




Improvement of knowledge in NLP based on AI for students and teachers in the fashion department

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ARTICLE INFO	ABSTRACT
<p>Article history Received: 2024-02-15 Revised: 2024-08-23 Accepted: 2024-10-25 Published: 2024-12-27</p> <p>Keywords Artificial intelligence Fashion industry Natural language processing</p>	<p>The fashion department at SMK Negeri 1 Warureja faces significant challenges in understanding and applying Artificial Intelligence (AI)-based Natural Language Processing (NLP) among its students and teachers. Despite the potential benefits of NLP technology for the fashion industry, the limited knowledge and skills concerning NLP tools at SMK Negeri 1 Warureja impede effective utilization. This Community Service Program (CSP) is strategically designed to address these gaps by providing targeted training on NLP tools such as ChatGPT, Chatbot, and Brand24.com within the fashion context. This CSP activity applies the technique of training an initial evaluation through a pre-test assessed participants' baseline understanding prior to the training. During the practical tutorial phase, participants received hands-on training with NLP tools, including practical guidance to ensure real-world application of these concepts. Evaluation results indicated a significant improvement in participants' understanding and skills. The post-test average of 80.47 points showed a significant improvement of 32.19 points over the pre-test average of 48.28 points.</p>
<p>Kata Kunci Industri tata busana Kecerdasan buatan Pemrosesan bahasa alami</p>	<p>Peningkatan pengetahuan NLP berbasis AI bagi siswa dan pengajar jurusan tata busana. Jurusan tata busana di SMK Negeri 1 Warureja menghadapi tantangan yang signifikan dalam memahami dan menerapkan Natural Language Processing (NLP) berbasis Artificial Intelligence (AI) di antara para siswa dan gurunya. Meskipun teknologi NLP berpotensi memberikan manfaat bagi industri tata busana, keterbatasan pengetahuan dan keterampilan mengenai perangkat NLP di SMK Negeri 1 Warureja menghambat pemanfaatannya secara efektif. Program Pengabdian kepada Masyarakat (PKM) ini dirancang secara strategis untuk mengatasi kesenjangan ini dengan memberikan pelatihan yang terarah tentang perangkat NLP seperti ChatGPT, Chatbot, dan Brand24.com dalam konteks tata busana. Kegiatan PKM ini menerapkan teknik pelatihan evaluasi awal melalui pra-tes yang menilai pemahaman dasar peserta sebelum pelatihan. Selama fase tutorial praktis, peserta menerima pelatihan langsung dengan perangkat NLP, termasuk panduan praktis untuk memastikan penerapan konsep-konsep ini di dunia nyata. Hasil evaluasi menunjukkan peningkatan yang signifikan dalam pemahaman dan keterampilan peserta. Rata-rata pasca-tes sebesar 80,47 poin menunjukkan peningkatan yang signifikan sebesar 32,19 poin dibandingkan dengan rata-rata pra-tes sebesar 48,28 poin.</p> <p style="text-align: right;">Copyright © 2024, Af'idah, et al This is an open access article under the CC-BY-SA license</p> 

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INTRODUCTION

Artificial Intelligence (AI) has rapidly evolved as a cornerstone of technological advancement, finding extensive applications across diverse sectors (Niham, 2023). The last few decades have witnessed AI's transformative potential, driven by the continuous development of sophisticated computational devices such as computers, smartphones, and cloud-based systems, which have become fundamental to modern life. The integration of AI into daily applications, from voice recognition systems like Apple's Siri and Google Assistant to autonomous vehicles and predictive analytics,

exemplifies the profound impact of this technology (Bini, 2018; Gruetzemacher & Whittlestone, 2022). Central to AI's advancement are complex methodologies, particularly machine learning and deep learning, which enable machines to learn from data and make decisions with minimal human intervention. While these techniques hold immense promise, they are inherently complex, especially for individuals new to the field. Nonetheless, the applications of AI, particularly in domains such as Computer Vision (CV) and Natural Language Processing (NLP), continue to drive significant technological innovations and offer efficient, scalable solutions to various real-world problems (Ekawati & Khodra, 2017).

