

Higher Education Institutions' (HEIs) Business Models Are Not Sustainable – Implications of Text-Generating NLPs

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Abstract (Summary)

Text Generation Models such as ChatGPT has recently caught spotlights attributing to its unprecedented capability of generating argumentative, verbose, and human-like text that is relevant to the user's query (Mitrović et.al., 2023). Heralded as the next disruptive innovation, ChatGPT (and any subsequent text-generating models) have significant implications in the context of higher education, especially regarding academic integrity. But the disruptive nature of the technology also brings into light the severely dynamic environment, threatening Higher Education Institutes (HEIs) in their value proposition. A luddite response is cautioned against, and this paper contributes by opening the discussion on the implication of text generation models on HEIs as a business. We posit HEIs value proposition to be contributing to the acquisition of critical thinking abilities, that of which enables the problem-solving process of complex challenges perpetuating current dynamic environments, as a significant contributor to increased employability. The recommendation is to develop frameworks to address AI in ways that is academically ground and ethically sound in augmenting it to HEI's value proposition as a business.

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Introduction

In the field of machine learning, Natural Language Processing (NLP) models have seen extensive development, attributed to the deep learning process that refines the trajectory of its advancements. Effective text generation is now a reality, with ChatGPT taking the forefront.

Heralded as the next disruptive innovation in the field of education, ChatGPT is bound to cause significant changes, both positive and negative. The main debate, especially in regard to Higher Education Institutes (HEIs), addresses the end of academic integrity in writing-based assessments. While this topic is often discussed, fewer research is available on the implication of ChatGPT for HEIs themselves – what value can universities (and other HEIs) bring to the table?

This paper introduces the concept of ChatGPT and its development stages, describing capabilities, limitations, and future trajectories. We address its implications to HEIs through the perspective of academic integrity, citing its significance to HEI accreditation. Finally, we open the discussion on HEIs and their value proposition, assuming students as ‘consumers’ and HEIs ‘businesses’. In accordance with that, reasons for the limited availability of this area of research is briefly mentioned, with recommendations for HEI in responding to these disruptions and further exploration.

Text Generation Models

ChatGPT is the latest of a series of Natural Language Processing models, utilising machine learning to generate argumentative, verbose, and human-like text based on user queries (Mitrović et.al., 2023). Built upon GPT-3 and InstructGPT, it's developed through a mixture of supervised and reinforcement learning, using datasets from a myriad of web sources up to 2021 (Rudolph, et.al., 2023).

Its overnight rise to fame was attributed to the unprecedented capabilities that its predecessors lack; using reinforcement learning, it managed to align itself with user needs, rendering their output relevant (unlike GPT-3). Augmentation of the training dataset with more human conversations safeguarded the model against “offensive, inappropriate, and simply wrong (fact-based) texts”, putting it ahead of InstructGPT (Mitrović et.al., 2023). ChatGPT also possesses an extensive range of functionality, placing it closer to AGI (Artificial General Intelligence) than any other models (Mitrović et.al., 2023). Contributors of

a recently published paper concedes to ChatGPT's ability to enhance productivity with tangible benefits in multiple fields (e.g., banking, management, and marketing) (Dwivedi, et.al., 2023). It is this great capability of ChatGPT that brings it into the forefront of mass discussion, with many heralding it as the next disruptive innovation, including (but not limited to) the field of education (García-Peñalvo, 2023).

Empirically, this is reflected through the rapid uptake of ChatGPT despite its shortcomings; within five days of the initial launch, approximately one million users have signed up to the free platform (Murati, 2022). Opinion is split, however, on the merits of ChatGPT use in education, resulting on polarisation between restriction and legislation (Dwivedi, et.al., 2023). Accordingly, examination of text-generating NLPs as disruptor for higher education regarding academic integrity have arisen in literature.

Academic Integrity

Writing assessments form an integral part of higher education and ChatGPT can potentially end its trajectory, but what is the significance of this disruption to HEIs?

