

## **Empowering College Students With Generative AI Literacy in Higher Education**

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### **Abstract**

This study aims to optimize excellence in teaching, learning, and research among institutions of higher education via the revolution of generative AI. To promote generative AI literacy in higher education, this paper encourages institutions of higher education worldwide to establish specific generative AI guidelines for academic executives, faculty, librarians, and students in ever-changing academic learning environments. Based on their teaching practice at Georgia Southern University (<https://www.georgiasouthern.edu/>) and Georgia Southern University Libraries (<https://www.georgiasouthern.edu/library>), this paper suggests 25 primary generative AI tools for college students to boost their skills of critical thinking, decision-making, and problem solving in higher education. Also discussed are the relevant impacts of AI integrity, AI literacy, and generative AI literacy concerned by academic faculty, librarians, and students in the age of artificial intelligence.

*Keywords:* academic integrity, academic learning environments, AI literacy, artificial intelligence (AI), college students, generative AI, generative AI literacy, higher education

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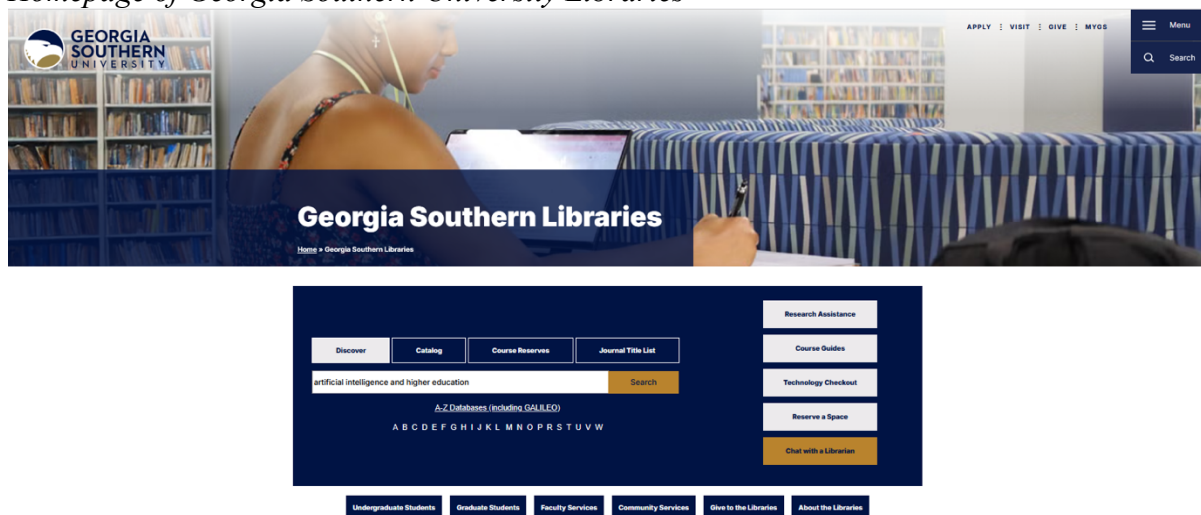
The International Academic Forum  
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## Introduction

Since Dr. John McCarthy coined this term with his colleagues in 1955 (Computer History Museum, 2001), the definition of artificial intelligence (AI) keeps evolving with the rapid advance of AI technology, especially machine learning, deep learning, large language models (LLMs), machine translation, natural language processing (NLP), etc. Defined by IBM experts, “Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy” (Stryker & Kavlakoglu, n.d.). After OpenAI released the world’s first generative AI chatbot called ChatGPT on November 30, 2022, the rise of generative AI has been disrupting academic learning environments worldwide. Academic executives, faculty, IT specialists, librarians, and students in higher education must confront the impact of generative AI on existing modes of teaching and learning across academic learning environments. Explained by IBM experts, “Generative AI, sometimes called *gen AI*, is artificial intelligence (AI) that can create original content such as text, images, video, audio or software code in response to a user’s prompt or request” (Stryker & Scapicchio, n.d.). During the process of human-machine interaction, generative AI tools, like ChatGPT (<https://chatgpt.com/>), Claude (<https://claude.ai>), DeepSeek (<https://www.deepseek.com/>), Google Gemini (<https://gemini.google.com/app>), Microsoft Copilot (<https://copilot.microsoft.com/>), Meta AI (<https://www.meta.ai/>), Midjourney (<https://www.midjourney.com/home>), Perplexity (<https://www.perplexity.ai/>), xAI Grok (<https://grok.com/>), etc., can quickly generate new contents to satisfy dynamic user needs. Trained from massive token vectors stored within large language models (LLMs), generative AI tools can explore, learn, and predict the semantic relationships between abstract concepts and natural language words before responding to user prompts.

