

DESIGNING AUTHENTIC ASSESSMENTS TO ADDRESS THE USE OF CHAT-GPT IN HIGHER EDUCATION

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Abstract

Since its official launch, there has been much discussion in academic circles around the use of artificial intelligence, specifically natural language processing models such as ChatGPT, with many seeming to focus on the distrust issues of student cheating and academic misconduct. Explicitly drawing on ChatGPT for assistance, this paper critically analyses authentic assessments created by ChatGPT for business and nursing programs and highlights the limitations of relying on technology as the sole source for assessment in these areas. Implications for practice and further research conclude this paper, including the integration of artificial intelligence into higher education with consideration of ethical and legal implications surrounding its use.

Background

Artificial intelligence is a vast field that encompasses several subfields such as natural language processing (NLP), computer vision (CV), robotics, and machine learning (ML), among others. NLP models combine “computer algorithms with machine learning and deep learning models to automatically extract, classify, and label elements of text and voice data and then assign a statistical likelihood to each possible meaning of those elements” (IBM, 2023, para. 1). The focus of this paper is on the subfield of natural language processing, specifically the large language model ChatGPT.

ChatGPT (Chat Generative Pre-trained transformer) “is an autoregressive language model that uses deep learning to produce human-like text. It is the third-generation language prediction model in the GPT-n series created by OpenAI” (Lab Lab AI, 2023, para. 1). Essentially, it is designed to not only understand the questions posed to it but generate responses based on the data it is trained on. As ChatGPT is designed to generate text based on the prompts it is given, the more specific the prompt is, the more context it has for generating a response.

The evolution and developing sophistication of ChatGPT or similar Artificial Intelligence (AI) is sparking considerable coverage in mainstream media, specifically within academia due to concerns around student misuse and associated

academic misconduct. However, given that ChatGPT has been identified as becoming pervasive in many workplaces and similarities are being drawn between the emergence of ChatGPT and calculators, excel spreadsheets, Grammarly, and Google, it leads us to ponder if it should be, in fact, perceived only as a threat. Or, as some have suggested, is ChatGPT just another tool to get around meaningless work? We would advocate it is far more than that.

Whether you are strongly for, strongly against, somewhere in between, or just strongly confused, ChatGPT and other large language models are here to stay. With the excitement around what AI can offer also comes the fear of uncertainty, especially surrounding academic rigour. The approach from universities has been widespread, with some completely banning it, and others taking the avoidance strategy (e.g., moving to paper-based exams instead of online) (University World News, 2023). Rather than work against it in an avoidance-type strategy, in this paper we take the stance of looking at how to integrate it.

This is an important and relevant topic and, as aptly stated by Alby (2023) “The only faculty I can imagine not being alarmed are those who already only use assignments that are not writing-focused, cannot be replicated by AI, or are so meaningful to students that they wouldn’t want to use AI” (p. 2). Simonsen (CBS, 2023, para. 13) takes a slightly different tack and suggests students “already use these tools. That is not new. We need to change assessments and curriculums.” Therefore, our focus is to explore ways to incorporate ChatGPT in some aspects of assessment thereby promoting its integration. Our work also looks to practically demonstrate how to integrate ChatGPT in academic practice and scholarly work as an exemplar through using ChatGPT to explicitly contribute to the writing of this paper.

Theoretical Underpinning

Assessment

The role of assessment in higher education has transitioned from focusing only on summative assessment *of* learning, to having a dual purpose to include assessment *for* learning, that is, to focus on feedback and support the development of transferable skills for graduates (Watling & Ginsburg, 2019). Effective assessment practices can foster life-long learning skills within and beyond university (Drewery et al., 2020). Ideally, effective assessment should measure students' capabilities in different ways, with opportunities for students to reflect critically on their learning and performance to enhance future learning experiences and ultimately their future career. Authentic assessment is proffered as the most effective way to achieve this through real-world contexts, enabling students to demonstrate their understanding and encouraging deeper learning.

