Chapter 1
Leveraging Natural Language Processing in Practical Skills Education and Training

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ABSTRACT

This chapter explores the transformative role of Natural Language Processing (NLP) in skill-based education and training, emphasizing personalized, adaptive, and competency-focused learning. It examines emerging trends such as multimodal NLP, AI-powered coaching, and adaptive microlearning, which enhance engagement, provide real-time feedback, and support scalable learning environments. The chapter highlights opportunities for data-driven assessment, interactive practice, and tailored instruction while addressing challenges related to language diversity,

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contextual understanding, ethical design, and data privacy. Recommendations for educators and developers emphasize the responsible and effective use of NLP's educational impact.

INTRODUCTION

The concept of skill-based education and training has taken center stage in contemporary learning paradigms, whereby having a practical competence that is crucial to professional and personal growth is not only taught through theoretical knowledge (Barbee & Martin, 2013; Selim, 2020). In contrast to the traditional models of education, which tend to focus on elements of rote learning and standardized scoring, the skill-based models focus on experience, critical thinking, and the capacity to utilize the knowledge in practice. This transformation is associated with the growing need of industries and workplaces to hire workers who are able to complete their duties and tasks, keep up with changes in various challenges, and demonstrate a certain level of skills.

Simultaneously, the idea of individualized learning has become prominent, as teachers have realized that learners possess different abilities, previous knowledge, and learning preferences. The use of competency-based approaches, where the determination of progress is based on the mastery of the skills displayed over time as opposed to time spent in a classroom, also indicates that there is a necessity to have educational approaches that are flexible enough to potentially adapt to the needs of individual learners. In this regard, technology-based solutions are vital in providing scalable, flexible, and custom leadership experiences that facilitate not only the acquisition of skills but also sustained enhancement (Divayana et al., 2021; Hadžiomerović et al., 2023; Prasittichok et al., 2024; Romli et al., 2022).

Artificial intelligence in the form of Natural Language Processing (NLP), which is concerned with processing, interpreting, and producing human language, has a massive potential in improving practical skills learning. Through NLP, learning devices can determine learner feedback, give real-time feedback, and offer adaptive content that matches the individual's progress. They are applied in automated writing and language testing as well as smart tutoring platforms and chatbots simulating the environment of a workplace or a professional interaction. Platforms powered by NLP not only promote the building of cognitive skills but also good communication, critical thinking, and problem-solving skills, bridging the disconnect between theoretical learning and practical competence (Alqahtani et al., 2023; Jose Gonzalez-Gomez et al., 2024; Shaik et al., 2022).

This chapter addresses the transformative nature of NLP in skills-based education and training, the applications, advantages, and challenges of NLP in these areas. It