### Figure 1

*Homepage of Georgia Southern University Libraries*



*Note:* From <https://www.georgiasouthern.edu/library>

## Background

### Georgia Southern University and Georgia Southern University Libraries

As one of the twenty-eight member institutions of University System of Georgia (<https://www.usg.edu/>), Georgia Southern University (<https://www.georgiasouthern.edu/>) is

classified as an “R2” high research institution by the Carnegie Classification of Institutions of Higher Education (<https://carnegieclassifications.acenet.edu/>) in the United States. Founded in 1906 at the Southeast Georgia, Georgia Southern University now has 27,506 students across 10 colleges offering undergraduate, graduate, and doctoral degrees. To support the missions of the university, Georgia Southern University Libraries (<https://www.georgiasouthern.edu/library>) serve faculty, staff, students, and community users across four campuses. Impacted by the surge of generative AI, the University System of Georgia, like many higher education institutions worldwide, released an AI guide (University System of Georgia, 2025) to provide guidelines for ethical and legal practice of AI applications and tools in higher education.

### **Research Design**

From the perspectives of academic librarians, this study is designed to identify key generative AI tools that promote critical thinking, decision-making, and problem-solving skills for college students in higher education. This study addresses two research questions:

RQ1: Which generative AI tools are needed for college students in higher education?

RQ2: How to promote AI literacy and generative AI literacy in higher education?

### **Literature Review**

The rapid advance of generative AI, the latest breakthrough of AI technology, has been disrupting higher education beyond expectations. A large body of research (An et al., 2025; Assaf et al., 2024; Bodur et al., 2025; Crompton & Burke, 2025; Iatrellis et al., 2025; Jin et al., 2025; Kituku et al., 2025; Rai et al., 2025; Shahzad et al., 2025) has explored the impacts of generative AI on teaching, learning, and research excellence in higher education institutions.

### **Generative AI Tools in Academic Learning Environments**

Three years after ChatGPT’s release on November 30, 2025, a variety of generative AI tools (Beer, 2025; Dreamhunter, 2024; Gwilym, 2024; Huang, 2024; Michel-Villarreal et al., 2023) have emerged in the marketplace. They can increasingly be embedded into higher education courses, as they can generate new content including images, music, programming codes, texts, and videos based on prompts input by users. Faculty and students are increasingly eager and enthusiastic to explore the range and scope of generative AI tools across the academic landscape. However, several prominent universities in the United States: Columbia University (<https://www.columbia.edu/>), Dartmouth College (<https://home.dartmouth.edu/>), Duke University (<https://duke.edu/>), Liberty University (<https://www.liberty.edu/>), Princeton University (<https://www.princeton.edu/>), University of North America (<https://uona.edu/>), and University of Notre Dame (<https://www.nd.edu/>), maintain strict policies regarding the use of generative AI in those learning environments.

### **Generative AI Tools and Academic Integrity**

The generative AI boom led by ChatGPT is continually challenging the principles of academic integrity (Duke Univ., 1999; Eaton, 2024; Kofinas et. al., 2025; Macfarlane et al., 2014; Vallespir Adillón et al., 2024) in higher education. Defined by the online encyclopedia Wikipedia,

Academic integrity is a moral code or ethical policy of academia. Academic integrity supports the enactment of educational values through behaviours such as the avoidance of cheating, plagiarism, and contract cheating, as well as the maintenance of academic standards; honesty and rigor in research and academic publishing. (Wikipedia, 2025)

The high tide of generative AI has prompted instructors and academic librarians to consistently remind students to follow academic integrity policies and AI ethics when competing assignments, projects, and term papers (Gonsalves, 2025; Hill & Hargis, 2025; Jafry & Vorstermans, 2025; Laflamme & Bruneault, 2025; Yang et al., 2025).

## **Methodology**

### **Research Methods**

This quantitative study used the content analysis to review the collected research literature, while the descriptive analysis method was used to select generative AI tools in higher education.