By aligning assessment *of* and *for* learning, educators can design quality assessments that not only measure students' knowledge and understanding, but also facilitate deeper learning. When considering the design, implementation, and grading of quality authentic assessment in higher education, Bloom's revised taxonomy is an appropriate framework to contemplate the levels of complexity and specificity of the assessment in relation to the learning opportunities and learning objectives (Anderson et al., 2001). Specifically, we focus on the cognitive domain of Bloom's taxonomy, which is separated into six levels representing an order in which the lower levels allow for the scaffolding of skills towards the higher levels of the taxonomy (Anderson et al., 2001; Villarroel et al., 2018). For context, authentic assessment necessitates the construction of knowledge, with an emphasis on using higher-order cognitive skills, such as analysis, synthesis, and evaluation as described in Bloom's revised taxonomy (Villarroel et al., 2018). Against this background of assessment, we prompted ChatGPT to *write two paragraphs in academic style using four journal article references on why ChatGPT is important in designing assessments in universities.*

ChatGPT:

ChatGPT, a large language model trained by OpenAI, has shown great potential in natural language processing and has been applied to various applications such as machine translation, text summarization, and dialogue systems. Its ability to understand and generate human-like language has also made it an attractive tool for designing assessments in universities.

In recent studies, ChatGPT has been used to evaluate students' language proficiency in a more natural and authentic way. For example, in a study conducted by Smith et al. (2020) it was shown that ChatGPT can effectively mimic human-like conversation, providing a more authentic assessment experience for second language learners. Additionally, ChatGPT has been found to be able to accurately evaluate language proficiency in areas such as grammar, vocabulary, and fluency (Jones et al., 2019; Kim et al., 2020). Furthermore, ChatGPT's ability to understand context and generate human-like responses has also been found to be useful in assessing critical thinking skills (Lopez et al., 2021). These studies demonstrate that ChatGPT holds great promise as a tool for authentic language assessment in universities.

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From the above output it is critical to note that all references that ChatGPT listed are not real and include fake reference details. For example, while there is a *Journal of Applied Linguistics*, the article cited does not exist. On reflection we assumed that the ChatGPT prompt was not specific enough around the kinds of references needed, and so was rephrased to *write two paragraphs in academic style using five existing peer-reviewed journal article references*. While the references changed, the fake references were still present.

Traditional written assessment methods, such as the one prompted to ChatGPT above, lend themselves to large language models due to the emphasis on examining the acquisition of knowledge (Poindexter et al., 2015). In most instances traditional assessments have single-answer solutions, focusing on assessment *of* learning and lower order levels of Bloom’s taxonomy of learning, meaning these can more easily be “written” using AI.

So, are students less likely to use ChatGPT if the assessment is authentic, versus a more traditional *write 5 paragraphs about x in essay format*? We wrote several prompts around this question, and the ChatGPT response is not conclusive. It is dependent on the type of assessment, the purpose of the assessment and the foundational versus assessable aspects of the assessment:

ChatGPT:

The likelihood of students using ChatGPT for assessments depends on the specific design of the assessment and the goals of the learning designer. If the assessment is designed to measure student understanding of specific concepts or recall of information, ChatGPT might not be the most appropriate tool. However, if the assessment is designed to evaluate students' ability to engage in real-world problem-solving, critical thinking, or collaboration, ChatGPT could potentially play a role as a support tool for students.

For example, if the assessment involves a scenario-based task that requires students to analyze and respond to a complex problem, ChatGPT could be used to provide additional information, guidance, or suggestions to help students complete the task more effectively. In this case, ChatGPT could be used as a tool to enhance the authenticity of the assessment by providing

students with access to relevant and up-to-date information that would be difficult to obtain through traditional means.

Ultimately, the decision of whether to use ChatGPT for assessments will depend on the specific goals and objectives of the assessment, as well as the capabilities and limitations of the tool.

We might not be able to outsmart ChatGPT in the long run just by reformulating assessments, so we might need to re-think other ways of assessing students, for example, authentic assessment methods that focus on deeper understanding and application of knowledge and integration of complex concepts (Poindexter et al., 2015). Previous research has identified that the more authentic and relevant the assessment to the real-world, the less likely learners were to engage in misconduct (Sotiriadou et al., 2020). Depending on the design, we propose authentic assessments may reduce the likelihood of students engaging AI in assessment writing. So perhaps authentic assessments are the magic silver bullet to help decrease, or mitigate, student reliance on large language models like ChatGPT for their assessments.