Among the diverse branches of AI, Natural Language Processing (NLP) has gained prominence as a key enabler of human-computer interaction. NLP is the subfield of AI concerned with the ability of machines to understand, interpret, and generate human language in a way that is meaningful (Alyasiri et al., 2024). This technology forms the backbone of several critical applications, ranging from chatbots and virtual assistants to automated translation services and advanced search engines (Zhang et al., 2018). By enabling machines to process and respond to natural language inputs, NLP has revolutionized industries by facilitating seamless interaction between humans and machines. In today's world, where the ability to access and analyze vast amounts of unstructured data is crucial, NLP serves as a vital tool for extracting insights, enhancing communication, and automating routine tasks in a wide range of fields. For instance, social media analytics, content generation tools, and sentiment analysis engines leverage NLP to improve user experience and operational efficiency (Af'idah et al., 2020; Afidah et al., 2022; Ibrohim & Budi, 2023).

The growing relevance of NLP in everyday technology underscores the need for a deeper understanding of its capabilities, particularly among the younger generation, who will drive future innovations in this space. However, despite the increasing integration of NLP and AI technologies in the global workforce, there exists a notable gap in foundational knowledge of these technologies among students in certain vocational education settings, such as SMK Negeri 1 Warureja, particularly in the Fashion Department. This gap is significant, as AI and NLP are becoming essential tools not only in traditionally technology-focused industries but also in creative fields like fashion, where data-driven insights and automated processes are transforming business operations and customer engagement (Khurana et al., 2023). Addressing this gap by equipping students with a working knowledge of NLP technologies is vital to preparing them for the evolving demands of the job market. This study seeks to address the existing knowledge gap by introducing AI and NLP concepts into the curriculum at SMK Negeri 1 Warureja, with a focus on empowering students in the Fashion Department to apply these technologies effectively in their future careers.

Existing literature supports the value of integrating NLP into educational settings to enhance learning outcomes and provide students with practical skills relevant to modern industries. For example, NLP tools have been successfully employed in various educational applications, including text summarization, paraphrasing, question-answering, and automated evaluation of grammar and spelling, all of which are designed to enhance students' language comprehension and communication skills (Rumaisa et al., 2021). These tools not only assist in developing students' language proficiency but also foster critical thinking and problem-solving skills, making them better prepared for the job market.

In efforts to enhance the understanding of NLP technology at SMK Negeri 1 Warureja, it is crucial to emphasize the tangible benefits that students can acquire by learning NLP. Beyond its theoretical and computational complexity, NLP offers practical tools that can automate repetitive and time-consuming tasks, such as data entry, document summarization, and report generation (Sleiman et al., 2022). This automation not only saves time but also minimizes the risk of human error, thus improving overall efficiency. In industries where precise data management is critical, such as fashion, the integration of NLP tools can streamline operations, allowing professionals to focus on more strategic and creative endeavors (Iqbal & Qureshi, 2020).

Furthermore, NLP significantly enhances communication within organizations by powering chatbots, transcription services, and language translation tools. These applications are particularly relevant in the context of the globalized economy, where cross-language and cross-timezone collaboration has become a norm (Agarwal & Wadhwa, 2020). For instance, in international fashion markets, seamless communication facilitated by NLP-powered translation tools enables smoother transactions, customer service interactions, and collaborative design processes. Thus, for students in the Fashion Department, mastering NLP opens doors not only to domestic opportunities but also to global collaborations, positioning them as valuable assets in a highly interconnected job market (Chadha et al., 2023).

Moreover, the relevance of NLP in today's job market cannot be overstated. Companies across various sectors are increasingly adopting NLP technologies to enhance operations such as chatbot development, sentiment analysis, and language translation (Chung et al., 2020; Shi et al., 2021). This growing demand for NLP expertise translates to enhanced career prospects for individuals equipped with these skills. Students proficient in NLP are better positioned to secure competitive roles in industries that value automation, customer engagement, and data-driven decision-making. Therefore, integrating NLP into the educational framework at SMK Negeri 1 Warureja not only provides students with practical technological skills but also elevates their competitiveness in an AI-driven job market.

