Quick Answer: How to Build GenAI Skills in Software Engineering Teams

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Initiatives: Software Engineering Practices; Build a World-Class Software Engineering Organization

With the increased adoption of generative AI, demand for GenAI skills is rising. As these skills are scarce and hiring is often impractical, software engineering leaders must develop in-house upskilling programs to help their teams scale GenAI adoption.

Quick Answer

How should software engineering leaders build generative AI (GenAI) skills in their teams?

- Identify the skills needed for developers to use GenAI for software development.
- Select and promote courses from online learning platforms to help fill the skills gaps.
- Sustain and enhance GenAI skills with social and experiential learning.

More Detail

As organizations adopt GenAI to boost developer productivity and experience, software engineering leaders must equip developers with the skills required to realize the potential benefits of this technology.

Software engineering leaders cited talent availability as the primary risk factor for adoption of code assistants.

— 2024 Gartner Technology Adoption Roadmap for Large Enterprises Survey

More than 52% of IT leaders say they expect their organization will use GenAI to build software, according to the 2023 Gartner IT Leader Poll on Generative AI for Software Engineering. [1] Yet 60% of leaders state that their teams do not have the right skills. [2] Software engineering leaders must enable their teams to learn the desired GenAI skills.

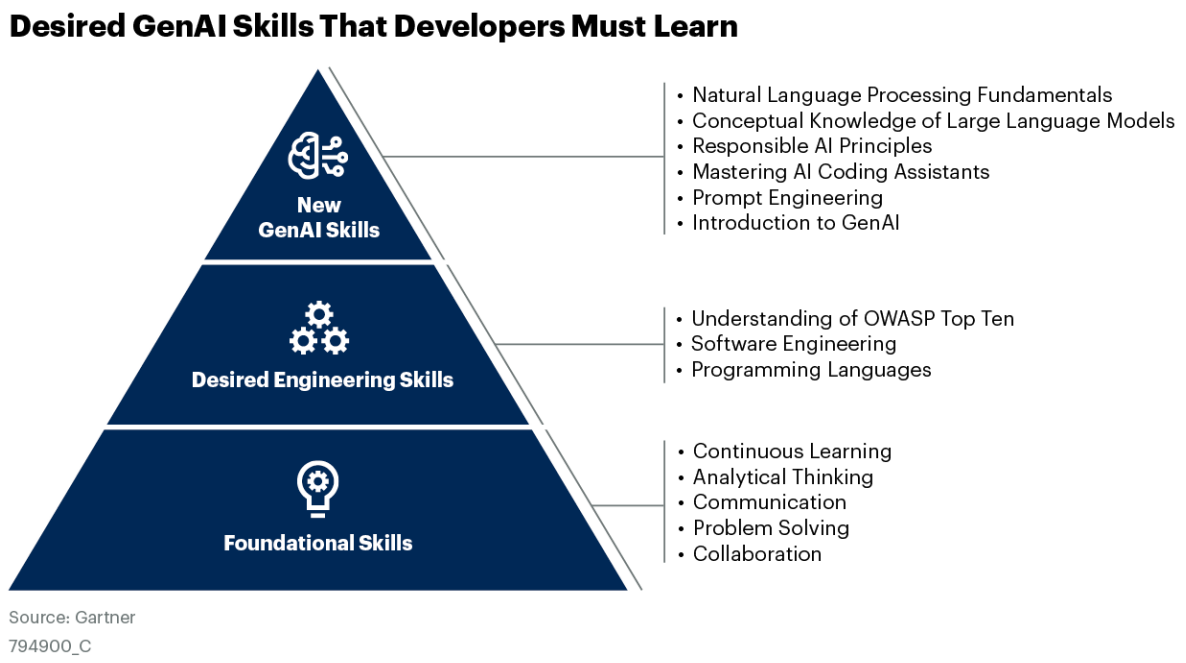
Identify the Skills Needed for Developers to Use GenAI

Software engineering leaders should start by identifying which skills their developers must have to scale the adoption of GenAI tools. As shown in Figure 1, engineers need: [3, 4]

- **Desired engineering skills.** Developers must learn to solve problems, communicate and collaborate effectively. They also need a working knowledge of programming languages and software engineering skills required for code generation (see Top Software Engineering Skills and Skill-Building Techniques). Developers must have a good understanding of the Top 10 Web Application Security Risks defined by the Open Web Application Security Project (OWASP) [5] to follow the standards established for developing secure code.
- **Desired GenAI skills.** Developers must learn to effectively use AI coding assistants and other GenAI technologies. Desired skills are emerging and evolving, so leaders need to monitor the evolution of these skills.

Figure 1 outlines these skills.

Figure 1: Desired GenAI Skills That Developers Must Learn



Leaders should conduct a pilot program to roll out training on the desired generative AI skills. [6,7] For the pilot program, leaders should create a GenAI enabling team comprising people who have a strong foundation of software engineering skills. The enabling team should validate the benefits of the desired GenAI skills toward meeting the business goals. This team can then help to teach product teams through social learning.

Select and Promote Courses From Online Learning Platforms

Online learning platforms offer several benefits, including easy access to learning materials, self-paced learning and continuous learning opportunities. Some online learning platform providers are introducing labs and workspaces that enable developers to immediately apply and practice new skills (see Market Guide for Digital Learning Content Providers).

Fifty-four percent of software engineering leaders said they perceived online learning platforms as an effective approach for improving skills of developers.

