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Research Article

Unlocking the Potential of ChatGPT in Vocational and Professional Education and Training (VPET)

Benson K.H. Hung [1*]
[1] *Department of Construction, Hong Kong Institute of Vocational Education, Vocational Training Council, Hong Kong, China*
**Corresponding Author Email: bensonhung@vtc.edu.hk*

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ABSTRACT

This research paper aims to investigate the opportunities and challenges associated with utilizing ChatGPT, an OpenAI language model, in Vocational and Professional Education and Training (VPET) with a specific focus on engineering education and practice. By employing ChatGPT as a tool for generating interactive and engaging outlines, this study examines the integration of AI in outlining Unit Standards, including the generation of explanatory notes, outcomes, and performance criteria. Furthermore, the paper addresses the potential obstacles that may arise when employing ChatGPT for workplace tasks design, with emphasis on ensuring accuracy and relevance to learning content. It also emphasizes the significance of human oversight and intervention in aligning Unit Standard outlines with the intended trainees and desired learning outcomes. Lastly, the paper provides recommendations for effectively utilizing ChatGPT in Unit Standard design, emphasizing the importance of planning, regular evaluations, and iterative refinement of the generated contents throughout the Unit Standard development process.

Keywords: ChatGPT, Unit Standards, VPET, AI Integration, Workplace Learning and Assessment.

INTRODUCTION

Under Vocational and Professional Education and Training (VPET), Workplace Learning and Assessment (WLA) is a structured pedagogical approach newly initiated by the Vocational Training Council (VTC) in Hong Kong. To nurture a highly skilled workforce, the VTC has taken a leap forward to developing a unique WLA system by referring to the best international practice. The VTC has cooperated with employers in developing unit standards and assessment tasks for assessing trainees' competence against the employers' requirements. A tripartite platform is therefore established to enable competency-based learning and assessment with the participation of the VTC, employers, and trainees. The Engineering Discipline of the Hong Kong Institute of Vocational Education (IVE) of the VTC has developed WLA elements for its Higher Diploma (HD) programmes and Diploma of Foundation Studies (DFS) programmes. The programme curricula are enriched by incorporating the latest skills, knowledge, and technologies required by the industry. In particular, the utilization of ChatGPT and similar language models in the field of WLA holds immense potential for transforming the process of writing unit standards. By leveraging the natural language processing, personalization, integration, and continuous learning capabilities of ChatGPT, programme teams can create more relevant, learner-centered, and industry-responsive unit standards, ultimately enhancing the quality and effectiveness of vocational education and training.

LITERATURE REVIEW

International Practices of WLA

The WLA model in New Zealand is also characterised by the mixture of on-the-job training and off-the-job training, where the former takes place in a company and the latter is conducted at a polytechnic or a technical college, so as to maximise the benefits of the complementarity between school-based and work-based learning. In this connection, assessment will be arranged in the polytechnic and/or workplace (Vaughan and Cameron, 2009). The structured

provision of WLA in New Zealand is arranged and managed by the Industry Training Organizations (ITOs) that are recognised by the Associate Minister of Education (Tertiary Education) (New Zealand Qualifications Authority, 2021). ITOs work with industries to develop assessment materials, including the unit standards. A unit standard describes what a trainee who has achieved the standard knows and can do. Each standard has a defined credit value, which reflects the level of complexity of the skills and knowledge that are recognized by the standard. To gain credits for a unit standard, trainees have to demonstrate that they are competent. Workplace assessors play a key role in supporting learners throughout the training and assessment processes. There is a systematic registration system of assessors in New Zealand. In accomplishing this, the VTC has cooperated with employers in developing unit standards and assessment tasks for assessing trainees' competence against the employers' requirements. Not least is the programme curricula enhancement which can be attained by incorporating the latest skills, knowledge and technologies required by the industry.

Unit Standards: Models of Assessment for Workplace Learning

Delivery of workplace assessment involves a complete process of assessing skills, knowledge and attributes of a trainee on the job in an authentic workplace. Real-time, authentic, reliable and valid evidence should be collected and recorded to demonstrate trainees' competences according to unit standards. The WLA development team has consulted the teaching staff on the appropriateness of QF Level, alignment to Module Intended Learning Outcomes, assessment standards and appropriateness of the workplace setting of the unit standards. Moreover, the unit standards are also supported by the employers concerned. Using engineering programmes as an example, the current WLA model adopts a contribution of not less than 5% of the total contact hours for the vocational modules of the programme. An incensement of percentage contribution is expected in the near future after years of successful implementation and positive feedbacks received from different stakeholders. Derived from the WLA framework described, there are different models for the assessment of work placements such as employers' ranking of competencies (Coll, Zegwaard & Hodges, 2002) and negotiated placement objectives (Zegwaard, Coll & Hodges, 2003).