The discussion is rife; those against the motion of utilising ChatGPT in the context of higher education cited fears of students generating essays automatically, as well as reiterating errors and (often) crude output that is result of design (García-Peñalvo, 2023). The latter is not much different from a Google search, but the difference is that many approach ChatGPT as a 'perfect' source of information, forgoing critical thinking and taking its output at face value.

In relation to that, the issue of academic integrity can be considered to be the most contentious, as ChatGPT has repeatedly shown to be able to generate prose with minimal human effort (García-Peñalvo, 2023). If one can retrieve credible arguments without expending any effort, how can they then acquire the necessary skills that the intellectual task was designed for? And so, how can HEIs maintain their accreditation in graduating students having acquired necessary "critical thinking, writing, and quantitative reasoning skills" (Rubin, 2013) in the face of such disruption?

Prior Disruption: Online Learning & the COVID Pandemic

Higher education is notorious for its resistance to change and very high risk-aversion (Kaplan, 2021) despite its increasing vulnerability to technological disruptions. This can be illustrated by the adoption of online learning in face of the COVID pandemic.

Online (distant) learning, one of many disruptive pressures arising from digitisation, has been conceptualised and realised long before COVID, but it never reached mainstream adoption (Kaplan, 2021). One of the earliest cases of online learning offerings was back in 1995, when Southern New Hampshire University experimented with the program as means to tackle financial limitations, with successful implementation culminating to 80,000 enrolments in 2018 (Lapovsky, 2018). Despite so, little else has been recorded, partly attributed to suppression from HEIs: the reluctance of faculty from teaching through lenses out of fear of redundancy or unfamiliar technology, the discouraged administration from high investment costs, and the deviating efficacy of distant learning to different student groups (Kaplan, 2021).

COVID changed this trajectory; it became necessary for online learning to be adopted. A massive shift occurred, and while higher education proceeded somewhat normally, most of these shifts were improvised and not up to standard (Kaplan 2021). HEIs became acquainted with the possibilities of online learning (if a bit forced). Students' reception was empathetically positive, but in normal times, expectations would increase (Kaplan, 2021).

ChatGPT is next in line, however, it disrupts the very essence of HEIs model as they threaten the feasibility and credibility of writing-based assignments – the main tool employed to measure performance. The following section highlights the structural issues HEIs face that enable such innovation to be disruptive.

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For-profit vs. Not-for-profit: a dilemma

From its inception, HEIs have faced a constant dilemma between financial survival (for-profit) and public service (not-for-profit). Castells (2001) identified four major functions for these institutes: expressing ideological struggles, selection and socialisation of dominant elites, knowledge generation through scientific research, and (most traditionally) training skilled labour force. All have some degree of public service, where quality is of importance.

As a social pillar of excellence, it is at the heart of all HEIs to fulfil most, if not all, these functions. The underlying assumption is that highly accredited HEIs are structurally sound to ensure their graduates capable of meeting real-world challenges by leveraging their acquired skills and knowledge. Tangibly, this transformation is assessed through writing assessments, being both efficient and effective for students to express their thoughts and for faculty to manage their workload.

But implicitly, HEIs are subject to other pressures from their immediate stakeholders.

Reduced government funding have shifted the financial burden to students and their families; this is evident by the persistently increasing student debt plaguing current generations (Kaplan, 2001). This gives rise to two problems.

First, HEIs must shift their operational (perhaps, even their business) model to contend with reduced financial assets when performing their role in education. Standards must be met and kept, and they must do so in a more cost-effective/efficient manner. Second, the shift of tuition fee to students have caused them to demand more value from HEIs; they must be convinced of the 'value' of HEIs.

The Value of HEIs in Face of Disruptive Innovation

In this dynamic and everchanging environment, how do HEIs stay relevant? Prior to ChatGPT's disruption, HEIs have faced increasing pressures that is commonplace of a highly marketized industry (Woodall, et.al., 2014). The norm has shifted to competitive funding models, and a reassessment of HEI's 'values' are, I argue, pertinent. Woodall et.al. (2014) showed that in the United Kingdom, students are progressively exhibiting consumer-like behaviour, pushing these institutions to give more value for their money. This is a hard pill to swallow, as culturally, the environment of HEIs have changed little compared to other organisations. The apprehension is rooted in labelling students 'consumers', as commodifying HEIs (is perceived to) undermine higher education, trivialising "core academic principles" (Woodall et.al., 2014). Yet, a new disruption has emerged (as previously discussed), and now more than ever, it is pertinent for HEIs to assume the plausibility of this concept in ensuring its relevance. Public perception has shifted towards scepticism on the value of higher education attributing to the large debt incurred by students in addition to lack of tangible proof for better employment (Lapovsky, 2018). When students collectively make up a large contribution on HEIs revenues, the 'consumer' label is legitimate.