— *2022 Gartner Software Engineering Leaders Role Survey*

Software engineering leaders should work with their teams to curate the most relevant courses from online learning platforms for learning desired GenAI skills (see Develop Your Technical Skills Using Online Learning Platforms). Table 1 lists the desired GenAI skills that developers must learn and provides a sample list of online learning platforms and courses to help build each skill.

Table 1: GenAI Skills and Courses That Online Learning Platforms Provide to Teach Them

(Enlarged table in Appendix)

Desired GenAI Skills	Online Learning Platforms	Courses
Introduction to GenAI	Google Cloud Skills Boost	Introduction to Generative AI
	Coursera	Introduction to Generative AI
	Udemy	Generative AI — From Big Picture, to Idea, to Implementation
	DeepLearning.AI	Generative AI for Everyone
Prompt Engineering	Udemy	The Complete Prompt Engineering for AI Bootcamp
	DAIR.AI	Prompt Engineering Guide
Mastering AI Coding Assistants	YouTube	Getting Started With GitHub Copilot by Sri Gunnala — Tech Talks
	Scrimba	AI Coding for Noncoders
Responsible AI Principles	LinkedIn	Responsible AI: Principles and Practical Applications.
	Udemy	Fundamentals of Responsible Artificial Intelligence/ML
	Google for Developers	Introduction to Responsible AI
Conceptual Knowledge of Large Language Models (LLMs)	Google Cloud Skills Boost	Introduction to Large Language Models
	edX and Databricks	Databricks: Large Language Models: Application Through Production
	Google for Developers	Introduction to Large Language Models
	DeepLearning.AI	Generative AI With LLMs
Natural Language Processing Fundamentals	Udemy	Introduction to Natural Language Processing
	Coursera and DeepLearning.AI	Natural Language Processing With Classification and Vector Spaces

Source: Gartner

Enhance GenAI Skills With Social and Experiential Learning

To sustain and enhance newly learned GenAI skills, developers must go beyond just taking a course (see An Executive Leader's Guide to Agile Learning). Software engineering leaders should augment GenAI courses on online learning platforms by connecting their teams with social learning and experiential learning opportunities.

Social learning helps developers to learn by sharing proven practices of applying new skills in their jobs. Software engineering leaders should:

- Sponsor an AI-augmented development community where software engineers can share the best practices of using GenAI tools in the organization (see Community of Practice Essentials).

- Establish a GenAI skills badging system to incentivize learning (see Case Study: Digital Badges to Provide Recognition for Business Technologists).
- Create a mentoring program and leverage your GenAI expert or coaching team as mentors who can help other developers to learn desired skills. In the 2022 Gartner Software Engineering Leaders Role Survey, leaders said they perceived mentoring and online platforms collectively as an effective approach for improving skills of developers. [8]

Experiential learning helps developers to learn by doing and by gaining practical experience on the job. High-performing organizations find that approaches involving learning by doing and gaining practical experiences are more effective in building and improving skills. [8] Through experiential learning, developers can gain practical experiences by leveraging AI tools for code generation. Open-source learning platforms like DeepLearning.AI offer hands-on training where developers can systematically engineer good prompts, and build custom chatbots. [9] Leaders should support the creation of experiential learning approaches such as pair programming, hackathons and innovation sprints.

For more guidance, see How to Establish a Reskilling/Upskilling Talent Development Program for Software Engineering.

Evidence

[1] **2023 Gartner IT Leader Poll on Generative AI for Software Engineering:** This survey was conducted online from 2 May through 8 May 2023 to gather data regarding current and expected use of generative AI in software engineering. In total, 91 IT leaders who are members of Gartner's Research Circle, a Gartner-managed panel, participated. Participants were primarily from North America (n = 44) and EMEA (n = 33); other respondents came from Asia/Pacific (n = 12) and Latin America (n = 2). *Disclaimer: The results of these surveys do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.*

[2] **2024 Gartner Technology Adoption Roadmap for Large Enterprises Survey.** This survey was conducted through an online panel survey among more than 600 respondents from North America, EMEA and Asia/Pacific across industries and enterprises with annual revenue of more than $1 billion. This research summarizes findings from more than 120 respondents identified as software engineering leaders. These results will allow software engineering leaders to cut through vendor hype to determine which technologies to invest in and when to invest in them, in order to remain competitive among peers.

[3] The Future of Jobs Report 2023 (PDF), World Economic Forum.

[4] 7 Essential Skills for Machine Learning and AI Developers on AWS, Pluralsight.

[5] OWASP Top Ten, OWASP Foundation.

[6] Top 14 In-Demand Skills Required for AI Professionals, Geekflare.

[7] Skills Workers Will Need in the Age of Generative AI — Part 1: Digital and Technical Skills, LinkedIn.

[8] **2022 Gartner Software Engineering Leaders Role Survey.** This survey was conducted to understand how organizations attract, hire and retain software engineering talent; improve and modernize developer skills; improve developer productivity; establish platform engineering teams; create platform teams; and incorporate design into software engineering. The survey was conducted online from November through December 2022. In total, 300 respondents were interviewed from the United States. Qualified organizations operated in multiple industries (excluding IT software and public sector) and reported enterprise wide revenue for fiscal year 2021 of at least $250 million or equivalent, with 60% over $1 billion in revenue. Qualified participants were highly involved in managing software engineering/application development teams and the activities they perform. *Disclaimer: Results of this survey do not represent global findings or the market as a whole, but reflect the sentiments of the respondents and companies surveyed.*

[9] ChatGPT Prompt Engineering for Developers, DeepLearning.AI.

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