Development of Unit Standards

The development of unit standards plays a crucial role in VPET, as they provide the foundation for designing and delivering effective training programs. Unit standards serve as benchmarks that outline the knowledge, skills, and competencies required in specific industries or occupational fields. The development of unit standards is a complex and iterative process that requires collaboration, stakeholder engagement, and alignment with qualifications frameworks and industry needs. Through a consultative and inclusive approach, unit standards can effectively guide curriculum development, facilitate assessment and certification, and promote the relevance and quality of vocational education and training. Continuous improvement, quality assurance, and validation processes are essential to ensure that unit standards remain responsive to the dynamic demands of industries and support learners in acquiring the necessary skills for successful careers. Further research and best practices in the development of unit standards can contribute to the enhancement of VPET systems worldwide, aligning them with emerging trends and the evolving needs of the workforce.

Workplace assessment involves the collection and evaluation of evidence about a trainee's performance. The assessment activities translate the requirements of the unit standard into action that can be assessed. Evidence is data that collectively proves a trainee can (or cannot) be judged competent in a unit standard. The supporting evidence may include verified documents, verified photographs and/or videos, and other types of supporting evidence to show demonstrated knowledge relating to assessment. Competence is not only about completing a task, but also doing it "to an appropriate standard" (Gonczi, 1999) or "to the expected standards" (Eraut, 2003). This relationship between work and competence has been acknowledged by the national competency-based training systems in Australia and the United Kingdom. National Quality Council (2010) states that competency is the consistent application of knowledge and skill to the standard of performance required in the workplace. Carroll & Boutall (2011) also mention that people need skills to be competent, but competence is about applying skills and knowledge to achieve a work function.

Integration of AI in Unit Standards Development

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Artificial intelligence (AI), specifically language models like ChatGPT, has brought about significant advancements in the field of WLA. These innovative technologies, such as ChatGPT developed by OpenAI, have the capability to revolutionize the way unit standards are written and implemented, particularly in the context of the VTC in Hong Kong. In the domain of WLA, ChatGPT can be employed to streamline and enhance the process of writing unit standards, ensuring their relevance and effectiveness in meeting the needs of the industry and learners. With its natural language processing capability, ChatGPT can understand and respond to complex queries and prompts, enabling a more interactive and engaging learning experience. This feature is particularly valuable in the context of workplace learning, where learners can interact with ChatGPT to seek guidance, clarification, and support in real-time, fostering a more dynamic and learner-centered approach.

ROLE OF CHATGPT IN DESIGNING UNIT STANDARDS

The emergence of AI technologies, such as ChatGPT, has opened up new possibilities in the design and development of unit standards. ChatGPT, as a powerful language model, can play a significant role in assisting instructors and educational institutions in the creation of comprehensive and personalized unit standards. This section explores the various ways in which ChatGPT can contribute to the design and refinement of unit standards.

Adoptability in Vocational Education

ChatGPT offers numerous advantages for enhancing the vocational training experience. It provides personalized feedback and support by analyzing student data and interactions, identifying areas of difficulty, and offering targeted assistance. Interactive simulations created with ChatGPT enable students to practice practical skills in a safe and controlled environment, such as virtual car repair or patient diagnosis scenarios. Additionally, ChatGPT aids non-native speakers by providing language support, offering personalized feedback and corrections for improved communication. It also promotes collaboration and communication among vocational training students through the use of chatbots, facilitating group projects and discussions for enhanced learning outcomes. Integrating ChatGPT into existing vocational training programs requires identifying specific needs and goals, designing tailored integrations, and working with IT professionals to customize the chatbot. Overall, ChatGPT has the potential to greatly enhance vocational training by providing personalized feedback, interactive simulations, language support, and collaboration tools, ensuring the development of practical skills and knowledge necessary for future careers in a rapidly changing job market.