It is imperative to discuss 'value' (or perceived value), given its ambiguity on conceptualisation and measurement. In the aspect of reactions to product-related stimuli, satisfaction and loyalty are two key traits used to measure value (Woodall et.al., 2014) with the objective of meeting or exceeding initial consumer expectations. The approach tends to gravitate between qualitative value mapping (benefits-based identification of stakeholder

wants and needs) and value scaling (connecting product attributes to metrics like satisfaction and loyalty) (Woodall et.al., 2014).

Woodall et.al. (2014) adapted from Heskett, Sasser, and Schelsinger (1997) and Grönroos (1997) to illustrate the value equation, as illustrated by *Figure 1*.

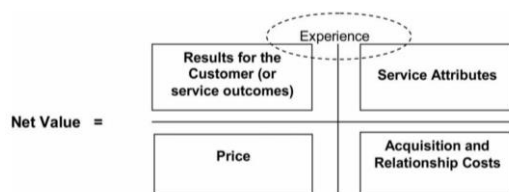


Figure 1. The value equation for HEIs (Woodall, et.al., 2014).

The top row represents the benefits that students receive from HEIs, in exchange for the sacrifices located on the bottom. The framework is extended to its subsequent components.

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Results for the Customer	Service Attributes
Practical outcomes - Knowledge/learning - Transferable skills - Business understanding - Time/money management Social outcomes - Life experience - Friendships - Social status - Familiarity with different cultures Strategic outcomes - Degree - Employment opportunities - Networking opportunities - Further education opportunities - Corporate pipeline Personal outcomes - Self-actualisation/fulfilment - Confidence - Independence - Personal development/maturity - Please parents/significant others	Lifestyle facilitators - Local sustenance (Cafés, shops) - Local services (Banking, print shop, insurance) - Transport links - Accommodation Office Support services - Personal counselling - Financial advice - Health centre - Students union - International office Lifestyle enhancers - City centre campus - City life - Cultural variety - Gym/sports facilities - Personal freedom - Student's Union Academic support - Library - Language programmes - Internet/pc access - Teaching staff - Administration Career Enhancers - Placement/Internship - University business initiatives - Careers office
Price	Acquisition and Relationship Costs
Course/tuition fees	Lost opportunity: - Work experience/wages - Travel/other social and entertainment - Starting family/establishing stable relationships Subsistence: - Rent - Daily transport - Occasional travel - Utilities - Food and entertainment - Telephone costs Effort - University work (revision/examinations, coursework) - Loss of home comforts/fending for yourself - Part-time work - Travel between classes/buildings Direct learning costs - Books - Stationary - Print costs - IT (laptop, etc.) Psychological costs - Academic stress (workload, deadlines, fear of failure) - Financial worries/debt - Homesickness - Pressure on personal relationships - Weight of expectation from family/friends - Personal expectations - Pressure to socialise Other Acquisition costs - Pre-course study - Loss of privacy (communal living) - Leaving 'safe'/familiar environment - Crime - Cultural/social prejudice - UK weather

Figure 2. Components of the value equation for HEIs (Woodall, et.al., 2014).

Strategic outcomes – especially increased employability – is arguably the most emphasized role for HEIs in current times (Brennan & Lebeau, 2004). In the end, return on investment (on student's tuition fees) is tangibly expressed through wages (and indirectly employability). If ChatGPT can be used the way it currently is, that undermines HEI's quality and accreditation as students reach set standards without exerting any critical effort or "training" for it. What will employers and the public think of university's quality (academic integrity)? What will student's perception be (on HEI redundancy)?

