from 2000 to 2020. Educ Inf Technol 28:8445–8501. https://doi.org/10.1007/s10639-022-11491-w
27. Ng DTK, Leung JKL, Su J et al (2023) Teachers' AI digital competencies and twenty-first century skills in the post-pandemic world. Educ Tech Res Dev 71:137–161. https://doi.org/10.1007/s11423-023-10203-6
28. Ng W (2012) Can we teach digital natives digital literacy? Comput Educ 59(3):1065–1078
29. Perez-Alvarez R, Chavarría Villalobos CR, Dalorso Cruz M, Miranda Loría J (2024) Expectations of Higher Education Teachers Regarding the Use of AI in Education. In: Olney AM, Chounta IA, Liu Z, Santos OC, Bittencourt II (eds) Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium and Blue Sky. AIED 2024. Communications in Computer and Information Science, vol 2150. Springer, Cham. https://doi.org/10.1007/978-3-031-64315-6_16
30. Pickering JD, Quesnelle KM (2022) Asynchronous Teaching. In: Huggett KN, Quesnelle KM, Jeffries WB (eds) An Introduction to Medical Teaching. Innovation and Change in Professional Education, vol 20. Springer, Cham. https://doi.org/10.1007/978-3-030-85524-6_10
31. Pratiwi DI, Fitriati SW, Yuliasri I et al (2024) Flipped classroom with gamified technology and paper-based method for teaching vocabulary. Asian J Second Foreign Lang Educ 9:1. https://doi.org/10.1186/s40862-023-00222-4
32. Rao NJ (2020) Outcome-based Education: An Outline. Higher Education for the Future, 7(1), 5–21. https://doi.org/10.1177/2347631119886418
33. Rodafinos A (2024) AI Tools for Education: The Development of a Free Asynchronous Course. In: Kafa A, Eteokleous N (eds) The Power of Technology in School Leadership during COVID-19. Studies in Educational Leadership, vol 26. Springer, Cham. https://doi.org/10.1007/978-3-031-51575-0_12
34. Singh MN (2021) Inroad of Digital Technology in Education: Age of Digital Classroom. High Educ Future 8(1):20–30. https://doi.org/10.1177/2347631120980272
35. Strachan JWA, Albergo D, Borghini G et al (2024) Testing theory of mind in large language models and humans. Nat Hum Behav 8:1285–1295. https://doi.org/10.1038/s41562-024-01882-z
36. Trolian TL, Parker ET (2022) Shaping Students' Attitudes Toward Diversity: Do Faculty Practices and Interactions With Students Matter? Res High Educ 63:849–870. https://doi.org/10.1007/s11162-021-09668-2

37. Varma A, Sudarsanam A (2024) Why Parental Education may be the Key to Raising the Digital Natives? Indian Pediatr 61:30–31. https://doi.org/10.1007/s13312-024-3083-6
38. Varsha T, Lokare, Prakash M, Jadhav (2024) An AI-based learning style prediction model for personalized and effective learning, Thinking Skills and Creativity. 1871–1871. https://doi.org/10.1016/j.tsc.2023.101421
39. Wallwork A (2023) Proofreading tools: checking the correctness of your English. English for Academic Research: Grammar, Usage and Style. English for Academic Research. Springer, Cham. https://doi.org/10.1007/978-3-031-31517-6_11
40. Yan D (2023) Impact of ChatGPT on learners in a L2 writing practicum: An exploratory investigation. Educ Inf Technol 28:13943–13967. https://doi.org/10.1007/s10639-023-11742-4
41. Yim IHY, Su J (2024) Artificial intelligence (AI) learning tools in K-12 education: A scoping review. J Comput Educ. https://doi.org/10.1007/s40692-023-00304-9

