Public Discussions about ChatGPT in Malaysian Education During its Initial Launch: A Qualitative Content Analysis of Newspaper Articles

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Abstract: The launch of ChatGPT in late 2022 offers a glimpse into the capability of generative artificial intelligence (AI) chatbots, as well as a future that is both exciting and filled with uncertainty about how powerful chatbots might become. ChatGPT, which has been trained on a huge dataset, can engage in a conversation with its users and respond to their questions. The launch of ChatGPT was followed by newspaper articles speculating on the transformations and impacts that ChatGPT would have on various facets of life, especially education. To gain a better understanding of what people have discussed about ChatGPT in Malaysian education during ChatGPT's initial launch, this study first searched three mainstream national Malaysian English newspapers using the search terms "ChatGPT" and "education" to identify 16 relevant newspaper articles, which were then analysed using a qualitative content analysis. The analysis revealed that the discussions regarding ChatGPT in Malaysian education in these newspaper articles could be categorised into five level-one categories: academic ethics, AI competence, ChatGPT adoption, learning design, and soft skills, which were further divided into 15 level-two subcategories. The findings of this study have various practical implications that may help academics and educational institutions better prepare for the expected increase in chatbot use by students and academics. The findings also make several theoretical contributions and provide a point of departure for future research.

Keywords: Artificial intelligence, ChatGPT, Chatbot, Education, Education policy, Qualitative content analysis

1. Introduction

The launch of ChatGPT by OpenAI in late 2022 has sparked considerable interest in the generative artificial intelligence (AI) chatbot's capabilities and the challenges it may pose to the education sector (Crawford, Cowling and Allen, 2023; Kohnke, Moorhouse and Zou, 2023). ChatGPT is trained on large language models and can respond to questions in a conversational style through a simple user interface. Users have come up with creative ways to ask the chatbot to write things like lyrics, letters, and computer codes, which raises serious concerns about the authenticity and ethics of the work it produces. These concerns are especially relevant to learning assessment in education because students may seek the help of chatbots to complete their assessment tasks, making it difficult for assessors to determine whether the work is written by students or chatbots (Benuyenah, 2023; Geerling et al., 2023).

During ChatGPT's initial launch, as the use of ChatGPT was still in its early stages, people had different views about chatbots. Some consider chatbots a positive development and support their use, while others perceive them negatively and oppose their use (Benuyenah, 2023; Hasanein and Sobaih, 2023). Before academics and educational institutions could better understand its applications and implications for teaching and learning, a US school district in New York (Fahr, 2023), some Hong Kong universities (Mok, 2023), and a French university (The Star, 2023a), banned the use of the chatbot in assessments due to concerns about plagiarism. Others, such as several Japanese institutions (The Star, 2023b), restricted its use, while others, such as some Australian universities (Starcevic, 2023), redesigned their assessment practices.

ChatGPT's initial launch received significant worldwide media coverage; Malaysian newspapers were no exception and had reported on it since its launch, not only in their news section but also in other sections such as education, technology, and editorial. During ChatGPT's initial launch, differing perspectives emerged about its potential impact and future development. However, despite the many discussions surrounding ChatGPT in newspapers, these discussions remain scattered across different newspaper articles, making it unclear whether these discussions can be further synthesised and categorised to better reflect various aspects of ChatGPT in Malaysian education and what these aspects actually represent and mean. This study therefore attempts to answer the question of "what have people been discussing" about ChatGPT in Malaysian education in newspaper

articles published in the first few months following its launch. To collect qualitative data, this study searched newspapers for relevant articles, using a qualitative exploratory research design. It then employed a qualitative data analysis method (i.e., qualitative content analysis), following an inductive approach, to create categories based on the concepts found in the data.

Since its launch, various studies have examined the opportunities, benefits, threats, challenges, and implications that ChatGPT or chatbots pose to teaching and learning. For example, some of these studies analysed ChatGPT's responses to teaching and learning questions (Athilingam and He, 2024; Michel-Villarreal et al., 2023), field diaries (Humble et al., 2023), journal articles (Lo, 2023), and Twitter tweets (Adeshola and Adepoju, 2023). Nevertheless, Skavronskaya, Hadinejad and Cotterell (2023) recommend that more studies be undertaken to better understand the implications of chatbots on education so that academics may stay relevant and adapt their learning design and delivery. Ciampa, Wolfe and Bronstein (2023) also contend that a deeper understanding of the issues surrounding the use of chatbots in education will lead to better measures to mitigate the issues. This study aims to contribute to the historical narrative of ChatGPT by examining what people have discussed about it in newspaper articles since its initial launch.

