Empowering SMBs through Undergraduate AI Research:

Leveraging Low-Cost Hardware and Open-Source Innovation

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The Purpose of this Presentation

Showcase a replicable model for integrating AI into undergraduate research to support Small and Medium Businesses (SMBs), bridging the gap between academia and industry through innovative, and real world student projects.

- **Highlight the Value of Undergraduate AI Research for SMBs**
- **Provide Insights on Low-Cost, Open-Source AI Solutions**
- **Introduce a Model for Experiential Learning in AI with Local SMBs**
- **Offer a Replicable Framework for other Business Schools**

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A Question from two Visionaries

Dr. Gregory Carnes
(former Dean)

Dr. Doug Barrett
(new Dean)

"What would it look like if our College of Business provided experiential learning for our students, assisted local small businesses, *and* incorporated AI into the business classroom?"

Oh, and provide AI research opportunities…

Without spending money…

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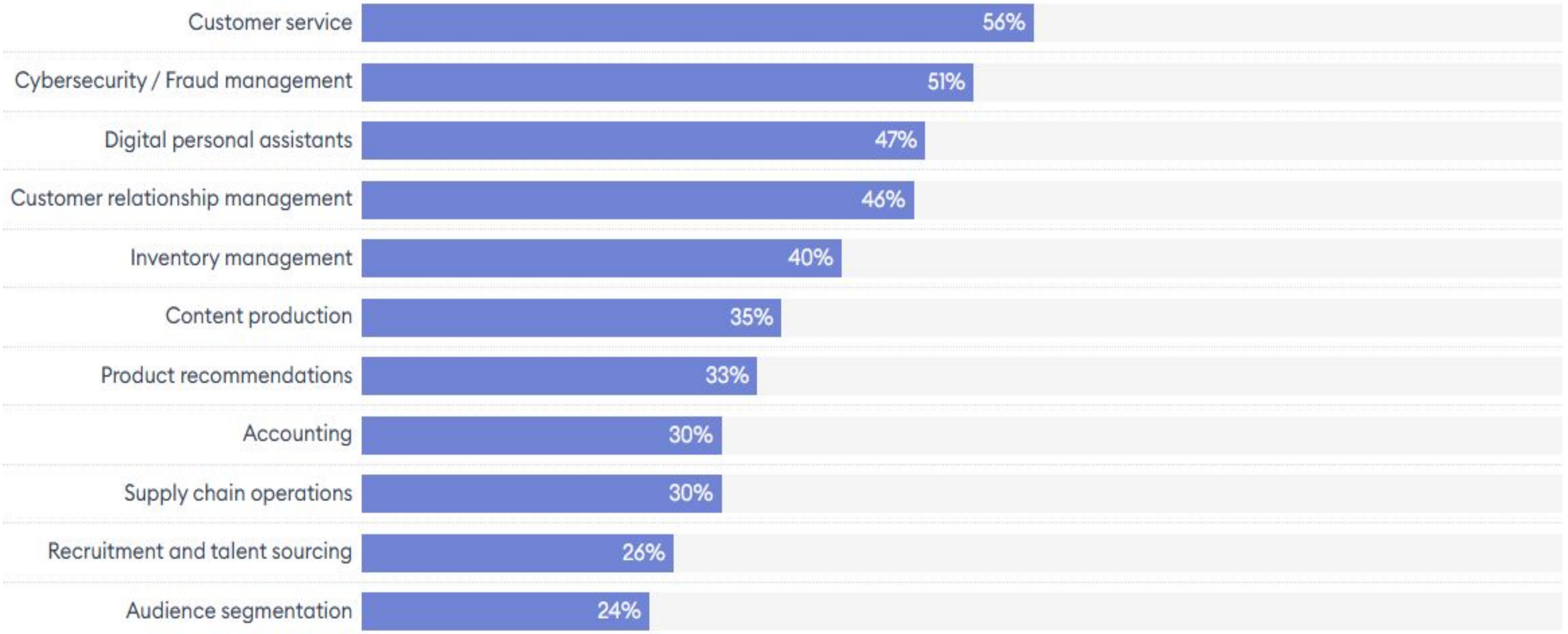
Forbes ADVISOR