Moreover, NLP holds specific promise for the fashion industry, where technologies such as automated customer interactions, product recommendation systems, and sentiment analysis can significantly improve customer experience and business outcomes (Li & Xu, 2020; Mohammadi & Kalhor, 2021). For instance, by analyzing customer feedback and social media trends, fashion companies can gain real-time insights into market preferences, allowing them to adapt

quickly to changing trends and improve their marketing strategies based on customer sentiment (Lin, 2020; Mahmud et al., 2023).

In addition to its applications in enhancing customer engagement, NLP offers opportunities for automating routine tasks within the fashion industry, such as generating product descriptions, automating inventory management, and improving communication through translation systems. With globalization driving increased collaboration across cultures and languages, NLP-powered translation tools are becoming essential for fashion companies looking to expand their reach in international markets. By providing students with a foundation in NLP, SMK Negeri 1 Warureja can better prepare them to participate in global projects and contribute to a more interconnected and digitally driven industry. Moreover, a strong grasp of NLP technologies will empower students to innovate in the fashion industry, enabling them to create content that resonates with a diverse, international audience, and to collaborate effectively in cross-cultural environments.

This study is designed to explore the impact of integrating NLP concepts into the curriculum at SMK Negeri 1 Warureja, particularly in the Fashion Department. The primary aim is to assess how the introduction of AI and NLP technologies into the learning environment influences students' understanding and application of these tools, as well as to examine the specific benefits that NLP provides within the fashion industry context. By evaluating the effectiveness of NLP-based education in enhancing students' technical competencies and readiness for the job market, this research seeks to contribute to the broader conversation on AI literacy and its importance in vocational education. The study will also explore the potential for expanding this initiative to other departments within the school, highlighting the cross-disciplinary benefits of AI and NLP education in preparing students for a rapidly changing digital landscape. Through this work, SMK Negeri 1 Warureja aims to empower its students with the knowledge and skills needed to thrive in an AI-driven economy and to foster a culture of innovation and creativity within the Fashion Department, ultimately contributing to the development of the fashion industry's next generation of leaders and innovators.

METHOD

The Community Service Program (CSP) implemented at SMK Negeri 1 Warureja is strategically designed to address the challenges faced by students and teachers in the Fashion Department with respect to understanding and applying Natural Language Processing (NLP) based on Artificial Intelligence (AI). This initiative specifically targets the existing gaps in NLP knowledge, which are crucial for adapting to the rapidly evolving landscape of information technology. The CSP engages ten educators and thirty students from the XII grade of the Fashion Department, aiming to significantly enhance their comprehension and practical application of NLP technologies. Teachers, as facilitators of knowledge, and students, as prospective professionals in the fashion industry, are central to this program. Their active participation is essential for bridging the knowledge gap and preparing them for a technology-driven job market.

This CSP activity applies the technique of training. The CSP is meticulously structured into a comprehensive a month program, designed to maximize impact through a series of well-defined stages: preparation, socialization, practical tutorials, mentoring, and evaluation, as illustrated in figure 1. This structure is executed by three lecturers from the Informatics Engineering Department at Harapan Bersama Polytechnic, complemented by six Informatics Engineering students who serve as teaching assistants and mentors throughout the program.

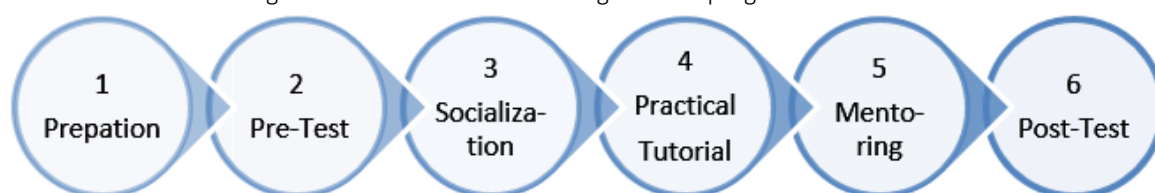


Figure 1. The stages of community service activities

The initial phase of the program, spanning the first part, involves the thorough preparation of AI-based NLP learning materials. This process includes gathering and customizing content to match the comprehension levels of the participants and addressing the specific needs of the Fashion Department. The preparation stage ensures that the materials are relevant, practical, and aligned with the participants' learning objectives. A pre-test is administered using the Quizziz platform to evaluate the baseline understanding of NLP concepts among participants. This pre-test provides critical data to tailor the subsequent instructional strategies and refine the training approach as needed. The preparation phase is pivotal for setting the foundation of the program, ensuring that the content is adapted to meet the participants' needs and that the instructional methods are effectively aligned with their learning goals.