Following an outcome-based role of HEI in advancing employability of its graduates relates to the demand for skills; essentially, identifying the capabilities required to navigate current challenges in a dynamic environment. Of the most contentious capability, especially in

relation to academic integrity and accreditation, is that of critical thinking, with as much as 81% of surveyed employers in the United States citing the need for HEIs to place more emphasis on the topic (Liu, et.al., 2014). The definition of critical thinking itself is still debated, but Liu et.al. preferred the transferability of general critical thinking across a multitude of fields, provided with relevant contextual information (Liu, et.al., 2014). Critical thinking is a central aspect in summative usage of accreditation, accountability, and benchmarking in HEIs, as well as contributing to formative usage in improving faculty instructions (Liu, et.al., 2014).

Essay writing enables constructed-response assessments, which is argued to be crucial for formation of critical thinking when compared to the alternative multiple-choice based assessments (Liu, et.al., 2014). In real life, one is expected to formulate their own choices in response to a problem, followed by performing the necessary critical evaluation in determining the most optimum course of action; it is this reason why essay-based assessments are predominantly used in higher education (Liu, et.al., 2014). While some argue that ChatGPT provides an opportunity to focus upon raising thought-provoking questions in contrast to developing mere writing skills, others suggest that it poses a threat of 'lethargy' in the hands of students substituting essay-writing entirely in favour of rephrasing the generated content (Dwivedi, et.al., 2023).

We then frame the question of HEI's value proposition in today's environment as "contributing to the acquisition of critical thinking abilities, that of which enables the problem-solving process of complex challenges perpetuating current dynamic environments, as a significant contributor to increased employability", wherein such value proposition is outcome-based for both students and employers. The description is apt when considering the relevant indicators of ChatGPT-uptake in HEI (or lack thereof), including accreditation and accountability.

HEI Responses – Past and Present

It pays to address the fact that ChatGPT is not the first disruptor of HEIs business models historically, although it does present a rapid and impactful change in relative terms (Lapovsky, 2018). Historical analysis of HEI business model has seen a strategy of persisting with its missions (and in turn, business models) regardless of how narrow they are defined nor the changing external environment, though there are a few exceptions. The age-old issue of funding has prompted tactical changes in operations, such as the introduction of online

courses, development of pre-professional programmes, and internationalisation of the student population as means to increase net tuition revenue (Lapovsky, 2018). These tactical changes enable diversification of revenue streams, but more importantly, it illustrates the tactical preference of HEIs in addressing new challenges and disruptions (rather than a complete restructuring of their business model and value proposition).

In the matter of AI-based disruption, ChatGPT is merely the latest in a string of different innovations; popular tools such as Grammarly, Research Rabbit, and rTutor.ai all shows significant contribution in text-generation software but substantial disruptions for academic integrity (Dwivedi, et.al., 2023). As of current, policing seems to be the most common response adopted by relevant bodies. Mitrović et.al. (2023) developed a ML-model of plagiarism detecting software with a 79% accuracy on spotting ChatGPT-generated reviews of restaurants; Turnitin developed an AI-written detection tool (Chechitelli, 2023); recommendations on substituting purely technical writing tasks with those incorporating creative or abstract thinking, personal experience, or a formulated opinion on events proceeding 2021 (which are the limitations of AI) are commonplace (Rudolph et.al., 2023).

But policing might not be the best long-term solution. García-Peñalvo (2023) aptly spotted the luddism in response to (drastic) change and outlined the case that said response will do little to halt the productivity plateau of the product's life cycle. ChatGPT, despite being in its infancy is significantly disruptive and its descendants (which is already under development) will prove to be more so. For that reason, policing as a sole response is cautioned against by most (Dwivedi, et.al., 2023).

Eaton (n.d.,) compiled a set of 29 self-reported qualitative data on several policies regarding generative AI across different HEIs. Responses ranged from outright ban, circumvention, contextual usage, and no limitations. However, there is little evidence of active support in guided use, which in retrospect has plausibility in benefitting outcome-based learning.

