THE UNIVERSITY OF TENNESSEE KNOXVILLE

COLLEGE OF EMERGING & COLLABORATIVE STUDIES

WHITE PAPER

VISIONING THE FUTURE OF HIGHER ED-INDUSTRY PARTNERSHIPS

INDUSTRY LEADERS SHARE THEIR TALENT NEEDS OF THE FUTURE AND HOW HIGHER ED CAN FULFILL THEM THROUGH PARTNERSHIPS WITH INDUSTRY

By: The College of Emerging and Collaborative Studies

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EXECUTIVE SUMMARY

In December 2023, the University of Tennessee's College of Emerging and Collaborative Studies (CECS) hosted over 50 industry professionals from small businesses, start-ups, corporations, non-profits, and the government sector to discuss how CECS and industry can partner to prepare students for emerging careers of the future and close the widening talent gap.

UTK Chancellor Donde Plowman gave opening remarks, speaking on the innovative nature of CECS and the exciting opportunities to partner with industry to equip students with the skills needed for emerging careers. UTK Provost John Zomchick echoed Chancellor Plowman's sentiments and encouraged industry to be a part of breaking the higher education mold, citing CECS as a bold investment for the future workforce of the state of Tennessee.

Interim Vice Provost for Academic Affairs and CECS Dean Ozlem Kilic presented on the state of higher education and showcased why the CECS structure is ground-breaking in a VUCA era. She shared that undergraduate enrollment dropped by 15% from 2010 to 2021 and that Tennessee saw a decrease in enrollment of 5% from 2019 to 2021. However, 86% of college graduates believe a degree was a good personal investment, and data shows that college graduates earn more long-term and experience lower unemployment.

Changing Higher Ed

Higher education needs to change to meet the needs of the future workforce.

Skilled Workers

Organizations need workers skilled/reskilled in emerging fields such as artificial intelligence and data science.

Partnership

Partnership between industry and higher ed is pivotal to develop curriculum and hands-on opportunities for students.

Primary areas of need emerged:

- Identifying and implementing AI solutions
- AI and Workflow
- Data Management
- Privacy and Security
- Keeping Up With Emerging Technologies
- Upskilling/Reskilling Workforce

Dr. Ozlem Kilic, Interim Vice Provost of Academic Affairs and Dean of the College of Emerging and Collaborative Studies

Kilic also shared plans for CECS degrees in Applied Artificial Intelligence, Data Science, and Innovative Transdisciplinary Studies, a CECS signature degree that is fully customizable, catering to both students and industry needs, along with stackable certificates in areas such as Applied Cybersecurity, Data Science, AI in Medicine, AI in Music, Literacy in Emerging Technologies, Sustainability, and Game Craft.

A panel discussion on industry needs followed. The afternoon was spent in breakout sessions on *Technology Trends and Innovations in the Marketplace* and *Research Curriculum Development, Skills Gaps/Industry Needs, and Student Engagement*.

Current Landscape and Future Strategies for Higher Ed-Employer Partnership Models Panel. (From L to R):Dr. Ozlem Kilic, Interim Vice Provost of Academic Affairs and Dean of the College of Emerging and Collaborative Studies; Edmon Begoli, Director of ORNL's Center for AI Security Research (CAISER); Amy Henry, Director of Transformative Innovation at the Tennessee Valley Authority; Wolfgang Maluche, Vice President of Engineering for Volkswagen Group of America; Mike Odom, president and CEO of the Knoxville Chamber, Britton Garrett, Chief Executive Officer of iO Urology

PANEL DISCUSSION

The panel focus was *Current Landscape and Future Strategies for Higher Ed-Employer Partnership Models*. Industry partners heard from panelists Mike Odom, president and CEO of the Knoxville Chamber, Amy Henry, Director of Transformative Innovation at the Tennessee Valley Authority, Wolfgang Maluche, Vice President of Engineering for Volkswagen Group of America, and Britton Garrett, Chief Executive Officer of iO Urology on the current and emerging talent gaps they see in their industries, and their visions for the future.