Following the preparation, the socialization stage commences on the morning of the second day. This stage is dedicated to introducing participants to the fundamental concepts of NLP. The topics covered include named entity recognition, part-of-speech tagging, syntactic parsing, and machine translation systems. In addition, the session explores advanced NLP technologies, such as the Generative Pre-trained Transformer (GPT) series, and their applications within the fashion industry. This includes the use of NLP tools for chatbots, virtual assistants, sentiment analysis, and text summarization. The goal of this stage is to establish a solid theoretical foundation, setting the stage for the practical

tutorials that follow. By providing a comprehensive overview of NLP technologies and their relevance to the fashion industry, this stage ensures that participants are well-prepared to engage with the practical aspects of the program.

In the afternoon of the second day, the Practical Tutorial Stage is conducted to offer participants hands-on experience with NLP concepts in real-world fashion contexts. This stage is designed to be highly interactive and immersive, allowing participants to directly engage with various NLP tools and technologies.

During this stage, participants first delve into ChatGPT simulations. They use ChatGPT to generate coherent and contextually appropriate text, which highlights the model's capability to produce human-like responses (Suraperwata & Suyanto, 2020). This exercise demonstrates how ChatGPT can be applied in fashion-related scenarios, such as creating engaging product descriptions or interactive customer interactions.

Following the ChatGPT simulations, participants move on to sentiment analysis using Brand24. This activity involves analyzing consumer sentiment derived from social media feedback on fashion products. Participants learn to track keywords and assess sentiment, gaining valuable insights into public perception and consumer behaviour (Mohamed & Bayraktar, 2022). This practical exercise showcases Brand24's utility in media monitoring and sentiment analysis, which are critical for understanding customer preferences and market trends.

The final component of this stage focuses on chatbot development using the ChatBot.com platform. Participants are tasked with creating simple chatbots capable of responding to customer queries. This hands-on exercise emphasizes the practical application of chatbots in enhancing customer service and engagement within the fashion industry (Aslam, 2023; Perez-Soler et al., 2021). By developing functional chatbots, participants experience firsthand how these tools can improve customer interactions and support business operations.

Overall, the Practical Tutorial Stage is structured to provide participants with comprehensive, real-world experience in applying NLP technologies, thereby reinforcing their understanding and readiness to utilize these tools effectively in their professional endeavors.

Concurrent with the practical tutorials, the mentoring stage involves guiding students through independent or group practice sessions. Lecturers and student mentors provide ongoing support, addressing any challenges faced by participants and reinforcing their understanding of NLP concepts. This stage is crucial for ensuring that participants can effectively apply the knowledge gained during the program. Mentors facilitate a collaborative learning environment, offering personalized guidance and troubleshooting support to enhance the participants' learning experience.

The program concludes with an evaluation phase, which includes a post-test conducted using the Quizziz platform. The post-test is designed to measure the effectiveness of the training by comparing participants' performance to their pre-test results. This comparative analysis provides valuable metrics on the program's impact, highlighting improvements in participants' understanding of NLP and identifying areas for future enhancement. The evaluation data is crucial for assessing the program's success and informing any necessary adjustments for subsequent iterations. The results of the evaluation will be used to refine the program's content and delivery methods, ensuring that future iterations continue to meet the educational needs of the participants.

Overall, the CSP's structured approach, encompassing preparation, theoretical instruction, practical application, and comprehensive evaluation, is designed to equip participants with essential NLP skills. This approach not only enhances their immediate understanding but also contributes to their long-term competitiveness and creativity within the dynamic fashion industry. By integrating theoretical knowledge with practical experience and ongoing support, the program aims to foster a deep and practical understanding of NLP, empowering participants to leverage these technologies effectively in their future careers.