Support on Developing Unit Standards

ChatGPT offers valuable support in the development of unit standards by leveraging its ability to train on vast educational datasets, including textbooks, research papers, and industry reports. Through natural language processing techniques, ChatGPT can extract essential information, such as frequently mentioned topics, key skills, and challenges within a given field. Generating initial drafts efficiently, ChatGPT can adhere to specific criteria provided by human experts, enabling the creation of technical and comprehensive standards. Furthermore, ChatGPT can provide feedback on draft standards, highlighting areas of language clarity, excessive jargon, or vagueness, contributing to the production of comprehensive and understandable standards. Additionally, ChatGPT's capacity to answer questions, clarify terminology, provide practical examples, and suggest alternative wording streamlines the consultation process for human experts. By analyzing existing unit standards, ChatGPT assists in identifying common themes and areas for improvement, ensuring the standards' relevance and currency. Lastly, ChatGPT enhances readability by flagging complex language structures and suggesting simplified alternatives, thereby ensuring accessibility and clarity for a broader readership.

Prompt of ChatGPT in Development of Unit Standards

The prompt provided by ChatGPT serves as a valuable tool for supporting the development of unit standards, which are essential for assessing students' learning in specific fields. The prompt acts as the initial input that primes ChatGPT to generate a response, and its quality and relevance significantly impact the accuracy and usefulness of the system's output. By using prompts to clarify concepts, educators and subject matter experts can obtain clear and concise definitions that inform the development of precise unit standards. Similarly, prompts can be employed to

identify best practices, soliciting information on key skills and competencies required for success in a given field. This input helps integrate industry standards into unit standards, ensuring students are prepared for the workforce. Furthermore, prompts can generate examples that illustrate practical applications, allowing for the development of relevant and applicable unit standards. As the field of artificial intelligence progresses, leveraging ChatGPT and similar language models in the unit standards development process will become increasingly valuable, equipping students with the necessary knowledge and skills to thrive in an ever-changing world.

DISCUSSION

The development of unit standards is a complex process that involves input from subject matter experts, industry representatives, educators, and other stakeholders. ChatGPT has the potential to significantly enhance this process by generating text, providing feedback, answering questions, analysing existing standards, and improving readability. These capabilities can help to streamline the development process and ensure that the final product is of high quality and relevance to the industry or sector in question. However, it is important to recognize that ChatGPT has limitations that must be taken into account.

The integration of ChatGPT in VPET presents both opportunities and challenges. One significant opportunity lies in its potential to revolutionize engineering education and research by automating text generation tasks such as Unit Standard development. This technology prompts institutes to reassess their teaching and assessment methods, urging them to incorporate generative language models into their instructional practices.

Limitations of Using AI to Develop Unit Standards

Artificial intelligence technologies, such as ChatGPT, offer transformative potential in educational standards development, including unit standards. ChatGPT's ability to generate human-like responses to prompts can be beneficial in this process. However, it is crucial to recognize and consider its limitations. One limitation is ChatGPT's limited understanding of practical considerations, as effective unit standards require an understanding of real-world teaching and learning dynamics, available resources, learner capabilities, and classroom realities. ChatGPT may not sufficiently account for these practicalities, potentially hindering the effectiveness of the generated unit standards.

Another limitation is ChatGPT's limited ability to assess learning outcomes comprehensively, potentially resulting in standards that are too broad, too narrow, or fail to capture intended outcomes. Incorporating stakeholder feedback is also challenging, as ChatGPT may struggle to incorporate the perspectives and insights of educators, learners, assessors, and subject matter experts, potentially leading to standards that do not align with the needs of the educational community.

Furthermore, ChatGPT may struggle to address cultural and regional differences in educational standards, potentially resulting in standards that are irrelevant or inappropriate in certain contexts. Adapting to technological and labor market changes is another limitation, as ChatGPT may not provide guidance on updating standards to reflect current practices and trends, potentially resulting in outdated or ineffective standards. Legal and ethical considerations, including privacy and data protection, may not be adequately addressed by ChatGPT, which could lead to standards that fail to meet legal and ethical standards. Finally, fostering critical thinking and creativity is challenging for ChatGPT, despite its ability to guide specific learning outcomes, as these skills are vital for success in the modern workforce and should be supported by unit standards.

RECOMMENDATION

ChatGPT has emerged as a transformative force in various aspects of our lives, including vocational education. Its development represents a significant milestone in the field of artificial intelligence. With its advanced capabilities, ChatGPT has the potential to provide valuable support in the development of unit standards. The evolution of ChatGPT has been driven by breakthroughs in deep learning and natural language processing. It has been trained on vast amounts of text data, enabling it to understand and generate human-like responses. This language model has demonstrated remarkable proficiency in generating coherent and contextually relevant text, making it a valuable tool for various applications.