Quasi-experiment: Perception of HEI Faculty and Deanery in a London-based Business School

As part of gathering perception of experts in the value of HEIs in face of disruptive innovation, we conducted a quasi-experiment of qualitative survey on the faculty members and deanery of a London-based business school. Eleven questions pertaining to the value of HEIs in regards to the introduction of ChatGPT includes qualitative perceptions as well as

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quantitative ranking (0 – No to 4 – Absolutely) of different indicators is thought to illustrate current perceptions. Out of 23 questionnaires sent, we received a 34.8% response rate. The following passage reports on our findings.

To what extent do HEIs contribute to knowledge acquisition?

8 responses

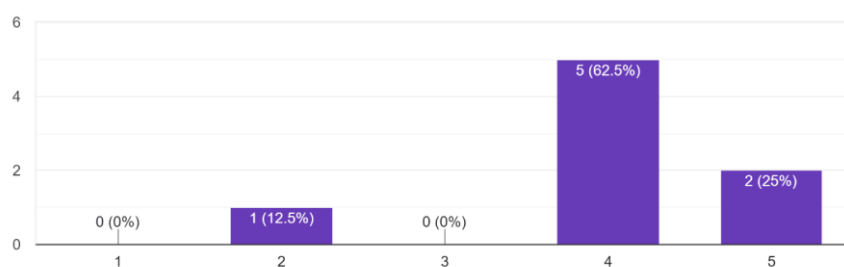


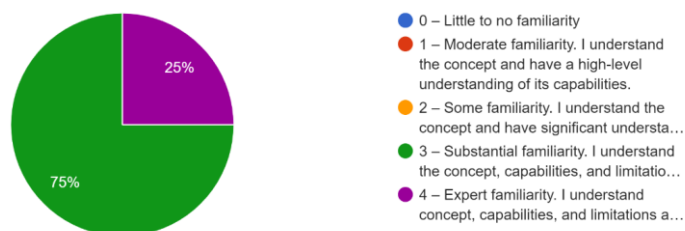
Figure 3. Extent of HEI contribution to knowledge acquisition (0 – low; 5 – high)

On the question of “what is your understanding of the role Higher Education Institutes in today’s dynamic environment?”, all answers revolve around the role of HEIs as a “bridge” between organisations and workforce, with objectives such as “skill development” to be essential and acknowledging the shift of students to customers. Most still attributes HEIs to contribute to knowledge-acquisition.

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How familiar are you with Chatbots such as ChatGPT and GPT-3?

8 responses



Do you think they pose a threat to written essays as a form of learning assessment, whether formative (to build knowledge) or summative (to test knowledge)?

8 responses

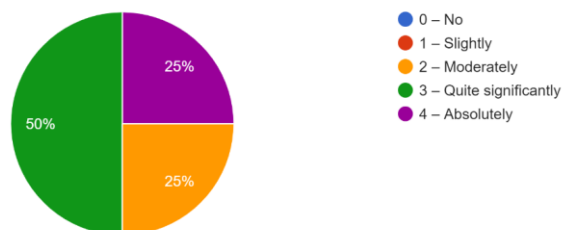


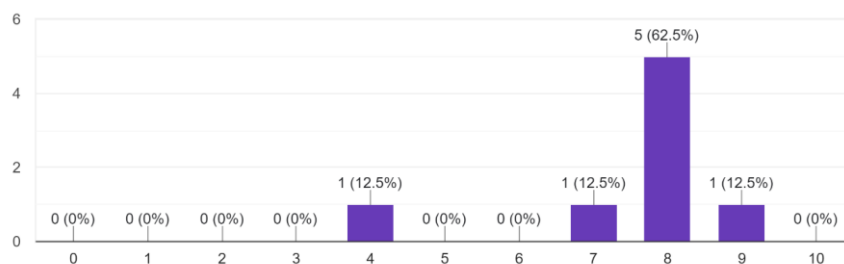
Figure 4 – 5. (In order) Familiarity with text-generation models; perception of the threat of text-generation models on written essays as a form of learning assessment.

Familiarity of faculty and deanery with generative AIs tend to be high (mean = 3.25) while sentiment towards their impact on written essays as a form of learning assessment to be moderate-high (mean = 2.75).