RESULTS AND DISCUSSION

The Community Service Program (CSP) executed at SMK Negeri 1 Warureja was a meticulously planned and well-executed initiative that spanned two days and involved 40 participants—30 students from the 12th-grade Fashion Design class and 10 Fashion Design teachers. This program, led by a dedicated team of three lecturers from the Informatics Engineering Department at Harapan Bersama Polytechnic, along with six students who acted as teaching assistants and mentors, aimed to significantly enhance participants' understanding of and practical engagement with Natural Language Processing (NLP) tools based on Artificial Intelligence (AI). The initiative was designed to bridge the gap between fashion and technology, offering new insights and tools to address the evolving demands of the industry.

The first phase of the program focused on socialization, as depicted in Figure 2, which showcases the detailed process of introducing the participants to fundamental AI-based NLP concepts. This session was led by a lecturer and aimed to familiarize participants with a broad range of NLP applications in both everyday tasks and the fashion industry. Topics such as named entity recognition, syntactic parsing, and machine translation systems were explored, alongside practical use cases like sentiment analysis and chatbot development. These early activities helped establish a strong theoretical foundation for the participants, ensuring that they were well-prepared for the hands-on tutorials that followed. The socialization session not only emphasized the utility of NLP but also highlighted the strategic role these tools can play in enhancing competitiveness in the fashion sector.



Figure 2. Documentation of socialization activities

The next stage, the Practical Tutorials, took place on the afternoon of the second day, as documented in Figure 3. This phase was designed to immerse participants in real-world applications of the theoretical concepts they had learned. Participants engaged in various practical activities, including ChatGPT simulations, where they generated coherent and contextually relevant content for fashion-related tasks such as creating product descriptions, designing patterns, and analyzing trends. Following the ChatGPT activity, the participants used Brand24.com to conduct sentiment analysis on consumer feedback from social media platforms, helping them understand public perception and preferences. Additionally, the participants developed basic chatbots using ChatBot.com, which demonstrated how these tools could enhance customer interaction and support services within the fashion industry. These practical exercises allowed the participants to not only engage with NLP tools but also see firsthand how these technologies could be leveraged to solve real-world challenges in the fashion field.