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In the context of unit standards, ChatGPT can be an invaluable asset. Its ability to generate text allows it to assist in the creation of standards by providing suggestions, examples, and explanations. It can offer insights and perspectives that human experts may not have considered, leading to more comprehensive and well-rounded unit standards. Additionally, ChatGPT can analyze existing standards, identify gaps or areas for improvement, and contribute to the refinement of the standards development process. Furthermore, ChatGPT's capacity to answer questions can be particularly beneficial in the development of unit standards. Stakeholders involved in the process can interact with ChatGPT, seeking clarification, guidance, or specific information relevant to the standards. ChatGPT's responses can help in addressing ambiguities and ensuring a clearer understanding of the intended content. Moreover, ChatGPT's capability to improve readability is noteworthy. It can assist in simplifying complex language and technical jargon, making unit standards more accessible to a wider audience. By enhancing readability, ChatGPT enables a more inclusive approach to standards development, ensuring that they can be understood and effectively utilized by learners, educators, and industry professionals.

However, it is essential to acknowledge that while ChatGPT offers significant support in the development of unit standards, it should be viewed as a tool to augment human expertise, not replace it entirely. Human experts possess invaluable subject matter knowledge, experience, and nuanced understanding necessary for the creation of high-quality standards. They play a vital role in making final decisions, ensuring relevance, and considering real-world implications that may go beyond ChatGPT's capabilities.

In conclusion, ChatGPT represents a transformative advancement in artificial intelligence, with the potential to revolutionize vocational education, including the development of unit standards. Its text generation, feedback provision, question-answering, and readability improvement capabilities offer valuable support. By harnessing the power of ChatGPT while recognizing the indispensable role of human expertise, the development of unit standards can be enhanced, resulting in more comprehensive, accessible, and impactful standards for the benefit of learners, educators, and industry professionals.

CONCLUSION AND WAY FORWARD

The use of ChatGPT in the development of unit standards is a promising step towards making the process more efficient and effective. However, it's important to remember that human expertise is still crucial in ensuring that the final product meets the needs of the industry or sector in question.

One way to further enhance the use of ChatGPT in developing unit standards is to consider producing pictures and audios to transfer text to image. This approach could help to overcome some of the limitations of ChatGPT, such as its tendency to generate text that is not easily understandable for humans. By transforming text into visual and audio formats, unit standards could become more accessible and engaging for learners. For example, instead of presenting a lengthy written standard, a picture or diagram could be used to convey the same information in a more visual and memorable way. Additionally, audio explanations or voice-overs could be added to provide further clarity and context. This approach could be particularly beneficial for learners who have different learning styles or who struggle with reading comprehension. Incorporating pictures and audios into the development of unit standards using ChatGPT would require collaboration between experts in different fields, such as instructional designers and multimedia specialists. It would also require careful consideration of the needs and preferences of the target audience, as well as the technical requirements for producing and delivering the visual and audio materials.

While ChatGPT can be a valuable tool in developing unit standards, it should be used to support and supplement human expertise, not to replace it entirely. Exploring ways to incorporate pictures and audios into the development of unit standards using ChatGPT could enhance the accessibility and effectiveness of the standards, while still maintaining the importance of human expertise in the process. The role of human expertise in the development of unit standards cannot be overstated. Human experts are essential in ensuring the quality and relevance of the standards, and their input is necessary for making final decisions on the content and wording of the standards. Human experts also play a crucial role in incorporating feedback from stakeholders and ensuring that the standards meet the needs of the industry or sector in question. For example, ChatGPT lacks deep subject matter expertise and cannot make nuanced judgments about the content or wording of the standards. Additionally, ChatGPT has the

potential for bias and can generate text that is not easily understandable for humans. As a result, ChatGPT should be used in conjunction with human expertise, not as a replacement for it.

The successful development of unit standards using ChatGPT requires a balanced approach that involves both AI-powered tools and human expertise. ChatGPT can be a valuable tool in enhancing the efficiency and effectiveness of the development process, but it should not be relied upon as the sole source of expertise. By using ChatGPT to support and supplement the work of human experts, the development of unit standards can be made more efficient and effective, ultimately resulting in standards that are of higher quality and relevance to the industry or sector in question.

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