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Abstract

The purpose of the project was to find out whether humans can tell the difference between human-generated text and artificial intelligence (AI) chatbots-generated text and to identify how AI-generated text differs from human-generated text. The dependent variable was the results given by the participants (whether the paragraphs were AI-generated texts or human-generated text). The Independent variable was the participants in the experiment and the controlled variable was the type of paragraphs (both the AI-generated texts and human-generated texts) and time used to test each participant. The hypothesis for this experiment was that the participants were not going to be able to differentiate between AI-generated text and human-generated text.

In this descriptive and mixed-method study, participants were presented with questionnaires. Each participant needed to state whether they thought each paragraph was human-generated or AI-generated. At the end of the questionnaire, the participants were asked to briefly explain what assisted them in differentiating between the two. They were given 60 seconds to decide. A stopwatch was used to time them. A sample of 456 participants took part in this project. They were not told how many AI-generated passages and human-generated passages there were in the selection. They only knew the total number of passages.

Over 99% of the participants could not correctly differentiate between AI-generated text and human-generated text in all passages. Only four participants were able to get 100% of the questions correct. All four learners attend schools located in urban areas.

After I did my analysis, I discovered that my hypothesis was incorrect. Four of the participants were able to get 100% of the questions correct this indicates that not all the participants were not able to tell the difference between AI-generated text and human-generated text. This rejects my hypothesis. However, the chances of humans differentiating between the two are very low. All four learners attend schools located in urban areas; this indicates that it is easier for learners attending urban area schools to recognise AI-generated texts than learners attending schools located in rural areas.

Introduction

The creation of text by AI (artificial intelligence) is a popular topic for several reasons. Today, computers are capable of producing convincing paragraphs or even entire pages of text that appear to have been written by humans. How can people tell if an AI chatbot or a human wrote the news story they are reading? How can a teacher tell if an AI chatbot wrote a student's essay? How can you know that an AI chatbot did not write this text? How does AI-generated text differ from human-generated text and how do humans tell them apart?

Literature review

A chatbot is a computer program that uses artificial intelligence (AI) and natural language processing (NLP) to understand customer questions and automate responses to them, simulating human conversation. It makes it easier for users to find the information they need by responding to their questions and requests; through text input and/or audio input without needing human intervention.

Chatbot technology is almost everywhere, from smart speakers at home to messaging applications in the workplace. The latest AI chatbots are often referred to as “virtual assistants” or “virtual agents.” You can ask questions about what you need conversationally, and the chatbot can help refine your search through responses and follow-up questions.

Historically, chatbots were text-based, and programmed to reply to a limited set of simple queries with answers that had been pre-written by the chatbot's developers. They operated like an interactive FAQ, and while they worked well for those specific questions and answers on which they had been trained, they failed when presented with a complex question or one that had not been predicted by the developers.

Over time, chatbots have integrated more rules and natural language processing, so that end users can conversationally experience them. The latest models are contextually aware and able to learn as they are exposed to more and more human language. They use natural language understanding (NLU) to discern the user's needs. Then use advanced AI tools to determine what the user is trying to accomplish. These technologies rely on machine learning and deep learning with nuanced differences to develop an increasingly granular knowledge base of questions and responses that are based on user interactions. This improves their ability to predict user needs accurately and respond correctly over time.

In addition, if a user asks about tomorrow's weather, a traditional chatbot can respond plainly whether it will rain. An AI chatbot, however, might also inquire if the user wants to set an earlier alarm to adjust for the longer morning commute (due to rain).

You may notice the terms chatbot, AI chatbot and virtual agent being used interchangeably at times. In addition, indeed, some chatbots are now using complex algorithms to provide more detailed responses. However, it is worth noting that the deep learning capabilities of AI chatbots enable interactions to become more accurate over time, building a web of appropriate responses via their interactions with humans. The longer an AI chatbot has been in operation, the stronger its responses become. Therefore, an AI chatbot using deep learning may provide a more detailed and accurate response to a query and especially to the intentions behind the query, than a chatbot with recently integrated algorithm-based knowledge.

Artificial intelligence chatbots offer many benefits that are available 24/7 to provide support and guidance to students. Whether you need help with a difficult assignment or just want to ask a quick question, chatbots are always there to help. Chatbots can also use machine-learning algorithms to analyse an individual's learning history and provide personalized recommendations based on the individual's needs. This means that people can get targeted advice on how to improve their performance in specific subjects or areas. Chatbots can help people develop better study skills and time management strategies. It can provide tips and strategies for managing workload.

There are multiple studies on the negative effects of using chatbots, Some of these are academic dishonesty, lack of critical thinking, decrease in creativity, promoted laziness and memory loss. Artificial intelligence is extremely advanced; hence it may be difficult for humans to identify whether a passage of text was AI-generated or human-generated. This has multiple negative effects.

AI writing tools can write texts that look plausible, but their assertions are not necessarily accurate. AI is only as good as the data it's trained on, meaning it's susceptible to bias and misinformation. If one cannot recognise that a passage is not from a human source then they might not see the need to intently look into the information before using it. Which leads to the use of inaccurate information.