The remainder of this paper provides a background to the research, explains the research design and method, presents the data analysis and results, discusses the study findings and their practical implications and theoretical contributions, and concludes with a discussion of the research limitations and future research directions.

2. Literature Review

2.1 ChatGPT and Generative AI Chatbots

Generative AI chatbots, driven by large language models, can carry out natural language processing tasks such as language translation, software development, text writing, and so on, by first receiving a question from users and then generating a response accordingly (Sanders, 2023). Some of these chatbots can even understand a question not only in text but also in the form of a picture or audio, making interactions with them feel very human-like, as if a real person were responding to the users' questions and inputs. Besides individual users, businesses in various industries have also deployed specialised chatbots to improve productivity, e.g., healthcare (Fox, 2023), fast-moving consumer products (Johnston, 2023), and banking (The Straits Times, 2023).

Launched on 30 November 2022, ChatGPT is a generative AI chatbot developed by OpenAI, a company that specialises in AI solutions. It is built on the GPT-3.5 model and is free to use. Unlike a traditional search engine, which returns pages of web links, the chatbot returns a specific, summarised text response to the user's questions. Particularly, the chatbot is capable of understanding questions in context and learning from its own responses. Besides using text, users can also use speech recognition and text-to-speech functions to converse with the chatbot. The chatbot can communicate in many languages, although the quality and accuracy of responses may vary (OpenAI, 2022).

ChatGPT quickly gained international fame and surpassed 100 million active users within the first two months of its launch (Diaz, 2023). Although ChatGPT users may find the chatbot useful in many ways, such as planning a trip, writing an essay, or coding a software application, the GPT-3.5 model has several known limitations. Because the model is not connected live to the internet and it was trained on a huge dataset up to 2021, ChatGPT would technically have no responses to questions requiring information after that date (OpenAI, 2022). Furthermore, OpenAI (2022) cautions that ChatGPT responses are not always accurate and may be biased in some cases.

OpenAI launched ChatGPT Plus on 1 February 2023, charging users a monthly subscription price of USD 20 for faster response and improved access (OpenAI, 2023a). ChatGPT Plus customers were given access to a newer model, the GPT-4, on 14 March 2023 (OpenAI, 2023b). The GPT-4 model performs better in advanced reasoning, can handle more complex questions, and can search the web for current information to provide more up-to-date responses (OpenAI, n.d.).

Since the launch of ChatGPT, there have been other chatbots available on the market, e.g., Microsoft Copilot (formerly Bing Chat), Google Bard, and so on. These rival chatbots, which are free to use, also claim to be able to search the web for current information and are capable of citing sources of information (Google, n.d.; Microsoft, n.d.).

2.2 Generative AI Chatbots in Education

Generative AI chatbots are a potentially disruptive technology that can lead to a paradigm shift in transforming conventional teaching and learning (Adiguzel, Kaya and Cansu, 2023; Gill et al., 2024; Tlili et al., 2023). Past studies have explored their use and impact in various educational disciplines, e.g., programming education (Humble et al., 2023), tourism education (Skavronskaya, Hadinejad and Cotterell, 2023), engineering education (Sánchez-Ruiz et al., 2023), and nursing education (Athilingam and He, 2024).

Chatbots can play the role of a teaching assistant, a personal tutor, an assessment partner, and a co-researcher (Ansari, Ahmad and Bhutta, 2023). Kasneci et al. (2023) explain that chatbots can help students learn in various ways, such as developing reading, writing, research skills, and critical thinking and problem-solving skills. Dwivedi et al. (2023) deem that, in addition to obtaining feedback on their work, students can use chatbots to gain foundational information that can be used to develop higher-order thinking skills. Rahman and Watanobe (2023) suggest that chatbots can function as tutors who are constantly available to answer questions and provide feedback to students at any time and location. Chatbots can also assist academics in their teaching, e.g., designing learning activities and exercises, developing lesson plans, generating questions and quizzes (Kasneci et al., 2023; Rahman and Watanobe, 2023; Su and Yang, 2023), and providing research support (Hasanein and Sobaih, 2023; Lo, 2023; Strzelecki, 2023).