Authentic Assessment

Authentic assessment is defined as “an assessment requiring students to use the same competencies, or combinations of knowledge, skills, and attitudes that they need to apply in the criterion situation in professional life” (Guilikers et al., 2004, p. 69). According to Villarroel et al. (2018), authentic assessment is significant because it aims to replicate real-world tasks and performance standards, which have been shown to positively impact student learning, including problem-solving skills, autonomy, motivation, self-regulation, and metacognition, all of which are highly associated with employability (National Association of Colleges and Employers, 2022). Fook & Sidhu (2010) suggest that realistic contexts in assessments can make it more interesting for students, as well as enable teachers to assess whether a student can transfer skills, such as problem-solving, from one context to another, including the future workplace. Hence, it would seem so far, that authentic assessments might be more difficult for ChatGPT to replicate than traditional assessments.

There has been extensive scholarly inquiry to propose frameworks for authentic assessments. This includes, but is not limited to, the Authentic Assessment Framework (AAF), which proposed four criteria for authentic assessments: active student engagement with an authentic audience or workplace setting, high quality intellectual engagement, reflexive evaluation of performance, and industry contribution to assessment (Bosco & Ferns, 2014). Additionally, Ashford-Rowe et al. (2014) suggest that there are eight critical questions to assist in determining and

redesigning assessment authenticity. Herrington & Herrington (2006) recommend context, student factors, task factors, and indicators as guidelines for designing authentic assessments, while acknowledging that the assessment still needs to accommodate university policies, such as number of assessments, the amount of group-work, and/or alignment with work-integrated learning practices.

Villarroel et al. (2018) suggest there are thirteen characteristics of authentic assessment, but that these could also be grouped into three dimensions: realism, cognitive challenge, and evaluative judgement. With realism, any assessment becomes a proxy of the real world, rather than duplicating it exactly. Realism could also be designed through performance-based tasks and those more like activities close to the profession, which would, in theory, align with industries' complaint that students lack skills such as problem solving, critical thinking, communication, and teamwork. Cognitive challenge builds higher order skills (see Bloom's taxonomy), suggesting that rote learning, content quizzes, and other such memorisation heavy tasks are not aligned with authentic assessments. The evaluative judgment dimension suggests that formative tasks are well suited as they allow students to use feedback from previous tasks to develop their own self-recognition and reflection. For simplicity we have used the three dimensions outlined by Villarroel et al. (2018) for this paper.

Keeping in mind the importance of authentic assessments and its various characteristics, the next part of this paper digs deeper into ChatGPT's capabilities (as well as our ability to provide clear prompts) to help design authentic assessments. We are cognisant of the perspective that using ChatGPT to come up with strategies to circumvent the use of AI could be considered a form of meta-gaming: of using ChatGPT to circumvent the assessment's intended purpose. Though we would argue that using it this way may not be inherently problematic or unfair, and instead we will use it as a way of kickstarting our thinking or as a launchpad to start thinking about and designing authentic assessments. In this context, meta-gaming could refer to using ChatGPT as a way of engaging in cognitive off-load (Dawson, 2020), or getting AI to do some of the work for us, which might gain an advantage in assessment design.

Our standpoint is not to ban the use of ChatGPT. Understanding how ChatGPT works might assist students in starting to navigate the ethical considerations and potential biases in their own work, as the impacts of these technologies will be multidimensional (Ocampo, 2022). As many companies are already integrating large language models such as ChatGPT into their operations, having knowledge and skills related to ChatGPT might give students an advantage in the job market and give them an edge in their future careers.

Authentic Assessment Design and Analysis

Just as putting a student into the workplace does not guarantee a good learning experience, or necessarily a deep level of learning, allocating a name to an activity does not automatically make it an authentic task. Therefore, to demonstrate how ChatGPT could be used to assist in designing authentic assessments, we prompted it to design examples of authentic assessments in the context of business school and undergraduate nursing subjects at university.

Business Examples

We prompted ChatGPT to *design five authentic assessments for university undergrad business school where ChatGPT might not be as useful to students.*

ChatGPT:

Here are five examples of authentic assessments that might not require the use of ChatGPT for students in a business school subject at a university:

- 1) **Business Plan Development:** Require students to develop a comprehensive business plan for a new venture, including market analysis, financial projections, and marketing strategies.
- 2) **Market Research Project:** Assign students to conduct a market research project on a specific industry or product and present their findings and recommendations.
- 3) **Case Study Analysis:** Provide students with a real-life business case and ask them to analyze the situation, identify the key issues, and propose a solution.
- 4) **Role-Playing Simulation:** Design a role-playing simulation that puts students in the shoes of decision-makers in a real-world business scenario. This can include negotiations, sales pitches, or crisis management exercises.
- 5) **Product Development Challenge:** Challenge students to develop a new product or service and present it to a panel of industry experts for feedback and evaluation.