Top Ways Business Owners Use Artificial Intelligence

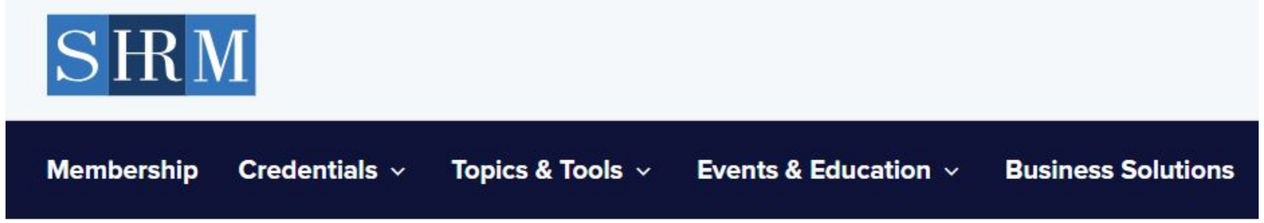
Forbes Advisor surveyed business owners to find out how they currently use or plan to use AI within their business



Source: Forbes Advisor • Embed

Forbes ADVISOR

https://www.forbes.com/advisor/business/software/ai-in-business/



IN FOCUS

Employers Want New Grads with AI Experience, Knowledge

February 20, 2024 | Kathy Gurchiek

A survey of 1200 professionals from the Washington State University Carson College of Business, in partnership with KRC Research found:

- **88%** think U.S. colleges and universities should provide educational opportunities for students to learn about AI and its practical uses
- **83%** think students should be prepared to use AI upon entering the workforce, and they expect higher education to play a critical role in that preparation
- **74%** think incoming college graduates should already have AI user experience prior to entering the workforce
- **56%** of professionals said they already are using AI for tasks such as analyzing data and to produce content or communications

https://www.shrm.org/topics-tools/news/technology/employers-want-new-grads-with-ai-experience--knowledge