However, despite these benefits, chatbots also bring challenges. It has been suggested that chatbots present some challenges, e.g., academic integrity (Adeshola and Adepoju, 2023; Benuyenah, 2023; Lo, 2023; Skavronskaya, Hadinejad and Cotterell, 2023), quality of the responses (Humble et al., 2023; Lo, 2023; Sánchez-Ruiz et al., 2023; Tlili et al., 2023), a decline in critical thinking skills due to over-reliance (Hasanein and Sobaih, 2023; Putra et al., 2023; Sánchez-Ruiz et al., 2023), a decrease in lecturer-student engagement (Hasanein and Sobaih, 2023; Sánchez-Ruiz et al., 2023), and equity in accessibility (Sánchez-Ruiz et al., 2023; Tlili et al., 2023).

The use of chatbots in assessment frequently comes under the spotlight as it raises concerns about plagiarism and cheating (Skavronskaya, Hadinejad and Cotterell, 2023). Student misuse of chatbots might result in plagiarism, and it is difficult for assessors to discern work generated by chatbots (Dwivedi et al., 2023). Another concern is that over-reliance on chatbots may reduce students' desire to learn to write and impede their cognitive development (Dwivedi et al., 2023). Students may lose their critical thinking skills if they accept the responses provided by chatbots without understanding or analysing the information before making decisions or suggesting solutions (Adeshola and Adepoju, 2023; Humble et al., 2023; Putra et al., 2023). Kasneci et al. (2023) also warn that relying too much on chatbots can lead to students not putting in their own effort to problem-solve, which can hinder the development of creativity, critical thinking, and problem-solving skills in students. Thus, academics should use chatbots to augment rather than replace learning delivery.

There have been suggestions to mitigate the challenges posed by chatbots. Students and academics should develop digital competence in using chatbots before adopting chatbots for teaching and learning (Adeshola and Adepoju, 2023; Ciampa, Wolfe and Bronstein, 2023). Academics need to understand the benefits and downsides of chatbots, as well as how to provide students with the knowledge and skills required to use chatbots as a learning tool (Kohnke, Moorhouse and Zou, 2023; Tlili et al., 2023). To maintain academic integrity, educational institutions should have guidelines, codes of conduct, or policies to guide students and academics in using chatbots responsibly and ethically (Adeshola and Adepoju, 2023; Ansari, Ahmad and Bhutta, 2023; Hasanein and Sobaih, 2023; Maheshwari, 2023).

In addition, academics should design assessment tasks that encourage students to use chatbots as a learning tool instead of relying on them to generate answers (Hasanein and Sobaih, 2023; Sánchez-Ruiz et al., 2023). Academics should also create learning environments that provide learning experiences that chatbots cannot replace (Geerling et al., 2023), e.g., encourage students to apply concepts to foster critical thinking rather than simply reiterating information (Abramson, 2023). In addition, academics can use detection tools like Turnitin (www.turnitin.com), GPTZero (gptzero.me), and Checker AI (www.aicheatcheck.com) to detect any irregularities for plagiarism.

Furthermore, in response to technological advances in chatbots, new teaching strategies and pedagogies are required (Benuyenah, 2023; Skavronskaya, Hadinejad and Cotterell, 2023; Tlili et al., 2023). Academics and educational institutions should evaluate course learning objectives (Abramson, 2023) before integrating chatbots into the curriculum, teaching methods, and learning activities to ensure that students achieve the intended learning outcomes (Adeshola and Adepoju, 2023; Sánchez-Ruiz et al., 2023).

Because chatbots do not possess reflective thinking and emotions (Tlili et al., 2023), they are unable to provide an equivalent level of human-to-human interaction (Ansari, Ahmad and Bhutta, 2023). Hence, Ansari, Ahmad and Bhutta (2023) contend that chatbots do not replace human academics but rather play a supporting role in teaching, learning, and research.

3.   Research Design and Method

As ChatGPT was officially launched on 30 November 2022, this study searched three mainstream national English newspapers in Malaysia (in terms of readership) (adQrate, n.d.) for articles that contained both search terms "education" and "ChatGPT" that were published between that date and 30 April 2023 (i.e., the cutoff date before a qualitative content analysis could begin at the beginning of May 2023). A Google search found a total of 411 newspaper articles. A cloud-based web scraping software was then used to retrieve the contents of the articles from the newspaper websites. These newspaper articles were then filtered to remove any articles that were not specific to ChatGPT in education in the first round and those that were not specific to the Malaysian context in the second round. Table 1 provides a summary of the search and filter results. A total of 16 newspaper articles were retained for the subsequent qualitative content analysis.