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What percentage of students do you estimate utilise chatbots when writing their essays?

8 responses



To what degree do you think chatbot-generated content comprise any given essay/written assessment?

8 responses

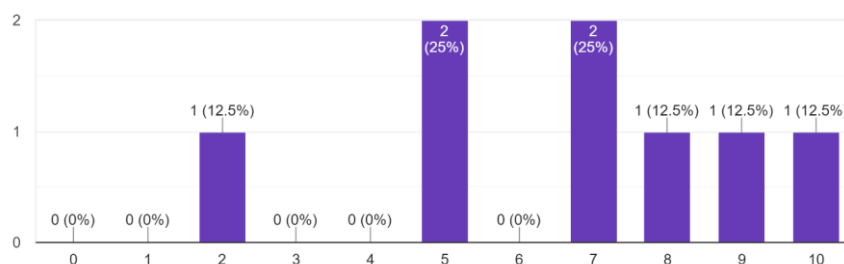


Figure 6 – 7. (In order) Estimation of chatbot usage by students; Estimation of the proportion of chatbot-generated content in any given essay/written assessment.

When estimating the usage of chatbots in written essays (here, usage denotes an all-or-nothing scenario wherein preliminary generation of chatbot-text is considered as usage), a large body of student is perceived to have done so (mean = 75%). The extent of chatbot usage is more varied, averaging at 66.25%.

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If you are a professor/teaching assistant, to what extent have you changed your teaching/assessment methods to contend with the shift of chatbot usage by students?

5 responses

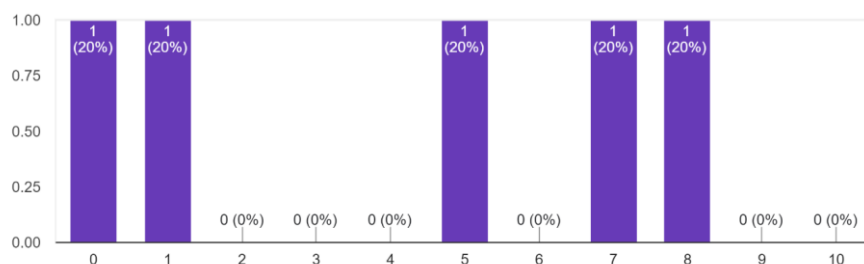


Figure 8. Extent of teaching/assessment methods modification.

Despite the large body of perceived chatbot-usage in academia, combined with the relatively high perception of their role in disrupting written-based assessments, response from faculty is much more varied. Half of user-inputted response allowed for the use of ChatGPT and other generative AI within academia, while others tend to design assignments in such way that circumvent the possibility of its use.

Do you think chatbots, in their disruptive nature of knowledge acquisition through aiding written assessments, pose a threat to HEIs in their value proposition?

8 responses

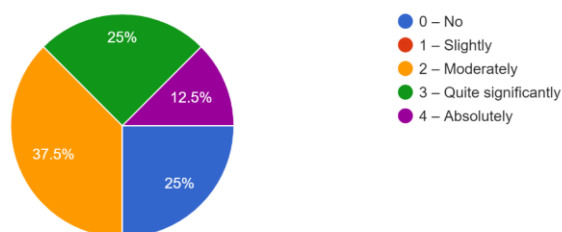


Figure 9. Perception of chatbot's disruptive nature on HEI value proposition.

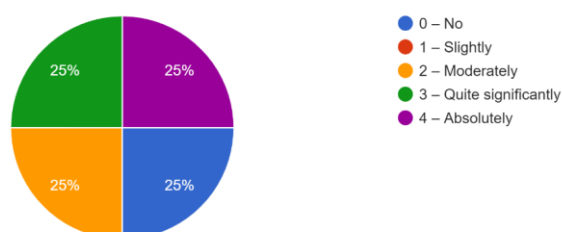
Responders have a lower perception of generative AI's disruptive role in HEIs and their value proposition (mean = 2; compared to 2.75 of generative AI's disruptive nature towards written-based assignments). Further development can be done to determine what other factors

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contribute to HEI's value proposition, but the marginal difference indicates that to a degree, written-based assignment contributes substantially to HEI's value proposition.