Figures

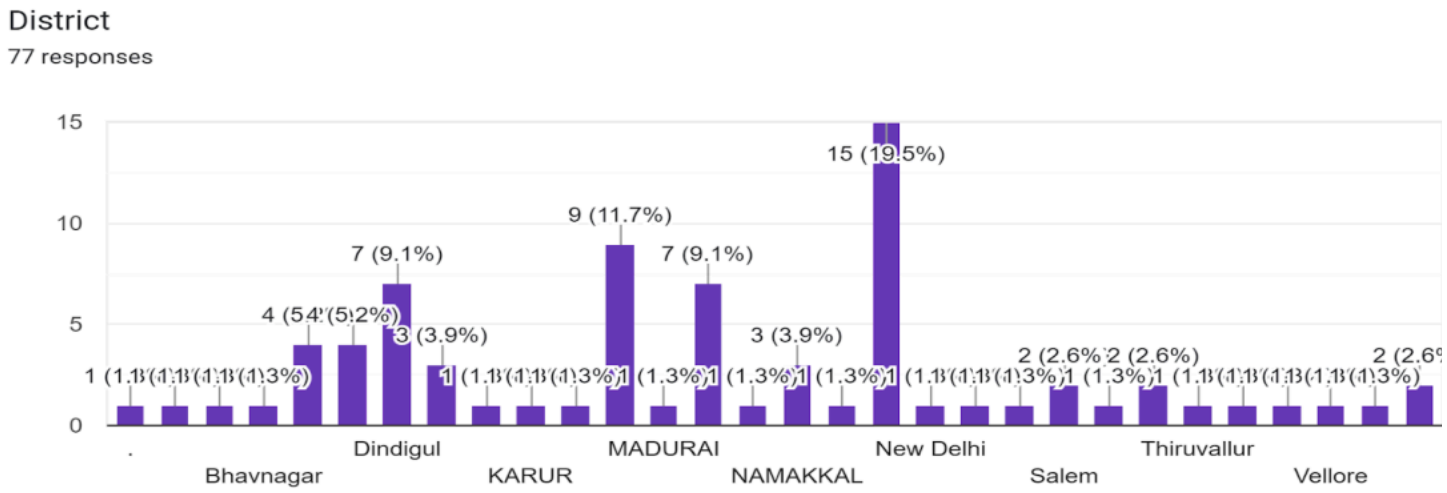


Figure 1

Responses of Faculty Members to the districts to which they belong.