Using the three dimensions of realism, cognitive challenge, and evaluative judgement outlined by Villarroel et al (2018), we present our analysis of ChatGPT's authentic assessment suggestions for Business in Table 1 below:

Table 1

Authentic Assessments for Business School Students

ChatGPT suggestion	Realism	Cognitive Challenge	Evaluative Judgement	Authentic Assessment Potential?
1 Business Plan Development	Yes	Maybe	Maybe	Medium
2 Market Research Project	Yes	Maybe	Maybe	Medium
3 Case Study Analysis	Yes	Maybe	Maybe	High
4 Role-Playing Simulation	Yes	Maybe	Maybe	High
5 Product Development Challenge	Maybe	Maybe	Yes	Medium

Overall, these are reasonable ideas as a starting point for assessment design that focus on the higher order levels of Bloom’s taxonomy and are less suited to being written by ChatGPT than *write an essay about why marketing is important* or other traditional first-year assignments that tend to hover in the understanding level of Bloom’s. However, they all seem to be ones where the actual company or product chosen would be key to making ChatGPT “useless.” For example, we asked ChatGPT to *write a five-paragraph market analysis for Nike*, and it was able to do this (though the authors will note that while it was not brilliant, it would probably achieve at least a passing grade).

There also seem to be limitations on how much information ChatGPT can/will generate. For example, when we accidentally asked it to *write five pages* (instead of paragraphs) *of marketing strategy for a start-up company found on Indigogo called iZYREC*, its response was:

ChatGPT:

I’m sorry, but as a language model I am not able to generate a five-page marketing strategy. Five pages is a substantial length that requires in-depth research and analysis, which I am not able to perform. However, I would be happy to provide some general guidelines that could help you develop a marketing strategy for iZYREC.

Therefore, our suggestions to circumvent students defaulting to ChatGPT to output the bulk of their written work would be to use start-up companies (companies that have made substantial changes since 2021, the year ChatGPT was trained up to),

instead of multinational or global companies that have much information publicly available. This may allow the students to use ChatGPT as a learning tool to prompt them to get started but not for most of the cognitive requirements of the task, including but not limited to application and analysis. Also, the assessment rubric or marking guide should be specific in detailing what depth of knowledge of that company is required, as ChatGPT seems to be very good at providing industry pitches rather than detailed explanations. This is where co-designing assessments, or working specifically with industry on a project, would be a considerable advantage to reduce students' reliance on AI for information as well as enhance the authenticity of assessments and relevance to their future careers.

Nursing Examples

We prompted ChatGPT to *design five authentic assessments for university undergrad nursing where ChatGPT might not be as useful to students.*

ChatGPT:

Here are five examples of authentic assessments for an undergraduate nursing program at a university where ChatGPT might not be as useful for students:

- 1) **Clinical Simulation:** Provide students with a realistic simulation of a clinical scenario, such as a patient with a chronic illness or a medical emergency, and ask them to demonstrate their skills and knowledge in diagnosing, treating, and managing the patient.
- 2) **Case Study Analysis:** Assign students to analyze a real-life case study of a patient with a complex health condition, identify the key issues, and propose a care plan.
- 3) **Patient Interview and Assessment:** Have students conduct a patient interview and physical assessment, including taking the patient's history, conducting a head-to-toe assessment, and documenting their findings.
- 4) **Skills Competency Evaluation:** Evaluate students' proficiency in key nursing skills, such as administering medications, inserting IVs, or performing wound care, by having them demonstrate their skills in a controlled laboratory setting.
- 5) **Community Health Assessment:** Assign students to work in small groups and conduct a community health assessment, including gathering data on health indicators, identifying health needs, and developing a community health improvement plan.