Do you think developing stricter policing methods (including but not limited to AI-detecting plagiarism softwares, citation requirements, etc.) ...to remain relevant in today's dynamic environment?

8 responses



Do you think incorporating chatbots in academia (as part of learning and class discussions) will contribute HEIs to remain relevant in today's dynamic environment?

8 responses

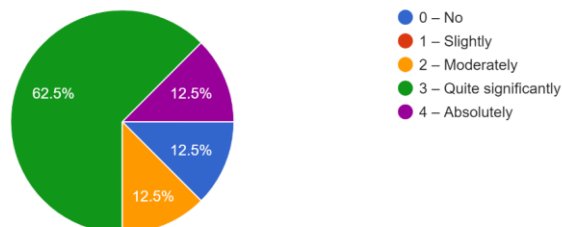


Figure 10 – 11. Two different scenarios of responding to chatbots in academia within the context of HEI relevance.

Comparatively, incorporating chatbots in academia as part of learning and class discussions (mean = 2.625) is perceived to help ensure HEIs relevance in today's dynamic environment to a larger degree than that of stricter policing methods (mean = 2.25).

Ongoing Research

“However, the ‘New Realities’ facing higher education are about responsiveness – not ‘downgrading’ higher education to training.” (Harvey, 2000)

One line of research suggests integrating AI into curriculum as a recommended course of action, accompanied by updated frameworks on how to interact with AIs in ways that are academically ground and ethically sound. This is built upon the opportunity presented through research gaps in identifying relevant skills, resources, and capabilities for one to handle ChatGPT and other generative AIs (Dwivedi, et.al., 2023). The perception tends to gravitate towards viewing ChatGPT as a tool, such as Buhalis who suggested the experimentation and exploration of ChatGPT applications and boundaries under faculty guidance, delegating the responsibility of ensuring critical use to professors (Dwivedi, et.al., 2023). On the other hand, O'Connor cautions the real possibility of AI to 'stifle critical thinking', leading to the need for more diverse assessment methods that is holistic of appropriate chatbot usage – a highly likely indicator of employability given the expectation for it to 'revolutionize the way we search for information' (Dwivedi, et.al., 2023; Else, 2023).

Integrating AI into curriculum is an extension of permitting ChatGPT use in assignments; essentially, it prompts ChatGPT to take centre stage in class discussions, guided by experts in relevant fields and assessing its content quality in an interactive format. The nature of this practice benefits greatly from utilising outcome-based learning. The framework refers to the achievement of learning outcomes (skills, knowledge, and competences) by placing learners as focal points; learning methods and assessments are based upon this principle (Crespo, et.al., 2010). The three learning outcomes build upon each other, whereby acquisition of one open the door to acquiring the next. 'Knowledge' assimilates information learned, applied in the form of 'Skills' and expanding such usage in other situations as 'Competence' (Crespo, et.al., 2010).

The framework was utilised by the European Union back in 1999 to tackle the challenge of making European HEI graduates suitably equipped with the "appropriate knowledge, skills, and competences required by the workplace" in meeting the challenges posed by global hyper-competition (Crespo, et.al., 2010). The process of transforming the role of HEIs as providers of learning methods to achieve employability outcomes is aligned with our postulation of HEIs value proposition, but application of such framework is limited by design. Learning outcomes are based as "units of learning", where these measures are contextualised, complete, and self-contained.

Outcome-based learning breaks down the logic behind assessments, wherein we can identify the base layer (knowledge) to be the main point of address. This is problematic, as previously

stated the determination of knowledge contributes to skills and competence in turn. Current responses are lacking, which can be attributed to the recent development of such rapid change. And yet, ChatGPT and other subsequent generative AI will escalate the rate of disruption within higher education. Tactical changes in the business model are required, but even more substantial development is required for HEIs to remain relevant in current times. The most pertinent question is developing a framework to provide critical thinking learning within curriculum to appropriately use generative AI, as such skill is necessary in tackling the near-term challenge of HEI relevance as well as fulfilling an outcome-based learning that incorporates demanded skills for employability.