"VUCA, volatility, uncertainty, complexity, and ambiguity are hot topics and we need to focus on teaching people to think openly, being ready to adapt, and execute and progress to address it."
- *Amy Henry, Director of Transformative Innovation, Tennessee Valley Authority*.

"We (VW) do a lot of testing on public roads using towers, connectivity, etc. to understand the customer perspective. We generate terabytes of data on each road test. We need to have students who have skills to dig through the terabytes of this data in a way that can help us make meaningful decisions."- *Wolfgang Maluche, VP of Engineering for Volkswagen Group of America*

"The fastest-growing occupation in the next 10 years will be computer and information sciences. Accenture is committing 3 billion dollars to hire 80,000 data and AI scientists. In Knoxville, there is an increase in population, but 55+ is the majority, so an increasing number are entering retirement. We need to fill that gap with new talent."
- *Mike Odom, President & CEO, Knoxville Chamber*

"AI is changing everything, but how the changes will be applied is unknown. Professionals usually seek to hire experience, but with AI, no one has experience. Organizations are learning as they go. We are looking for students who can leverage tools and understand how those tools can be applied to accelerate the benefit of these tools to the organization." - *Britton Garrett, Chief Executive Officer of iO Urology*

The Findings

The emergence of artificial intelligence and its evolving impact on the future of work is a top-of-mind priority among organizations. 75% of those surveyed indicated that they are interested in how AI can benefit both their employees and their overall organization.

In addition to a desire to learn more about AI and how it can help their organization, 88% said they are already exploring ways to implement AI in their organizations ranging from AI solutions as a product to workflow.

Employers are seeking to both reskill/upskill their current employees around AI concepts and to also hire recent graduates who have skills in integrating AI with other disciplines. There is also interest in ways to use AI for project management and data analysis.

To address this need, CECS offers a Bachelor of Science degree in Applied AI that provides a foundational understanding of AI concepts, data sources, and tools as well as a certificate in Applied AI. Students in this program will also receive hands-on experience through internships, capstones, and research projects. CECS will partner with industry to offer these unique opportunities.

CECS also offers a certificate in Applied AI.

Artificial Intelligence Needs

AI Principles

There is interest in learning what AI means for business, how it works, and its potential benefits to an organization

AI Solutions

Using AI to solve workflow challenges and improve outcomes.

Privacy & Ethics

Emphasis on understanding the ethics and privacy concerns of AI.

Upskilling/Reskilling

Skilling employees in AI and the technology integration into existing business plans

The CECS Certificate in Applied Artificial Intelligence is an option for organizations to upskill/reskill current employees.

The Findings

With the rise of large data sets available in all sectors, organizations are looking for solutions to their data needs which include the ability to work with unstructured data, using data to make projections, understanding data security, and beyond.

Data Management Needs

Unstructured Data

The need to work with unstructured data to make something useful

Projections

Using data to make projections

Integration

The ability to integrate AI/LLM technologies

Using AI in Data

The use of AI to develop code and other starting points for projects

Vetting

The ability to vet data for accuracy and determine/address errors

Security

Emphasis on the security of data both public and private

Data management is a growing area of interest for both students and employers. Employers are seeking workers who are savvy with handling large volumes of data and utilizing that data to make projections and provide informed recommendations.

Organizations are also interested in how AI can be used to develop code and other starting points for data projects such as data mining and data analysis, emphasizing the need for workers with skills in applied AI.

Another area of opportunity is data security and how data, both public and private, can be kept secure.

In response to the growing needs of organizations and student interest, CECS offers a Bachelor of Science degree in Data Science, a minor in Data Science, and a certificate in Data Science to prepare students for careers in data and/or utilizing data to make decisions and share findings.

The CECS Certificate in Data Science can be utilized by organizations to upskill/reskill the current workforce.