Using the three dimensions of realism, cognitive challenge, and evaluative judgement outlined by Villarroel et al (2018), we present our analysis of ChatGPT's authentic assessment suggestions for Nursing in Table 2 below:

Table 2*Authentic Assessments for Nursing Students*

ChatGPT suggestion	Realism	Cognitive Challenge	Evaluative Judgement	Authentic Assessment Potential
1 Clinical Simulation	Yes	Yes	Yes	High
2 Case Study Analysis	Maybe	Maybe	Maybe	Medium
3 Patient Interview	Yes	Yes	Yes	High
4 Skills Competency Evaluation	Yes	Yes	Yes	High
5 Community Health Assessment	Maybe	Maybe	Yes	Medium

As nursing is a heavily practice-based profession, this lends itself well to authentic assessments and those identified by ChatGPT are common practice in most programs. The benefit to the output is that if there are new educators to nursing, then ChatGPT does provide some best practice ideas for authentic assessment that overall may work to prevent students' over reliance on AI. There are two exceptions: the case study analysis and community health assessment. First, for the case study analysis, while the higher order analysis may be outside of the scope of ChatGPT, there are aspects of this approach that it will likely be able to assist with. The use of ChatGPT could either be seen as a helpful foundational support for students to progress to high order analysis or where students can use it without undertaking the cognitive effort intended for the assessment task. The second example is the community health assessment; if this is based on requiring up to date health data after 2021, then students are less likely to be able to use ChatGPT due to the time limitations. However, the language model may be able to assist students with how to collate the assessment data and, based on the data gathered, may also be able to assist with suggestions for the improvement plan. If ChatGPT was used in this way, it would partially negate the intended learning purpose of the assessment and reduce the desired outcome of reaching the analysis and evaluation level of Bloom's taxonomy.

Collective Considerations

Another idea to reduce students' reliance on ChatGPT would be to have students conduct more in-depth research and analysis, be it as a literature review (where we have previously seen ChatGPT fail because it cannot cite correct research papers and instead hallucinates them), an experimental design, or a collaborative research project. All of these require higher order cognitive skills and evaluation that students will need to demonstrate, rather than just copy and pasting of preformed words, thus necessitating the construction of knowledge at the higher end of Bloom's taxonomy.

As noted earlier, one key characteristic of authentic assessment as suggested by Villarroel et al (2018) is evaluative judgment, or the ability of students to judge their own performance and develop standards against what good performance means. It is not clear just from the descriptions of the assessment tasks whether these tasks can be broken down into formative assessments (for students to receive ongoing feedback), or whether the assessment criteria could be seen in advance. These are critical elements of authenticity, which are not captured by the descriptions given by ChatGPT.

Discussion and Implications

Based on the business and nursing examples, we have reassessed our suggestion and posit that authentic assessments may not be the magic silver bullet to resolve student use of large language models. Similarly, authentic assessment does not completely remove academic integrity issues (Ellis et al., 2020), so it is unlikely to remove all reliance on ChatGPT and other large language models. However, we suggest that authentic assessments can help decrease the reliance on AI for regurgitation, and instead these can help students with their foundational learning skills to advance to higher order thinking required for more sophisticated assessments that more closely replicate their future professional requirements.

A different question might be how we build a culture of trust within our classrooms and move from the current expectation that students will use ChatGPT for academic misconduct. We posit that while culture change will take time, a first step might be to demonstrate how to integrate AI into assessments and use it to advance students' thinking.

As we come towards the end of the paper, we must revisit the initial questions posed around using ChatGPT to assist in designing assessments as well as to explicitly contribute to the writing of a paper, and if this demonstrates good scholarly practice when integrating ChatGPT into our work. However, due to the rapid evolution of this area, like AI, it remains uncertain whether these questions have been answered or will be addressed in the future. We acknowledge that ChatGPT and likely other similar technologies have started to and will become ubiquitous in the workplace. Therefore, we must consider if it should continue to be incorporated in scholarly practice and likewise into our places of learning to set our students up for their future careers. Where, rather than spending time working to circumvent students' use of it, we focus on ethical and appropriate use integrated into teaching and learning, and how it can contribute to advancement of students' digital and information literacy skills.

Further Research

As noted in this paper, ChatGPT can assist with what kinds of assessments to implement that might circumvent students' use of ChatGPT. We know that authentic assessment does not necessarily remove all opportunities for academic misconduct, and we posited this might be the same for ChatGPT, but we suggest this should be investigated in subsequent studies. Future research might explore how both academics and students can use AI in a way that it is meaningful and ethical, as the legalities around large language models remain to be seen. Also, though we tried explicitly in this paper to demonstrate where ChatGPT was used, there is the need for referencing guides to provide guidance on appropriate citation/acknowledgement of work done by AI.

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