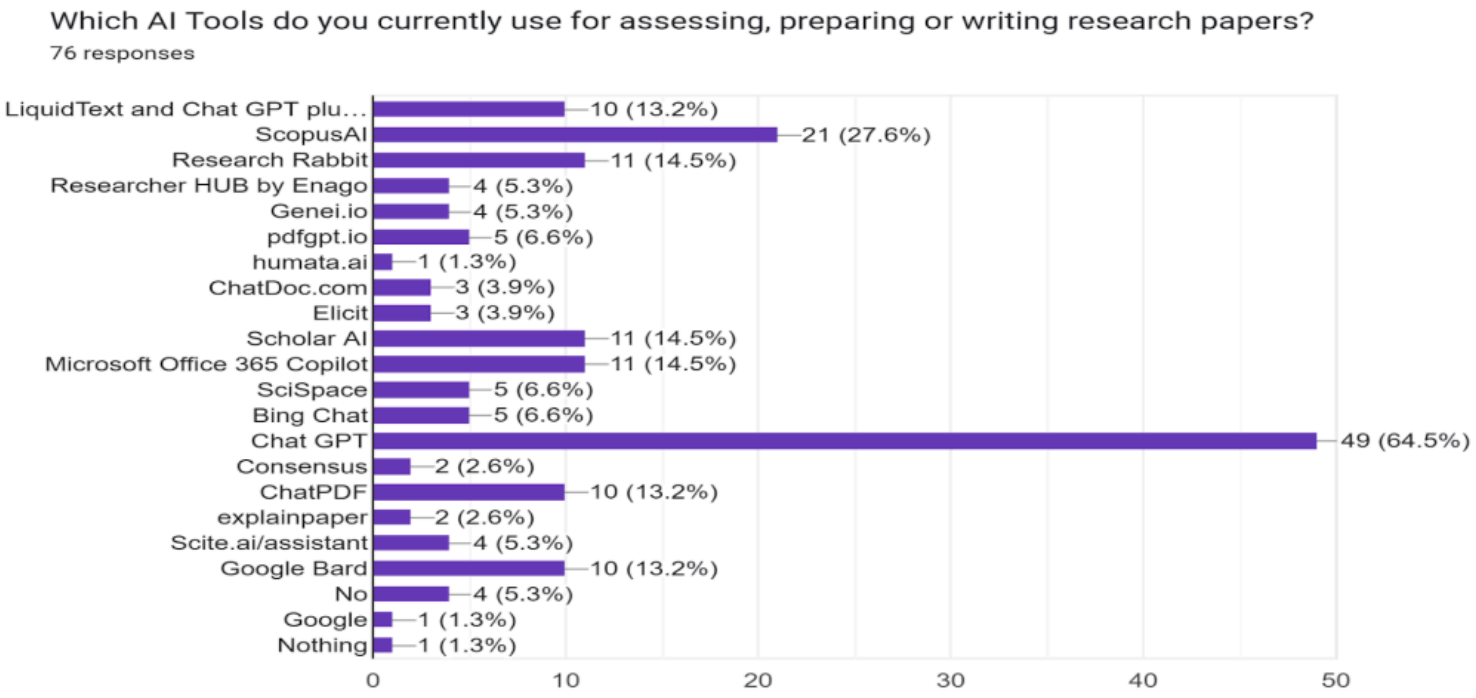


Figure 2

Responses from Faculty about the use of AI tools.

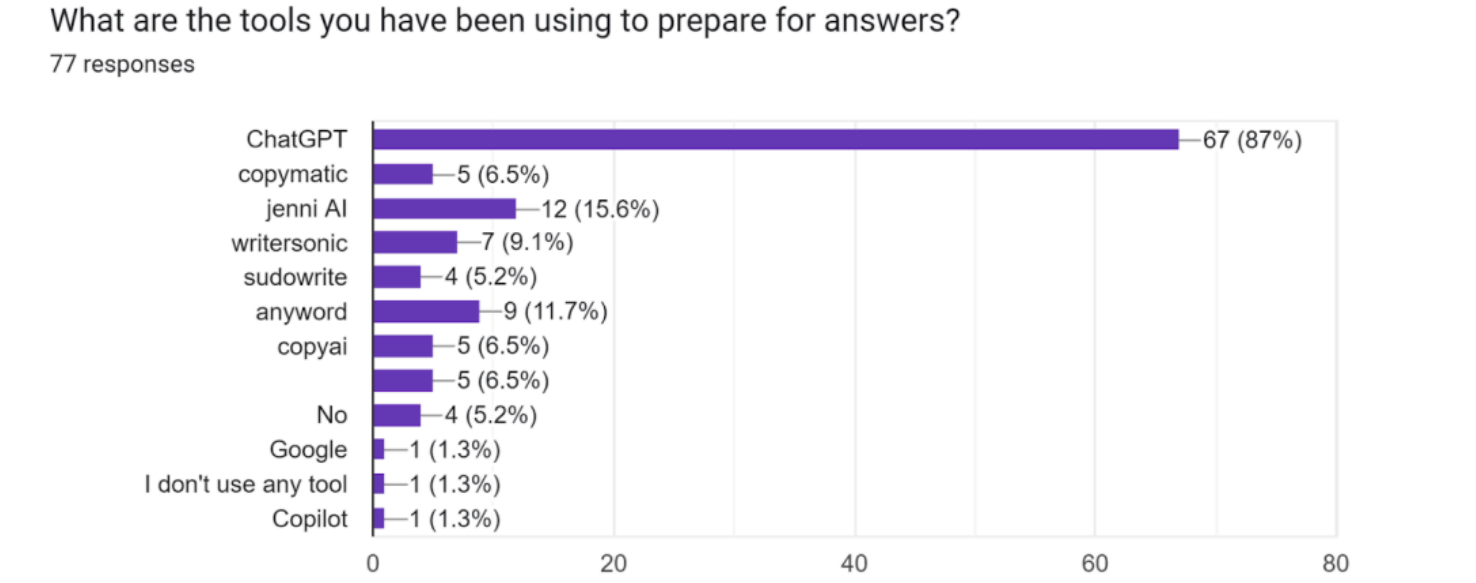


Figure 3

Responses from faculty members about the use of AI tools to prepare for classes.