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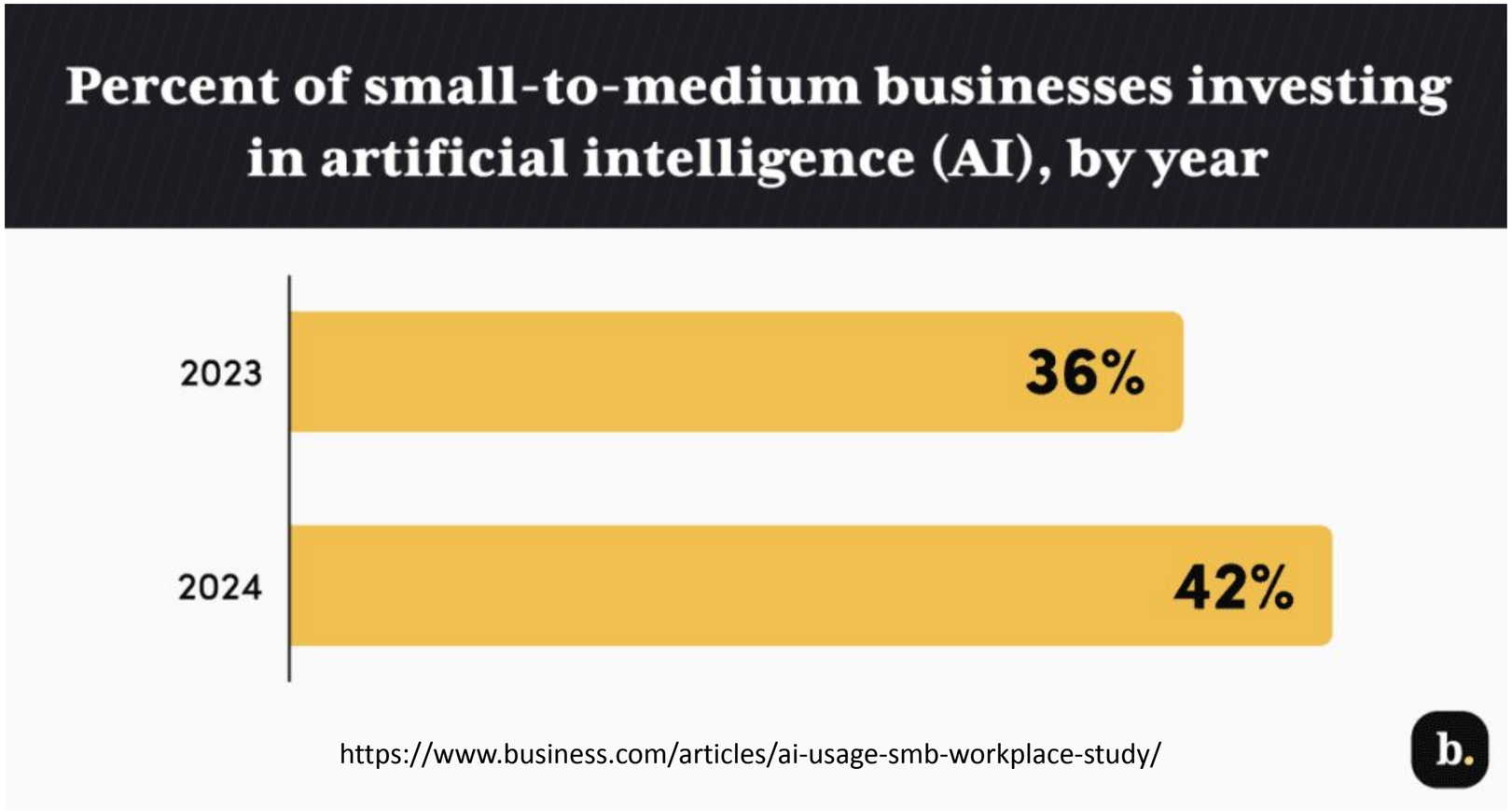
Updated Sep 16, 2024

AI Boosts Small Business Productivity, But Employee Training Lags Behind

42% of small-to-midsize businesses adopt AI with promising results, but over half of workers feel unprepared to fully harness its capabilities.



https://www.business.com/articles/ai-usage-smb-workplace-study/

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Why This Matters

- **Creating Real-World Learning Opportunities for Students**
- **Empowering SMBs with Affordable AI Solutions**
- **Fostering Collaboration Between Academia and Industry**
- **Advances UNA's and SBAA's Mission of Innovative Education and Leadership**

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The Challenges

Limited Opportunities

Additional Class Time

Resources

SMB Engagement

Huge Capital Startup Costs

Funding

Undergraduate Students

Faculty

New / Unknown Technologies

Time

Student Engagement

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Do you want cheese and crackers to go with your "whine"?

- Dr. Doug Barrett (our new Dean)

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The Goal

To create small, highly focused Generative AI models that can be trained and used for specific business tasks that are:

- *highly secure, and not cloud-based,*
- *work on hardware for less than $3000,*
- *use open-source software,*
- *run as fast as ChatGPT with higher accuracy,*
- *useful for SMB use cases,*
- *so easy a “Dean” can do it!*

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AI Model Testing and Valuation

Hardware:

- *Old donated servers with outdated GPUs*
- *3-year-old lab desktop computers with old GPU graphics cards*
- *New Cybersecurity Lab PCs with updated GPU cards (< $3000 in cost)*

Software:

- *Nearly a dozen AI models and LLMs were tested over 9 months.*
- *Most were determined to require extremely high-dollar GPUs and servers*
- *The Meta Llama 3.1 model was one of the few that worked on the low-cost hardware platforms.*
- *Test Cases were identified to test and validate the systems*