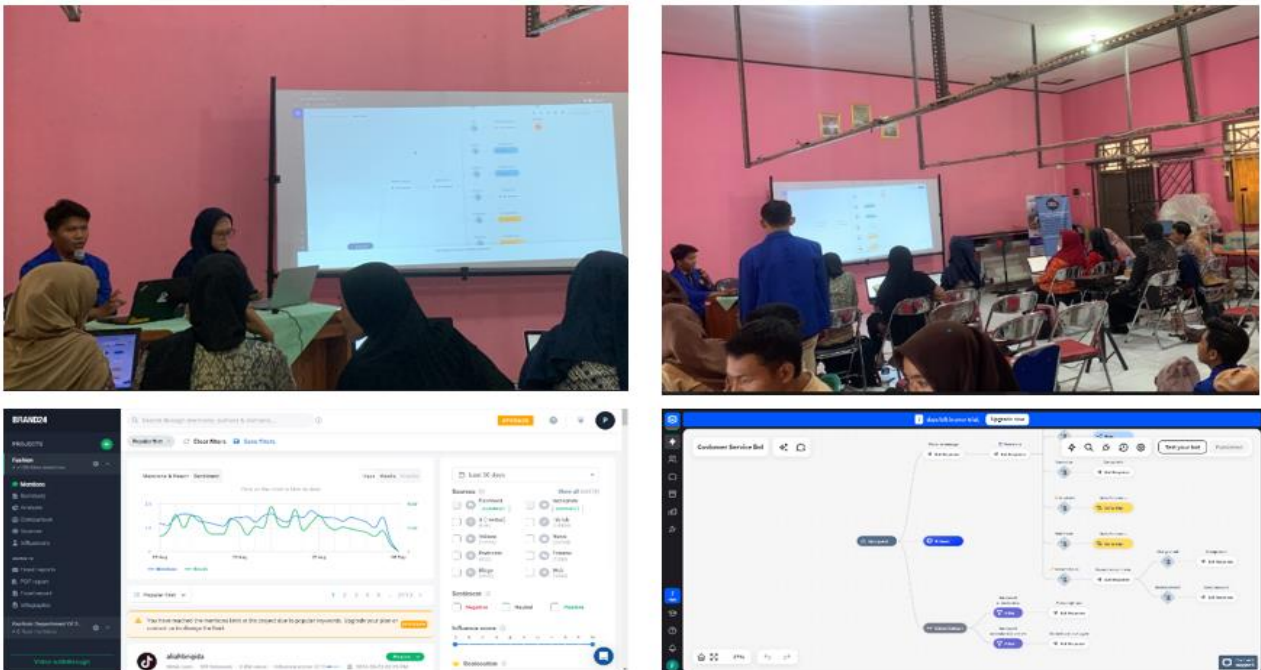


Figure 3. Documentation of practical tutorials

Concurrent with the tutorials, participants received ongoing assistance and guidance from both the lecturers and student mentors, as shown in Figure 4. This mentoring stage was essential in ensuring that participants could apply what they had learned independently or in small groups, with continuous support from the team to address any challenges. The hands-on approach and personalized guidance during the mentoring phase were instrumental in helping the participants solidify their skills and deepen their understanding of AI-based NLP tools. Mentoring sessions fostered a collaborative learning environment, where participants could actively engage in problem-solving and seek clarification on complex concepts, ensuring that they gained confidence in using the tools effectively.



Figure 4. Documentation of assistance activities

Finally, the program's effectiveness was rigorously evaluated through pre-test and post-test assessments administered via the Quizziz platform. The results, captured in Figure 5, revealed a significant improvement in participants' understanding and proficiency. The average pre-test score of 48.28 points rose to 80.47 points in the post-test, demonstrating a substantial increase of 32.19 points. This notable improvement underscores the program's success in delivering practical, applicable knowledge in a way that had a lasting impact on the participants' competencies. The significant rise in evaluation scores highlights the effectiveness of the structured approach, combining theoretical learning, practical application, and continuous mentoring to achieve the desired outcomes.