Conclusion

Developments in ChatGPT, despite its shortcomings, have enough advancements to place it on the pedestal of a disruptive innovation. Further development in text generation models is underway, carrying implications in the context of higher education and Higher Education Institutes (HEIs). HEIs value proposition is posited to be contributing to the acquisition of critical thinking abilities, that of which enables the problem-solving process of complex challenges perpetuating current dynamic environments, as a significant contributor to increased employability. In regard to fulfilling such role, it is strongly recommended for HEIs to respond to text-generation technologies not through rejection or ignorance, but by incorporation to augment the value proposition of higher education. Only then can they remain relevant in this increasingly dynamic environment.

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References

- Brennan, J., King, R. and Lebeau, Y., 2004. The role of universities in the transformation of societies. *Synthesis Report. Centre for Higher Education Research and Information/Association of Commonwealth Universities, UK*, 72.
- Crespo, R. M., Najjar, J., Derntl, M., Leony, D., Neumann, S., Oberhuemer, P., ... & Kloos, C. D. (2010, April). Aligning assessment with learning outcomes in outcome-based education. In IEEE EDUCON 2010 Conference (pp. 1239-1246). IEEE.
- Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., ... & Wright, R. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, 71, 102642.
- Eaton, L. (n.d.). *Classroom Policies for AI Generative Tools*. Retrieved 28 April 2023, from: <https://docs.google.com/document/u/0/d/1RMVwzjc1o0Mi8Blw-JUTcXv02b2WRH86vw7mi16W3U/mobilebasic>
- García-Peñalvo, F.J., 2023. The perception of Artificial Intelligence in educational contexts after the launch of ChatGPT: Disruption or Panic?.
- Harvey, L., 2000. New realities: The relationship between higher education and employment. *Tertiary Education & Management*, 6(1), pp.3-17.
- Illia, L., Colleoni, E. and Zyglidopoulos, S., 2023. Ethical implications of text generation in the age of artificial intelligence. *Business Ethics, the Environment & Responsibility*, 32(1), pp.201-210.
- Kaplan, A., 2021. *Higher education at the crossroads of disruption: The university of the 21st century*. Emerald Group Publishing.
- Lapovsky, L. (2018). The changing business model for colleges and universities. *Forbes*.
- Liu, O. L., Frankel, L., & Roohr, K. C. (2014). Assessing critical thinking in higher education: Current state and directions for next-generation assessment. ETS Research Report Series, 2014(1), 1-23.
- Mitrović, S., Andreoletti, D. and Ayoub, O., 2023. ChatGPT or Human? Detect and Explain. Explaining Decisions of Machine Learning Model for Detecting Short ChatGPT-generated Text. *arXiv preprint arXiv:2301.13852*.
- Murati, M. [@miramurati]. 2022, December 6. Tweets. [Twitter profile]. <https://twitter.com/miramurati/status/1599796191243669504>
- Rubin, B., 2013. University business models and online practices: A third way. *Online Journal of Distance Learning Administration*, 15(1), p.17.

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Rudolph, J., Tan, S. and Tan, S., 2023. ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?. *Journal of Applied Learning and Teaching*, 6(1).

Sengupta, A., & Ray, A. S. (2017). Choice of structure, business model and portfolio: Organizational models of knowledge transfer offices in british universities. *British Journal of Management*, 28(4), 687-710
Woodall, T., Hiller, A. and Resnick, S., 2014. Making sense of higher education: Students as consumers and the value of the university experience. *Studies in higher education*, 39(1), pp.48-67.

Zhang, Q., Guo, B., Wang, H., Liang, Y., Hao, S. and Yu, Z., 2019. AI-powered text generation for harmonious human-machine interaction: current state and future directions. *2019 IEEE SmartWorld, Ubiquitous Intelligence & Computing, Advanced & Trusted Computing, Scalable Computing & Communications, Cloud & Big Data Computing, Internet of People and Smart City Innovation (SmartWorld/SCALCOM/UIC/ATC/CBDCom/IOP/SCI)*, pp.859-864.