Table 1: Summary of the article search and filter results

	New Straits Times	The Sun	The Star	Total
Initial newspaper articles	58	26	327	411
After 1st filter round (not specific to ChatGPT in education)	10	4	37	51
After 2nd filter round (not specific to the Malaysian context)	4	3	9	16

This study conducted a qualitative content analysis to examine the article texts to identify the topics of discussion by categories and subcategories (Mayring, 2014; Schreier, 2012). This study employed the eight-step process proposed by Schreier (2012) to conduct the analysis: (1) decide on the research question; (2) select the material; (3) build a coding frame; (4) segment coding units; (5) conduct trial coding; (6) evaluate the coding frame; (7) conduct the main analysis; and (8) present findings.

Qualitative content analysis is a qualitative data analysis method that works well for descriptive research questions. It can be used with qualitative materials that are written, spoken, or observed, like transcripts, newspaper articles, advertisements, and so on. The method reduces large volumes of qualitative data systematically by employing a coding frame. Qualitative content analysis is a good fit for this study as it aims to answer the question: "what have people been discussing" about ChatGPT in Malaysian education (Schreier, 2012).

Following an inductive approach and based on the 16 newspaper articles, the study created a two-level coding frame that included five level-one categories and 15 level-two subcategories. The level-one categories represent the primary dimensions, and the level-two subcategories represent the subdimensions. The coding frame was built to meet four methodological requirements: unidimensionality, mutual exclusiveness, exhaustiveness, and saturation (Schreier, 2012). Figure 1 depicts the coding frame for this study.
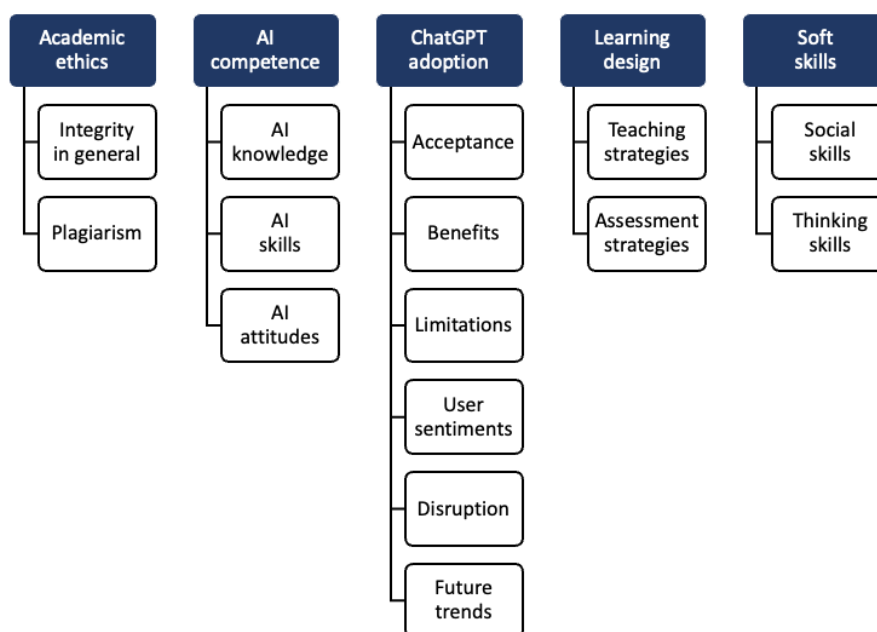
Figure 1: Coding frame

The individual newspaper articles were the units of analysis in this study, and the texts that were relevant to ChatGPT in Malaysian education were segmented into coding units. The coding units could be a partial sentence, a complete sentence, or multiple sentences. There were a total of 209 coding units. The same coder then pilot-tested the coding frame in two rounds, with a two-week gap in between, as suggested by Schreier (2012). There were no modifications to the categories or subcategories between the two rounds. With a percentage agreement of 82.4% (i.e., the number of coding units on which the coder agreed divided by the total number of coded units), intra-coder stability was satisfactory. Each coding unit was then coded into one or more subcategories in the main analysis. A coding unit, however, could not be coded to more than one subcategory within the same category. To maintain coding consistency, the coding was done by a single coder with a two-week gap in between. In total, 209 coding units were coded 244 times in the main analysis, with one coding unit being coded an average of 1.2 times.

