

The Impact of Artificial Intelligence on the Future Workforce: The Case of Advanced Manufacturing

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ABSTRACT

This research examines the extent to which Artificial Intelligence (AI) technology could impact different advanced manufacturing (AM) workforce competencies and technicians' readiness for AI. A sequential explanatory mixed-method approach is applied to understand what knowledge, skills, and abilities of the AM workforce could be replaced or augmented by AI technology, and how the skill profiles of available AM jobs could change in the presence of AI deployment. The first phase of the research applies natural language processing to examine the competency requirements inherent in AI patents and comparing them to the U.S. Department of Labor's AM Job Competency Model. The second phase builds upon the findings of the first phase through the expert panel review conducted by the focus group interview. The study found that while there is not complete topical overlap between the AI patents and the AM Competency Model, they do reflect each other in some of the key areas such as data, device, information, and system. Also, AI technology has the potential to perform certain activities related to identify, process, and control. Moreover, AI technology functions overlap with a significant proportion of academic competencies, workplace competencies, and industry competencies, with 76%, 70%, and 93% respectively. These results suggest that although AI has the potential to perform competencies in various AM domains, it does not necessarily imply the replacement of human workers. The integration of AI in these domains will require careful consideration of the roles of both AI and human workers to optimize process efficiency and quality.

ALISE RESEARCH TAXONOMY TOPICS

Artificial intelligence; Political economy of the information society; Computer-supported collaborative work; Education programs/schools; Natural language processing.

AUTHOR KEYWORDS

Workforce Development; Advanced Manufacturing; Job Competency

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