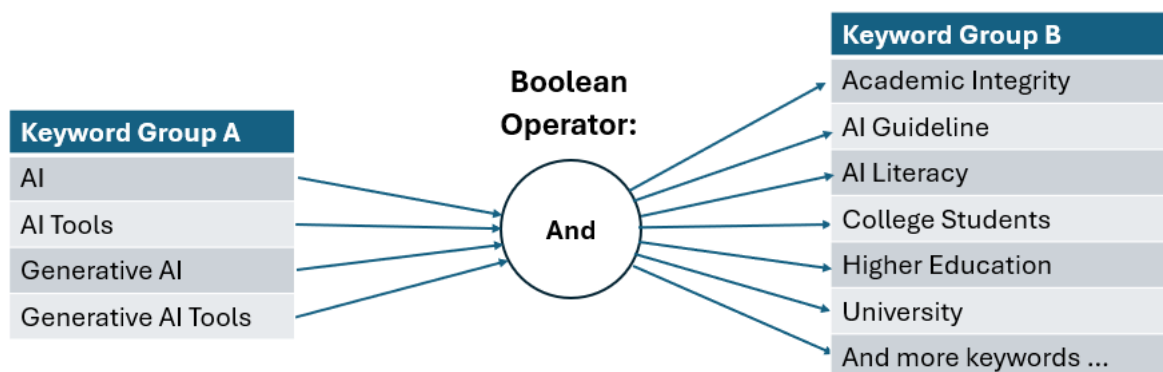
### **Keyword Search and Boolean Operators**

A keyword search refers to an information retrieval method of using important words to focus on research topics. Since 1990s, keyword searches have been widely used to find web-based information resources on the World Wide Web (Kargar et al., 2015; Liu et al., 2006; Zhou & Pei, 2012). Also, Boolean Operators (AND, OR, and NOT) are often combined with keyword(s) to further optimize information search results (Aliyu, 2017; Picalho et al., 2022; Scells et al., 2020). In this study, keywords and the Boolean Operator (And) are combined to locate scholarly peer-reviewed resources.

### **Keyword Processing**

To identify AI tools for college students, the selected keywords were divided into two groups. Keyword Group A contains the primary keyword(s) selected in the fields of artificial intelligence, while Keyword Group B includes the selected keywords or keyword phrases for students from institutions of higher education. A Boolean Operator “And” was used to combine with the selected keywords from Group A and Group B. as a formula: Keyword A + And (Boolean Operator) + Keyword B, such as “academic integrity and higher education”, “AI literacy and generative AI” “generative AI tools and college students”, “generative AI tools and higher education”, “AI literacy and college students”, “AI literacy and undergraduates”, etc. The finalized keyword process and information retrieval were optimized to support this study:

**Figure 2**  
*Optimized Keyword Search Combined With a Boolean Operator (And)*



### Research Resources and Web Search Engines

The primary resources selected for this study are library databases, such as Academic Search Complete (EBSCO), Business Source Complete (EBSCO), Computer Source (EBSCO), ERIC (Education Resources Information Center), IEEE Xplore Digital Library, ProQuest Databases, ScienceDirect, Scopus, Web of Science, etc., available from the collections of Georgia Southern University Libraries (<https://ww2.georgiasouthern.edu/library/>). To identify top generative AI tools for college students, the EBSCO Folio Services (<https://www.ebsco.com/academic-libraries/products/ebsco-folio>), Google (<https://www.google.com>), and Google Scholar (<https://scholar.google.com/>) are web search engines interchangeably used to seek general sources and peer-reviewed scholarly literature.

### Findings

#### Top Generative AI Tools Recommended

In response to the RQ1 previously presented, the following 25 generative AI tools are selected based on the latest reports for the generative AI tools applicable in academic learning environments (Adwani, 2025; Bradley, 2025; CogniPark, 2025; Lukan, 2025; Mojahar, 2025; Muchmore & Circelli, 2025). From the perspectives of academic librarians, these generative AI tools are recommended to promote student’s experience, knowledge, and skills of using generative AI in their current academic learning environments and future career development beyond higher education:

**Table 1**  
*List of Generative AI Tools for College Students*

No.	Generative AI Tools	Applications	Notes
1.	Andi ai <a href="https://andisearch.com/">https://andisearch.com/</a>	AI-powered search engine	Andi is an AI-powered search assistant delivering fast accurate answers.
2.	Blackbox ai <a href="https://www.blackbox.ai/">https://www.blackbox.ai/</a>	AI-powered code generator	Blackbox AI is highly appraised by users for transforming complicated enterprise software development.
3.	ChatGPT <a href="https://chatgpt.com/">https://chatgpt.com/</a>	Generative AI platform	ChatGPT is the world’s first generative AI-powered platform to complete a wide range of tasks based on the prompts input by users.