4. Data Analysis and Results

Table 2 shows the frequency and percentage of the coding units that have been coded into subcategories. The top five subcategories in order of frequency are: benefits (19.3%), plagiarism (13.9%), acceptance (8.6%), thinking skills (7.4%), and user sentiments (6.6%). The bottom five subcategories are: assessment strategies (4.9%), AI skills (3.3%), future trends (2.9%), AI attitudes (2%), and social skills (2%).

Table 2: Frequency and percentage of coding units coded into a subcategory

Subcategory	Frequency	Percentage (%)
Benefits	47	19.3%
Plagiarism	34	13.9%
Acceptance	21	8.6%
Thinking skills	18	7.4%
User sentiments	16	6.6%
Disruption	15	6.1%
AI knowledge	15	6.1%
Limitations	14	5.7%
Integrity in general	14	5.7%
Teaching strategies	13	5.3%
Assessment strategies	12	4.9%

Subcategory	Frequency	Percentage (%)
AI skills	8	3.3%
Future trends	7	2.9%
AI attitudes	5	2.0%
Social skills	5	2.0%
Total	*244*	*100.0%*

Table 3 shows the frequency and percentage of the coding units that have been coded into a subcategory within and across categories. Within the ChatGPT adoption category, the discussion about benefits led other topics by a large percentage (39.2%). AI knowledge (53.6%), plagiarism (70.8%), and thinking skills (78.3%) were the leading topics in the AI competence, academic ethics, and soft skills categories, respectively. There appeared to be a rather equal discussion of teaching strategies (52%) and assessment strategies (48%) in the learning design category. Across categories, the ChatGPT adoption category garnered the most discussion (49.2%), followed by academic ethics (19.7%), AI competence (11.5%), learning design (10.2%), and soft skills (9.4%).

Table 3: Frequency and percentage within and across categories

Category	Subcategory	Frequency	Within category percentage (%)	Across category percentage (%)
Academic ethics	Plagiarism	34	70.8%	
	Integrity in general	14	29.2%	
	Subtotal	*48*	*100.0%*	*19.7%*
AI competence	AI knowledge	15	53.6%	
	AI skills	8	28.6%	
	AI attitudes	5	17.9%	
	Subtotal	*28*	*100.0%*	*11.5%*
ChatGPT adoption	Benefits	47	39.2%	
	Acceptance	21	17.5%	
	User sentiments	16	13.3%	
	Disruption	15	12.5%	
	Limitations	14	11.7%	
	Future trends	7	5.8%	
	Subtotal	*120*	*100.0%*	*49.2%*
Learning design	Teaching strategies	13	52.0%	
	Assessment strategies	12	48.0%	
	Subtotal	*25*	*100.0%*	*10.2%*
Soft skills	Thinking skills	18	78.3%	
	Social skills	5	21.7%	
	Subtotal	*23*	*100.0%*	*9.4%*

5. Discussion

The category with the most subcategories is ChatGPT adoption. ChatGPT adoption was the most often discussed topic, accounting for over half of the total discussion. The launch of ChatGPT has sparked a great deal of interest in the chatbot. As a result, it is not surprising that there was a lot of discussion concerning its adoption for education in terms of benefits, acceptance, user sentiments, disruption, limitations, and future trends. The benefits of ChatGPT were the most frequently discussed topic in this category. People appeared eager to explore how they could benefit from using the chatbot, e.g., receiving feedback on their work or finding solutions to their problems (Ibrahim and Lee, 2023; Mohamed and Razawi, 2023). Furthermore, people also anticipated that it will become more powerful at a faster rate in the future (Ponnudurai, 2023; Rahman, 2023a). Although people

recognised the limitations of ChatGPT, such as issues related to information accuracy or feedback quality (Goh, 2023; Mohamed and Razawi, 2023), and how it may change learning delivery (Ponnudurai, 2023; Wing, 2023) or replace humans in future jobs (Rahman, 2023b; Yeoh, 2023), it appears that people were generally supportive of embracing and adopting the chatbot (Lim, 2023; Wing, 2023). This finding is comparable to Adeshola and Adepoju's (2023) sentiment analysis of Twitter tweets, which revealed that about half of the tweets were positive about ChatGPT, while about one-fifth were negative and about one-fourth remained neutral, and Sánchez-Ruiz et al.'s (2023) study of students in an engineering course found that a large percentage of the students were already using ChatGPT in their learning.