Examples of Recycled Systems and Lab PCs

"Free" Servers from our IT Department

- 128 Gigabyte of RAM
- 16 Core Processors
- Dual NVIDIA Tesla M60 GPUs

New Cybersecurity Lab PCs

- 64 Gigabyte of DDR5 RAM
- 12 Core Processors
- Dual NVIDIA RTX 4080 Supers GPUs

Test Case # 1: Human Resources

The Business Problem:

HR has dozens of PDFs outlining all the benefits, procedures, costs, deadlines, blah…blah…blah… As an employee, how can you find out anything without going through hundreds of pages of documents or calling all the time?

The Solution:

Downloaded all the PDFs and trained a chatbot utilizing our platform that can be integrated into the employee portal.

The Result:

Employees can easily access information about their benefits 24/7 by simply querying the company intranet webpage. All information is kept within the company's internal systems.

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Test Case # 2: Radio Shows and Podcasts

The Business Problem:

A local business expert donated over 15,000 radio shows and podcast interviews he had done on business and technology between 1994 and 2024 to the University for research. However, these audio recordings are very difficult and time consuming to do research with.

The Solution:

Students wrote Python programs to clean up the noise, convert them to text, and then add metadata to mark the interviewer and guest speaker's words. These text files were then utilized to train the Generative AI Large Language Model (LLM).

The Result:

The LLM can be used to query the data much like ChatGPT to provide aggregation of data, look at trends over time, etc.

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Test Case # 3: 24/7 Customer Service

The Business Problem:

An Engineering Services firm with eight employees needed to provide 24/7 customer support for its drones used in forestry and oil exploration. Hiring employees to do Tier 1 support was estimated to cost $250k annually.

The Solution:

Students trained the G-AI model with their manuals, past trouble tickets and resolutions, and customer support emails to create a Customer Service Chatbot for their customer service portal.

The Result:

The new ChatBot could answer most Tier 1 and many Tier 2 questions.
If a valid solution could not be found after three tries, the customer was automatically given the phone number of the employee on call.

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Test Case # 4: Creation of "Bodies of Knowledge"

The Business Problem:

Many businesses have vast amounts of textual data in manuals, books, procedures, and regulations that need to be kept secure. Finding information quickly across these documents is extremely time-consuming and uploading them to a 3rd party AI would pose security problems.

The Solution:

Students trained the G-AI model with Cybersecurity eBooks to create a highly focused model that can provide detailed responses with references to the documents.

The Result:

The trained model worked on a $3000 desktop computer at a higher accuracy than ChatGPT and at nearly the same performance.
The information and model is securely ran inside the company.

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Pulling It All Together

Now that the Gen-AI Research Lab was up and going…

- *We needed to get real-world solutions for students to work on.*

- *A way to get businesses involved and their solutions developed for a fraction of the cost of other solutions.*

- *Payments for work performed that benefit both the students and the businesses*

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UNA Partnerships – The Ultimate Collaboration

The Institute for Innovation and Economic Development

Focused on small business growth with many local partnerships and SMB interaction.

The UNA Foundation

A nonprofit organization created to accept tax-exempt gifts to the University.

The Institute Fellows Program

Provides opportunities for students to be paid while helping local organizations solve real-world problems. Student payments are put directly into their university accounts, similar to scholarships.

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The Model

Business with AI Use Case

Pays Foundation for Institute Fellowship

Business Contracts with UNA

University of NORTH ALABAMA FOUNDATION

Solution is provided to Business

Institute for Innovation and Economic Development

Student Researches and Creates Solution

A Faculty Mentor Is Assigned

Funds Deposited into Student Account

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Steps for Success

Embrace your role as the visionary for your University, feeling empowered and inspired by the potential of AI.

Identify the right faculty member to lead the process.

- They will have a great passion for AI and its capabilities
- They must love working with students
- A little bribery goes far!

Find local partners!