HOW CAN CECS HELP?

As a new college, CECS offers a blank slate for new curriculum responding to the emerging talent gap. We have the ability to move fast, be agile, and be innovative and adaptable as we work with industry to identify and address future workforce needs, including staying abreast of emerging technologies.

How CECS and Industry Can Partner

Student Engagement

- Internships
- Classroom Participation
- Mentorship
- Industry-Sponsored Research
- Scholarships

Curriculum Engagement

- Workshops
- Board of Visitors
- Program Advisory Boards
- Adjunct Teaching Opportunities
- Sponsored Custom Certificates

Market Analysis

- Reviewing curriculum topics
- Recommended topics on emerging needs in the market.

Other

- Place-based learning or research
- Reskilling of existing employees that is flexible for working professionals

CECS offers students from all backgrounds a customizable education with a cohort experience and emphasizes hands-on, immersive experiences through internships, research, service projects, and capstones.

In addition to our undergrad degrees, CECS offers stackable certificates in areas such as AI, data science, and emerging topics that provide an opportunity for employees to upskill/reskill.

CECS also works closely with industry leaders to serve their growing talent needs and to provide students with internships, capstones, research opportunities, and service projects to ensure they are well-prepared for industry needs upon graduation.

To learn more about CECS and how CECS and industry can work together, email us at cecsinfo@utk.edu.

CECS ACADEMICS & PROGRAMS

CECS will launch three innovative, future-thinking Bachelor of Science degrees in Fall 2024 as well as eight stackable certificates. Because of the college's mission to be fast and agile in response to the rapidly changing landscape of the future of work, additional certificates, minors, majors, and graduate degrees will be introduced in the coming years. We invite our partners in industry to continue the conversation on how to engage with our existing programs as well as to help shape the curriculum of the future.

B.S. in Applied Artificial Intelligence

Offers a foundational understanding of AI concepts, data sources, and tools and accentuates real-world applications across various disciplines. Delves into the methods and components of AI solutions, assessing potential sources of bias, social impacts, and other ethical considerations related to AI. These skills are integral to the burgeoning sector of applied AI. *Certificate and Minor in Applied AI also available.*

B.S. in Data Science

Aims to provide comprehensive training in data analysis, preparing them for careers in diverse sectors. Focuses on teaching students to convert raw data into meaningful insights using advanced techniques like data mining and machine learning. Offers flexibility for students to specialize in areas of interest through electives and practical experience via internships and capstone projects. The program responds to the increasing demand for data science professionals in a data-driven world. *Certificate and Minor in Data Science also available.*

B.S. in Innovative Transdisciplinary Studies

CECS Signature Degree. A customizable degree to prepare students for future employment opportunities based on the need for a workforce skilled in multiple emerging areas of expertise. Student interests across disciplines will be facilitated by an innovative curriculum designed to be modular with stackable certificates. Students can earn (stack) multiple certificates to develop a customized skill set, e.g., a certificate in Applied AI can be stacked with certificates in Game Craft and AI Integration in Music to create specific expertise for a student.

**Bachelor of Science Degrees pending final THEC approval, expected in May 2024*

CECS STACKABLE CERTIFICATES

- Applied Artificial Intelligence
- AI and Medicine
- AI Integration in Music
- Applied Cybersecurity
- Data Science
- Game Craft
- Literacy on Emerging Topics
- Sustainable Development

Interested in partnering with CECS?

Website: CECS.UTK.EDU

Email: CECSInfo@UTK.edu

APPENDIX

The College of Emerging and Collaborative Studies would like to extend a special thank you to Chancellor Donde Plowman and Provost John Zomchick for their time and support of CECS. We would also like to extend our gratitude to our panelists, Mike Odom, Amy Henry, Wolfgang Maluche, and Britton Garrett, and to Edmon Begoli for co-moderating the panel with Dr. Kilic.

Additionally, we want to extend our sincere appreciation to the organizations that provided their time and insight:

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