Connecticut Academy of Science and Engineering Briefing:

An Initial Overview of Artificial Intelligence Skills Development and Use in Connecticut

Presented to the Artificial Intelligence Working Group,
Joint General Law Committee of the Connecticut General Assembly

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January 10, 2024

Briefing Background

Connecticut Academy of Science and Engineering (CASE) was created by CT General Assembly Special Act No. 76-53

- CASE's mission includes providing guidance when requested on issues of science and technology for the people and the state of Connecticut

- Co-Chairs, Artificial Intelligence Working Group requested that CASE provide an initial overview of who was doing what related to Artificial Intelligence Skills Development and Use in Connecticut

Research for the Briefing

- Interviews conducted with
    - 5 CT companies/health systems with 1,000 or more employees
    - 6 private and public, 2- and 4-year CT colleges and universities
    - 6 CT public school districts
    - Regional education service center
    - Commission empowered by the Connecticut General Assembly to oversee integration of technology in the state's schools, libraries, colleges, and universities.

- Survey of small businesses and industries (<100 employees)

- ***The AI Working Group should be cautious as it considers the information contained in this presentation and the briefing document as the sample size was small.***

Briefing Background

Methodology for the Interviews and Survey

- The AI Working Group edited and provided comments on the research focus for all three sectors

- Interview questions were developed for the 3 sectors; interviewees received the questions prior to the interviews; and a summary was submitted to the interviewees for their review and edit following the interview

- Small business and industry survey
  - CASE worked with the CT Data Collaborative on the first draft of the survey
  - The CT Business and Industry Association (CBIA) partnered with CASE on the survey and further refined it
  - CBIA transmitted the survey to 2000+ CBIA members and submitted aggregated results to CASE
  - 82 businesses and companies responded. The low response rate was attributed to the time of year (holidays) and the technical nature of the survey. The survey, or some version of the survey, should be used in the future to continue to monitor the needs of CT businesses and industries.

Deliverables

- AI Working Group Briefing (today)
- CASE AI Briefing Report – January 15, 2024

Connecticut PreK-12 Districts

AI Implementation – Current Status

- Districts are at the exploration stage, with all intending to use AI across the curriculum in all disciplines and grade-levels; districts reported some use of AI in business operations, including communications and contract reviews

- Five of 6 districts are planning or have in place frameworks to provide guidance for responsible use, ethical considerations, and professional development.

- One district has an AI Policy, with the other districts waiting for more information before establishing a policy, relying instead on more general policies, such as existing honesty and technology policies.

Opportunities: Innovations in Teaching and Learning

Challenges

- Data Privacy and Security
- Educational and Operational Technology Leadership and Expertise
- Digital Access and Equity

- Ethical Dilemmas and Bias
- Impact on Critical Thinking and Cognitive Abilities
- Multiple major impacts on schools
- Plagiarism and Cheating

Engagement with Business and Industry, and Institutions of Higher Education

Limited, with one district partnering with the Connecticut Community College – local campus and several districts partnering with local businesses for internships, work-based learning opportunities and job shadowing.

Connecticut PreK-12 Districts

Skills
- Awareness of AI
- Critical Thinker
- Digital Citizenship

- Project-based Learning Skills
- Prompting

Professional Development Strategies
- In-district
- Collaborative Forums/networking
- State-Level

Policy Suggestions
- Digital Divide: Important to address the potential of AI to magnify inequalities.
- Guidance for AI framework development and support for Sharing Best Practices.
- Balance of innovation versus safety and security: Districts recognize the difficulty securing the right balance; although no suggestions, several districts thought a revisit to recommendations contained in the Student Data Privacy Task Force report released March 25, 2019, would be of value.
- Multiple Major Impacts on Districts: Staff are overwhelmed by multiple challenges, including the aftermath of the pandemic, care for the social, mental, and physical well-being of their students, social media, and now the onset of generative AI. Respondents requested caution when developing new policies and mandates, and that policymakers proactively seek to avoid unintended consequences that will add additional pressures on educators.