- Chamber of Commerce
- Business Incubators
- Small Business Development Centers (SBDC)
- Local Banks (They have $$$ and LOVE to help!)

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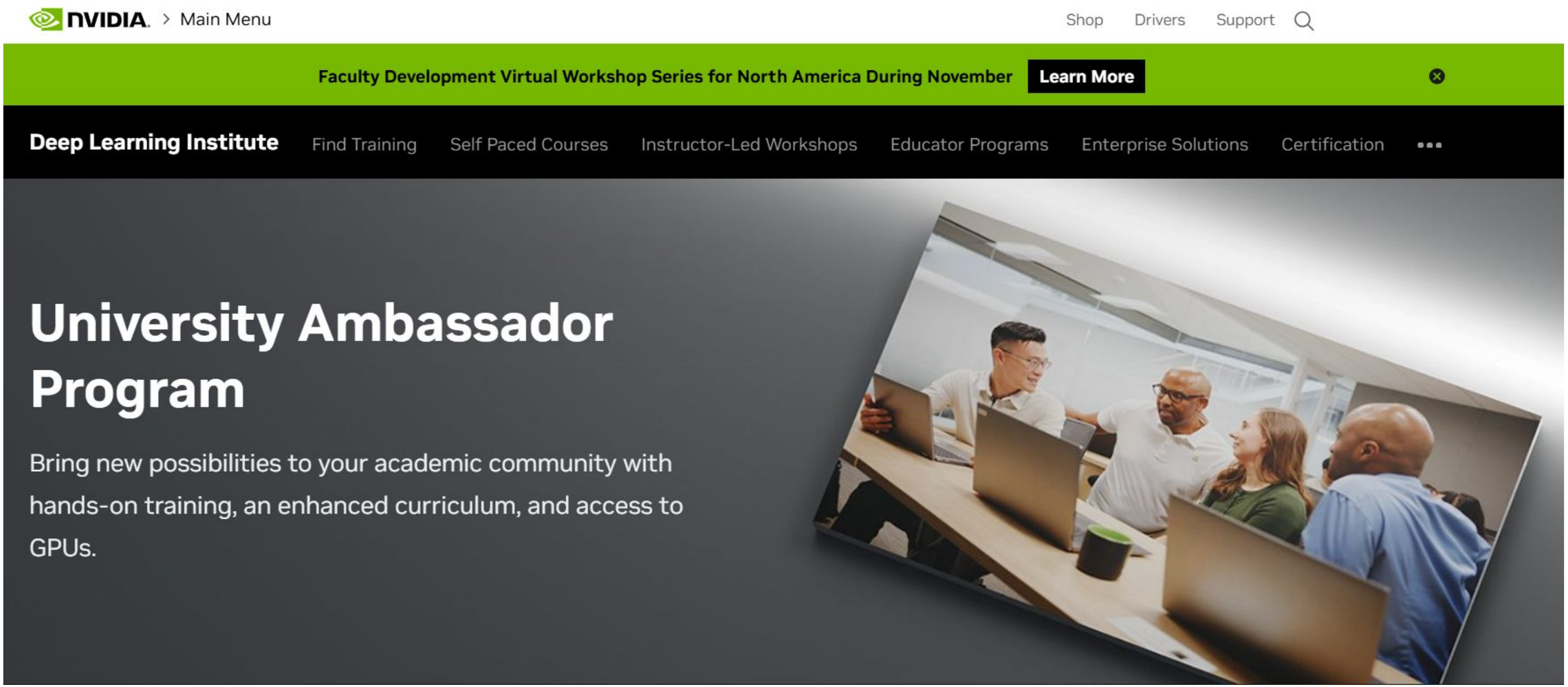
NVIDIA – Free Resources for Universities



https://www.nvidia.com/en-us/training/educator-programs/university-ambassador-program/

NVIDIA – Free Resources for Universities

https://www.nvidia.com/en-us/training/teaching-kits/

Instructions for Setting Up an AI Research Lab

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