Academic ethics was the second most often discussed topic, accounting for over one-fifth of the total discussion. Plagiarism issues were the most frequently discussed topic in this category. People were concerned about how students may use ChatGPT to complete their assignments while maintaining academic integrity in general (Muthiah and Carvalho, 2023; Yeoh, 2023) and avoiding plagiarism because it can be difficult to distinguish whether an assignment is the student's own work or produced by the chatbot (Muthiah, 2023; Yeoh, 2023). People also discussed the use of anti-plagiarism software to detect plagiarism. These findings are similar to the concerns that have also been reported in past studies (e.g., Dwivedi et al., 2023; Kasneci et al., 2023; Skavronskaya, Hadinejad and Cotterell, 2023).

AI competence was the third most often discussed topic, accounting for slightly more than one-tenth of the total discussion. The discussion centered around a need to help students use ChatGPT ethically and responsibly by establishing some guidelines, principles, or skills (Muthiah and Carvalho, 2023; Yeoh, 2023). This discussion was highly similar to the concept of digital competence as defined by the European Commission in terms of knowledge, skills, and attitudes (European Commission, 2019). The need for AI knowledge was the most frequently discussed topic in this category. These findings support the suggestions made by Adeshola and Adepoju (2023), Ciampa, Wolfe and Bronstein (2023), and Tlili et al. (2023) to develop competence, which includes understanding chatbot capabilities and constraints, using chatbots ethically, and critically evaluating information for accuracy and trustworthiness.

Learning design was the fourth most often discussed topic, accounting for around one-tenth of the total discussion. The discussion was fairly even between teaching and assessment strategies. People discussed the need to adapt teaching strategies, such as teaching methods, pedagogies, the role of academics, and so on (Kuan, 2023; Rahman, 2023b), as well as assessment strategies, such as using authentic assessment or revising assessment criteria, to keep up with the developments in ChatGPT and how the chatbot may be better integrated into learning delivery (Kuan, 2023; Ponnudurai, 2023). These findings are consistent with the conclusions made in past studies that academics and educational institutions should adapt teaching and assessment strategies to coexist with chatbots or mitigate their impacts (e.g., Benuyenah, 2023; Kohnke, Moorhouse and Zou, 2023; Su and Yang, 2023; Tlili et al., 2023), such as redesigning assessment tasks to use authentic assessment (Ansari, Ahmad and Bhutta, 2023; Ciampa, Wolfe and Bronstein, 2023; Skavronskaya, Hadinejad and Cotterell, 2023), formative assessment (Farrokhnia et al., 2023), open-ended assessment (Ciampa, Wolfe and Bronstein, 2023), or reasoning-based assessment (Skavronskaya, Hadinejad and Cotterell, 2023).

Soft skills were the fifth most often discussed topic, accounting for just under one-tenth of the total discussion. The discussion of soft skills can be divided into two categories: social skills and thinking skills. Thinking skills were the most frequently discussed topic in this category. People discussed the idea that using ChatGPT does not help students develop personality traits such as empathy, attitudes, emotions, or interpersonal skills (Ngo, 2023; Raman, 2023). However, the discussion appeared to differ on whether the chatbot supports or hinders students from developing critical thinking, problem-solving, or creativity skills (Muthiah and Carvalho, 2023; Zaideen, 2023). This finding concurs with those of Dwivedi et al. (2023) and Kasneci et al. (2023) that over-reliance on ChatGPT may impede students from learning these crucial soft skills. While Ciampa, Wolfe and Bronstein (2023) and Putra et al. (2023) emphasise that the use of chatbots should not replace critical thinking, Hasanein and Sobaih (2023) and Maheshwari (2023) highlight the importance of learning activities and assessment that foster critical thinking, problem-solving, and creativity.