4.	Claude <a href="https://claude.ai/">https://claude.ai/</a>	Generative AI platform	Compared to ChatGPT, Claude stands out for handling large documents, detailed writing, in-depth research, etc.
5.	Connected Papers <a href="https://www.connectedpapers.com/">https://www.connectedpapers.com/</a>	AI-powered visual search tool	Connected Papers is an AI-powered search tool for researchers to graphically track scholarly papers via similarity metric.
6.	Consensus <a href="https://consensus.app/">https://consensus.app/</a>	AI-powered search engine	Consensus is an AI-powered search engine for seeking peer-reviewed scholarly papers.
7.	DeepSeek <a href="https://www.deepseek.com/en">https://www.deepseek.com/en</a>	Generative AI platform	As the world's first open-sourced generative AI chatbot, DeepSeek is widely used to solve complex tasks including content generation, data analysis, business consultation, code optimization, etc. via natural language processing (NLP).
8.	Elicit <a href="https://elicit.com/">https://elicit.com/</a>	AI-assisted research assistant	Elicit is an AI-powered assistant to help researchers optimize their research process, such as gathering papers, extracting insights, generating reports, etc.
9.	GitHub Copilot <a href="https://github.com/features/copilot">https://github.com/features/copilot</a>	AI-powered coding assistant	GitHub Copilot is an AI-powered coding assistant to streamline professional coding development by using different programming languages.
10.	Google Gemini <a href="https://gemini.google.com/app">https://gemini.google.com/app</a>	Generative AI platform	Google Gemini is a generative AI assistant designed to complete a wide range of tasks via its large language models (LLMs).
11.	Google Lens <a href="https://lens.google/">https://lens.google/</a>	Generative AI assistant	Google Lens is an AI-powered assistant to identify information via images taken.
12.	Google NotebookLM <a href="https://notebooklm.google/">https://notebooklm.google/</a>	AI-powered note-taking assistant	Developed by Google, NotebookLM is the world's first AI-powered notebook, which can closely summarize the documents uploaded by users.
13.	Grammarly <a href="https://www.grammarly.com/">https://www.grammarly.com/</a>	AI-powered writing assistant	Grammarly AI provides AI-powered writing assistance, including citation generation, grammar check, plagiarism checking, text generation, writing correction, etc., for users to write more effectively.
14.	Jasper <a href="https://www.jasper.ai/">https://www.jasper.ai/</a>	AI-powered content generator	Jasper is an AI-powered content creation platform to generate academic papers, blog articles, books, YouTube videos, etc.
15.	Litmaps <a href="https://www.litmaps.com/">https://www.litmaps.com/</a>	AI-powered literature review tool	Litmaps is an AI-powered research tool to assist researchers to analyze, review, and track scholarly literature visually.
16.	Microsoft Copilot <a href="https://copilot.microsoft.com/">https://copilot.microsoft.com/</a>	AI-powered assistant	Microsoft Copilot is an AI-powered assistant integrated within the Microsoft 365 ecosystem like Word, Outlook, and Excel for new content generation.
17.	NaturalReader <a href="https://www.naturalreaders.com/">https://www.naturalreaders.com/</a>	AI-powered voice generator	NaturalReader is an AI-powered software to transform text to speech via natural-sounding voices.
18.	Perplexity <a href="https://www.perplexity.ai/">https://www.perplexity.ai/</a>	AI-powered search engine	Perplexity is an AI-powered search engine to search for scholarly resources.