Connecticut Institutions of Higher Education

AI Implementation – Current Status

- Goal for campuses is to be innovative in their practices, while ensuring responsible and ethical use of artificial intelligence, including data privacy.

- Exploration stage of planning for AI on their campuses with efforts focused on providing opportunities for faculty to explore the use of AI tools

Opportunities

- Equity and Accessibility
- Innovation in Teaching and Learning

- Interdisciplinary Opportunities
- Productivity Improvements

Challenges

- Data Privacy and Security
- Ethical, Safe and Responsible Use
- Digital Divide, Equity and Access
- Environmental Impact

- Human-Centered Approach
- Provenance
- Resource and Cost Challenges
- Transparency

Engagement with Business and Industry; PreK-12

Limited engagement, with one university reporting an active partnership with a high school local to their campus and several respondents noting an active partnership with Skills 21 at EdAdvance, a Regional Education Service Center.

Connecticut Institutions of Higher Education

Skills

- Critical Thinking and Evaluation
- Data Analysis and Utilization
- Data Privacy

- Digital and Media Literacy, and Ethical and Responsible Use
- Prompt Engineering

Professional Development Strategies

- Collaborative Learning
- Teaching and Learning Centers

Policy Suggestions

- **Policy and Framework Development**: State development of AI policies and frameworks - specifically guardrails - will help guide development of IHE policies and frameworks

- **Collaboration and Knowledge Sharing**: State should encourage collaboration and knowledge sharing across educational institutions

- **General Education Requirement**: Basic Technology Skills

- **High-Performance Computing Centers and Resource Challenges**: Support the building and maintenance of a state-based, high-performance computing center.

- **Engagement with Technology Companies**: State-level efforts should be made to connect large technology companies with the state's IHE's to assist in the preparation of an AI skilled workforce

Connecticut Business and Industry

AI Implementation – Current Status

- Using a "human-in-the-loop" approach where AI supports human decision-making.

- **Large Companies**: Taking a pragmatic approach in the context of the historical development of AI; being considered across various business and logistical functions and is viewed as a tool to enhance efficiency, improve services, and drive innovation
    - Core Business Competency: Machine learning is being used as a first pass for analyzing data and predictive maintenance; AI - enhanced imagery
    - Non-Core Business Processes: Customer service functions, HR queries, training and on-boarding of employees, and enabling staff to interact faster with lengthy, multiple page documents

- **Small Companies:** AI Survey (82 companies): 20% using AI; 35% expecting to use AI; 45% will not be using AI in the next 5 years

Challenges

- Security and Data Privacy
- Ethical Considerations
- Quality Control and Verification

- Digital Divide and Accessibility
- High-Performance Computing
- Limited Capacity for AI Use

Connecticut Business and Industry

Future Workforce -- Skills & Training

- Optimistic that AI will have a positive impact on the future workforce. Rather than job displacement, retraining and upskilling are emphasized as necessary for adapting to the new tools and technologies.

- **Skills Needed:** Data analytics, digital literacy, analytical thinking, critical thinking and evaluation, and prompting will become increasingly important for all employees

- **Training:**
  - <u>**Large Companies:**</u> Multi-faceted approach to training with internal training programs used for non-engineering staff and external courses and professional development for highly technical staff
  - <u>**Small Companies**</u>: Business functional training (marketing, sales, customer service), manufacturing (operations management, production, quality control), and IT training needed within the next two years. Most common training methods are consultants, outside workshops, vendor certification, and in-house training

Suggested AI Policies

- **Governance and Artificial Intelligence Guidance:** Larger companies rely on internal structures in providing guidance for AI adoption

- **Educating the Public on Data Privacy**: Campaign to alert the public about issues of data privacy, including educating the public on a person's right to data privacy, protecting their data, safely using generative AI, identifying AI misinformation, disinformation, and deep fakes

- **Possible State Investments:** High Performance Computing; AI Research and Student Preparation

Questions/Contact

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