Overall, based on the top five most often discussed topics, people appeared keen to discuss how they could benefit from using ChatGPT, although it was a relatively new technology. Others, on the other hand, were concerned about the effects of the chatbot, particularly plagiarism issues. It is worth noting that people were open to using ChatGPT as a tool. They were aware, however, that while the chatbot is beneficial for specific tasks, it is limited in terms of enhancing cognitive skills such as creative thinking, problem-solving, and so on. People also had mixed feelings about the chatbot. While some people expressed positive sentiments (e.g., fun,

impressive, exciting), others indicated negative sentiments (e.g., nervous, scary, anxiety). These findings are congruent with those of Benuyenah (2023) and Hasanein and Sobaih (2023), who found that depending on their views of chatbots, some people support their use and others oppose them.

5.1 Practical Implications

The findings have three practical implications for academics and educational institutions as the functions and features of generative AI chatbots evolve and become more widely available. First, to better leverage chatbots as a new educational tool, it is essential to begin experimenting with practical applications of chatbots in learning delivery in order to learn from trial and error and propose frameworks and approaches for using chatbots to achieve the intended learning objectives (Guo and Lee, 2023; Tlili et al., 2023). Second, it is plausible that there will be an increase in the use of chatbots in education in the future (Rahman et al., 2023). Thus, it is crucial to provide adequate training for students and academics to enhance their AI competence in preparation for the anticipated wider use of AI in the future, e.g., incorporating such training through curriculum or continuous learning workshops (Kortemeyer, 2023; Nikolic et al., 2023). Third, to avoid situations in which students misuse chatbots in assessment, whether intentionally or unintentionally, assessment tasks must be designed to evaluate students on their higher-order thinking skills as well as, if applicable, soft skills (Gorichanaz, 2023; Yeadon et al., 2023). Furthermore, developing and communicating clear academic integrity principles and policies to students and academics will help promote the responsible and ethical use of chatbots in education (Chaudhry et al., 2023; Lancaster, 2023).

5.2 Theoretical Contributions

This study makes two theoretical contributions. First, this study synthesises and categorises the discussions in newspaper articles about ChatGPT in Malaysian education during its initial launch to specifically identify the key aspects of these discussions, laying the groundwork for further conceptual development of research models. Future research on chatbots may conceptualise variables based on the categories and subcategories identified in this study to develop a research model. Second, this study offers an example of applying qualitative content analysis to newspaper articles, providing a reference for researchers interested in this method for addressing descriptive research questions.

6. Conclusions

In conclusion, this study has answered the question "what have people discussed" about ChatGPT in Malaysian education following the first few months of its launch by identifying the categories and subcategories (along with frequency and percentage) of the most discussed topics in newspaper articles. The findings capture various aspects of the discussions, which further contribute to the historical narrative of ChatGPT's evolution as people attempted to better understand the technology during its initial launch. In addition, as reflected generally by these aspects, the findings help academics and educational institutions gain a better understanding of people's views, attitudes, and concerns regarding the use of generative AI chatbots in education. As Tlili et al. (2023) and Athilingam and He (2024) have pointed out, restricting the use of chatbots will not solve the issues they present. A better understanding of chatbots and the issues will help academics and educational institutions determine the best approach to adopting the technology.

6.1 Research Limitations

This study has three limitations. First, the search was limited to newspaper articles that were published after the official launch of ChatGPT until 30 April 2023. The study does not reflect people's current perceptions and attitudes towards ChatGPT as they develop a better understanding of ChatGPT over time or when AI technology continues to evolve in terms of functionality and performance. Second, the analysis was only specific to newspaper articles written in the Malaysian context and published in three mainstream national English newspapers in Malaysia. People in other countries may have different perceptions and attitudes towards ChatGPT or chatbots. In addition, newspaper articles are not the only source of information about people's perceptions and attitudes. Third, the search was limited to ChatGPT and excluded other chatbots, such as Microsoft Copilot (formerly Bing Chat) and Google Bard, that became publicly available after the launch of ChatGPT.

6.2 Future Research Directions

There are two future research directions to examine people's perspectives on chatbots. First, when students and academics gain more knowledge and experience using ChatGPT or other similar chatbots, their perceptions of chatbots may shift. Future research may conduct surveys or experiments to investigate whether people's

perceptions, attitudes, or even behaviours have changed. Second, people's perceptions and attitudes towards technology may vary due to cultural differences, educational systems, and so on. Future research may conduct a cross-case analysis (Miles and Huberman, 1994) for a more in-depth examination of people's perceptions and attitudes towards chatbots in different countries to identify whether there are similarities and differences, as well as the factors causing such similarities and differences.

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