19.	Quillbot <a href="https://quillbot.com/">https://quillbot.com/</a>	AI-powered writing assistant	Quillbot is an AI-powered writing assistant for citation generation, essay check, grammar check, plagiarism check, writing assistance, etc.
20.	Research Rabbit <a href="https://www.researchrabbit.ai/">https://www.researchrabbit.ai/</a>	AI-powered tools for deep research	Research Rabbit is an AI-powered tool for scholarly information discovery.
21.	Scite <a href="https://scite.ai/">https://scite.ai/</a>	AI-powered Tools for Deep Research	Scite is an AI-powered search platform for researchers to search for scientific literature.
22.	Semantic Scholar <a href="https://www.semanticscholar.org/">https://www.semanticscholar.org/</a>	AI-powered Tools for Deep Research	Semantic Scholar is a free AI-powered search engine for scholarly information.
23.	Synthesia <a href="https://www.synthesia.io/">https://www.synthesia.io/</a>	AI-powered video generator	Synthesia is a free AI-powered platform to turn text into video.
24.	Teal <a href="https://www.tealhq.com/">https://www.tealhq.com/</a>	AI-powered tool to build resumes	Teal is an AI-powered tool for users to optimize their career management, job search, resume builder, etc.
25.	Tutor ai <a href="https://tutorai.me/">https://tutorai.me/</a>	AI-powered software for personalized learning	Tutor ai is an AI-powered tool offering one-to-one personalized online learning in many subjects.

## Discussions

### Academic Integrity

Debate continues over the impact of generative AI on academic integrity and student engagement in higher education. Among institutions of higher education in the United States, academic integrity remains a primary concern discussed among academic executives, faculty, librarians, scholars, and other professionals. Based on the scholarly literature reviewed for this study, the evolution of generative AI has consistently disrupted the principles of academic integrity and assessment in tertiary learning environments. Many researchers, such as (Gonsalves, 2025; Gruenhagen et al., 2024; Issa & Hall, 2024; Peterson, 2025; Petricini et al., 2025; Yusuf et al., 2024), warned that some college students do not comply with AI policies and regulations while using generative AI tools to complete their academic assignments, projects, and term papers. A key question is whether over-reliance on generative AI could erode students' critical thinking, decision making, and problem-solving competencies in higher education? Additional studies should be conducted to further explore the integration among generative AI, academic integrity, and student engagement in higher education.

### AI Literacy vs. Generative AI Literacy

From academic librarians' perspectives, AI literacy refers to the ability to understand the general application, concept, components, and usage of AI, while generative AI literacy (Annapureddy et al., 2025; Chen et al., 2025; Jomezai et al., 2025) focuses on the skills to learn, evaluate, and use a variety of generative AI tools. Recent studies conducted by (Ali & Richardson, 2025; Chigwada, 2024; Ndungu, 2024; Ru & Tang, 2025; Zhang et al., 2025), suggest academic libraries are a practical sector for promoting both AI literacy and Generative AI literacy.

## **AI Literacy Frameworks**

For institutions of higher education, establishing AI literacy frameworks, which is in response to the RQ2 previously presented, is urgent to meet the evolving needs for excellence in teaching, learning, and research based on their specific academic programs. Initially developed by Barnard College (<https://barnard.edu/>) in New York City, New York, United States, the Educause AI Literacy Framework (Hibbert et al., 2024) can serve as a template for higher education worldwide to promote AI literacy and generative AI literacy. To follow the guidance set by the University System of Georgia, Georgia Southern University is currently developing an institutional AI Guide to help faculty and student engage excellent in teaching, learning, and research.

## **Promote AI Literacy and Generative AI Literacy in Higher Education**

Academic librarians play a pivotal role as teaching partners in promoting AI literacy and Generative AI literacy in service-oriented and student-centered learning environments (Chaudhuri & Terrones, 2025; Ndungu, 2024; Ru & Tang, 2025; Solomon et al., 2025; Willenborg & Withorn, 2025). Academic faculty and librarians can collaborate on strategic plans and syllabi that include joint academic publications, embedded onsite or online library instructions, and new AI-related courses, and outreach such as library guides, seminars, workshops, etc. to advance AI literacy and Generative AI literacy across academic programs at institutions of higher education.

## **Conclusion**

The surge of generative AI is transforming current and future modes of organizing higher education (Hashmi & Bal, 2024; Klein, 2025; Linden et al., 2025; Maurya & DeDiego, 2025; Verboom et al., 2025; World Bank Group, 2025). This AI revolution epoch will shape students' future career development and lifelong learning beyond college and university. The continued evolution of generative AI will drive greater creativity and innovation for higher throughout the 21<sup>st</sup> century.

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