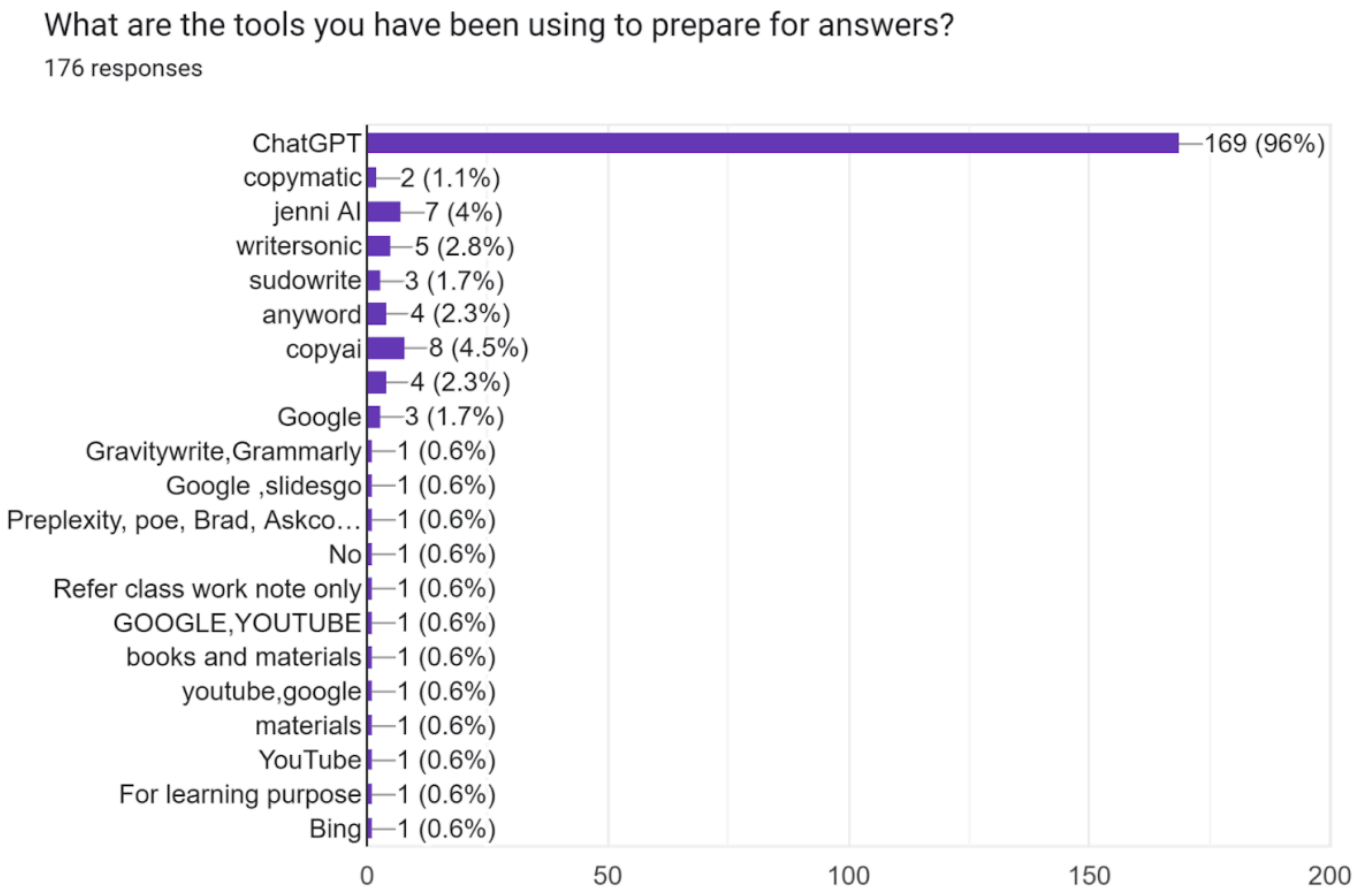


Figure 4

Responses from students about the AI tools they use for preparation.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- AIToolstoeducateselfandothersResponses.xlsx
- Questionnaire1Responses.xlsx
- 927625BAD110.pdf
- EthicsApprovalLetter.jpeg