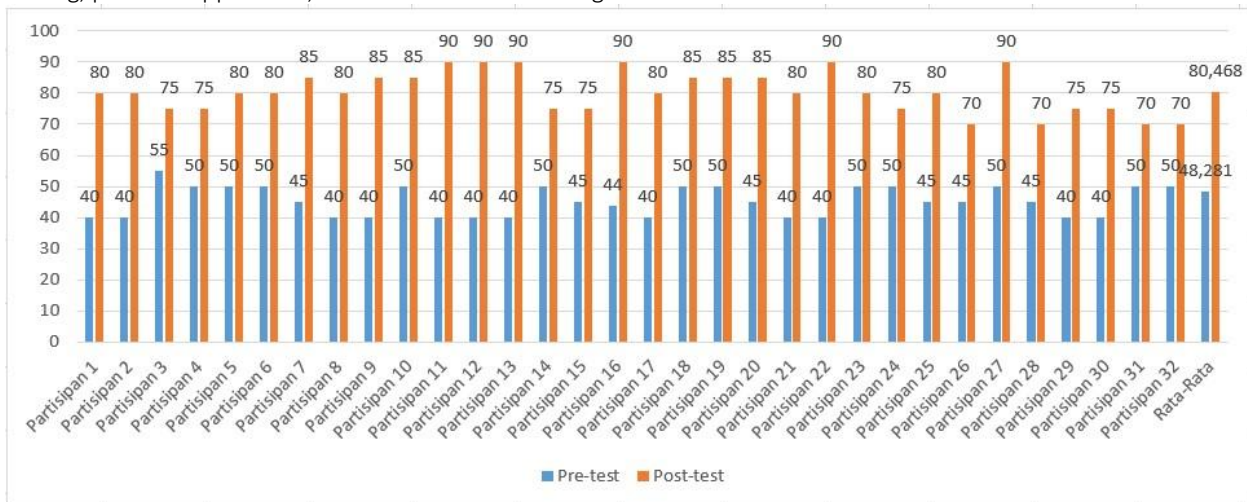


Figure 5. Documentation of participant evaluation results

The results of the Community Service Program (CSP) provide valuable insights into the transformative potential of integrating NLP-based AI tools within educational settings, particularly in non-technical fields like fashion design. The program's success in enhancing participants' understanding of these technologies not only showcases the adaptability of AI tools but also illustrates their relevance in a wide array of industries. The practical applications explored during the CSP, such as using ChatGPT for generating design ideas and sentiment analysis for monitoring consumer feedback, underscore how these tools can elevate both creativity and strategic decision-making within the fashion industry.

The integration of multiple AI-driven tools throughout the program reflects an educational approach grounded in experiential learning, where hands-on experience is integral to conceptual understanding. By combining theoretical instruction with practical tasks, the program facilitated a learning environment that fostered both intellectual curiosity and real-world application. This mirrors findings from prior research on the importance of experiential learning in education. For instance, the article (Ardiansyah, 2023; Yuniarti et al., 2022) demonstrated the effectiveness of interactive learning media, such as chatbot systems, in enhancing student engagement and understanding, which aligns with the positive outcomes seen in this program.

Additionally, the use of NLP tools in an educational context is increasingly supported by research in AI-assisted learning. The study by on AI tools like ChatGPT showed how these technologies could significantly improve comprehension and productivity in professional settings, echoing the benefits observed in the CSP (Baha et al., 2024; Liu et al., 2022). Similarly, another article highlighted the role of AI in educational innovation, with a focus on how interactive, practical tools can bridge learning gaps (Ferine et al., 2024). The successful implementation of AI-based NLP tools in this CSP reinforces these

conclusions, demonstrating how integrating advanced technologies can result in measurable improvements in both knowledge acquisition and professional readiness.

The holistic structure of the CSP, from socialization to hands-on tutorials and ongoing mentorship, aligns with current pedagogical models that advocate for immersive, technology-enhanced learning experiences. The mentoring sessions, in particular, played a crucial role in reinforcing the participants' understanding, offering them the support needed to overcome any challenges. This collaborative learning environment, where instructors and mentors provided personalized feedback, further underscores the importance of guided practice in mastering complex AI tools.

The CSP at SMK Negeri 1 Warureja serves as a model for future initiatives aiming to integrate cutting-edge technologies into vocational education. The success of this program highlights the adaptability of AI tools like NLP in diverse contexts and industries, from fashion to customer service. Moreover, the significant improvements in participants' pre-test and post-test results reflect the program's overall effectiveness and its potential for replication in similar educational settings.

CONCLUSION

A key indicator of the program's success lies in the participants' performance, as evidenced by the pre-test and post-test assessments. The significant increase of 32.19 points in average scores highlights the effectiveness of the CSP in not only imparting theoretical knowledge but also enhancing practical proficiency. This improvement underscores the tangible impact that AI-based NLP tools can have on students' competencies, particularly when integrated into a structured educational framework that combines instruction, hands-on practice, and personalized support. Furthermore, the CSP serves as a model for future educational initiatives aimed at incorporating advanced AI technologies into vocational training programs. The program's adaptability in addressing the specific needs of the fashion industry, coupled with its potential for broader application across other non-technical fields, exemplifies the transformative power of AI in education. By equipping participants with the skills necessary to navigate an increasingly technology-driven industry, the CSP has laid the groundwork for future exploration of AI applications in diverse sectors.

The program's success was made possible through the collaborative efforts of Harapan Bersama Polytechnic and SMK Negeri 1 Warureja, whose support and active participation were crucial to its implementation. The CSP not only achieved its immediate objectives of enhancing participants' understanding and use of AI-based NLP tools but also contributed to a larger conversation about the role of technology in shaping the future of education and industry alike. As AI continues to evolve, programs like this will be essential in ensuring that students and professionals are well-prepared to leverage these technologies for innovation and growth in their respective fields.

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