Another drawback of humans not being able to identify AI-generated text is the increased likelihood of unintentional plagiarism. For example, students may use it to write assignments and pass them off as their work. Teachers might not be able to identify plagiarism due to the lack of ability to recognise AI-generated text.

If humans cannot recognise information produced by AI then people will continue to frequently use chatbots to generate information while passing it as their own. Due to chatbots not requiring human interaction, a lack of self-involved ideas can occur resulting in a decrease in human creativity.

Problem statement

Even though AI chatbots can be valuable tools for language learning, they offer translations, grammar explanations, vocabulary practice, and conversation simulations. If humans cannot recognise the text they produce, it could lead to a lack of creativity, the use of inaccurate information, and unintended plagiarism.

Aim

To find out whether humans can differentiate between human-generated text and text generated by AI chatbots.

Hypothesis

Humans will not be able to differentiate between human-generated text and AI chatbots' generated text.

Method

Participants

The questionnaires were distributed to Four (4) different schools, Two (2) of the schools located in urban areas and the other Two (2) being located in rural areas. (One Hundred and fourteen) 114 learners from each school were selected to participate in the study. An equal number (38 each) of grade 8, 9, and 10 learners from each school were selected. This means a total of (Four hundred and fifty-six) 456 learners participated in this study. This decision was specifically made to aid the accuracy of this investigation. The participants approximately have the same academic intelligence because their grades and ages are similar. To increase the accuracy of the results even further, each group of participants contained an equal ratio of female participants to male participants. All the participants live around the same area (Rustenburg) and all questionnaires were answered in the same environment (classroom). They were not asked to write their names on the questionnaires for confidentiality reasons. Each participant needed to state whether they thought each paragraph was human-generated or AI-generated. At the end of the questionnaire, the participants were asked to briefly explain what assisted them in differentiating between the two.

Instruments/sources

- Structured Interview (formal set of questions posed to each participant).
- Structured Observations (Research conducted at a specific place, or time, where participants are observed in a standardised procedure).
- Survey research (Questionnaires were distributed to the participants and they were timed using a Stopwatch (they were given 60 seconds for each question)).

Procedure

Before participants could answer the questionnaires, they had to sign consent forms that respect the participant's confidentiality, explain how and why the study will be conducted, how and when the information will be used and the confidentiality of their identity in the whole study. No participant was required to write his or her name or other personal details on the questionnaires. The consent forms were detached and separated from the questionnaires to protect the participants' confidentiality even further. The participants were then asked to read and answer the questionnaires by indicating whether they thought each passage was AI-generated or human-generated. The participants were given sixty (60) seconds to answer each passage. After the participants were done, identifying the passages, they were required to write why they indicated AI generated for the ones they did and human-generated for the others.

The Dependent variable in this experiment is – The results given by the participants (whether the paragraphs are AI-generated or human-generated). The Independent variable is– The participants in the experiment. These participants were specifically chosen to aid the accuracy of the investigation by taking factors such as location, gender, and educational background into consideration. The controlled variable is– The paragraphs (Both the AI-generated passages and human-generated passages) used to test each participant and time. All of the participants answered questionnaires consisting of the same paragraphs and they were given an equal amount of time to answer the questionnaires. This allows the results of this study to be accurate.

Results

School A (Urban area school 1)

Eighty-two (82) percent of the participants correctly identified the first paragraph on the questionnaire. This paragraph was human-generated. It was the highest correctly identified paragraph. The least correctly identified paragraph was paragraph number nine (9). This paragraph addressing teenage pregnancy was AI-generated. Only Twenty-nine (29) participants correctly identified this paragraph. A block was created for the participants to write how they were able to differentiate between AI-generated text and human-generated text. Twenty-six (26) percent of the participants similarly wrote that they were able to differentiate between the two (2) types of text because AI-generated text had more complex wording. Eighteen (18) percent of the participants indicated that the AI-generated texts and human-generated texts differed in grammar. Six (6) percent of the participants said that Human-generated text was more personal. Four (4) percent of the participants said that AI-generated text showed no emotion. Four (4) percent of the participants said that AI-generated text was more informative and detailed. The remaining forty-two (42) percent of the participants said that they simply did not know how to differentiate between the two.

Three (3) participants identified 30% of the questionnaire correctly; Twenty-Two (22) participants identified 40% of the questionnaire correctly, Twenty (20) participants identified 50% of the questionnaire correctly, Thirty-three (33) participants identified 60% of the questionnaire correctly, Twenty-one (21) participants identified 70% of the questionnaire correctly. Then (10) participants identified 80% of the questionnaire correctly, Four (4) participants identified 90% of the questionnaire correctly and only One (1) participant identified 100% of the questionnaire correctly. The person who identified every passage correctly said this was able to happen because AI gen

Table 1: Percentage of participants who identified each paragraph correctly and incorrectly in school A aerated text shows less emotion than human generated text.

Numbering of passage on questionnaire	Human or AI? (Correct answer)	Participants Who Identified correctly	participants who identified incorrectly
1	Human	82%	18%
2	Human	47%	53%
3	AI	65%	35%
4	AI	60%	40%
5	Human	48%	52%
6	AI	65%	35%
7	Human	67%	33%
8	Human	62%	38%
9	AI	29%	71%
10	AI	72%	28%
Number of participants who identified everything correctly	1		

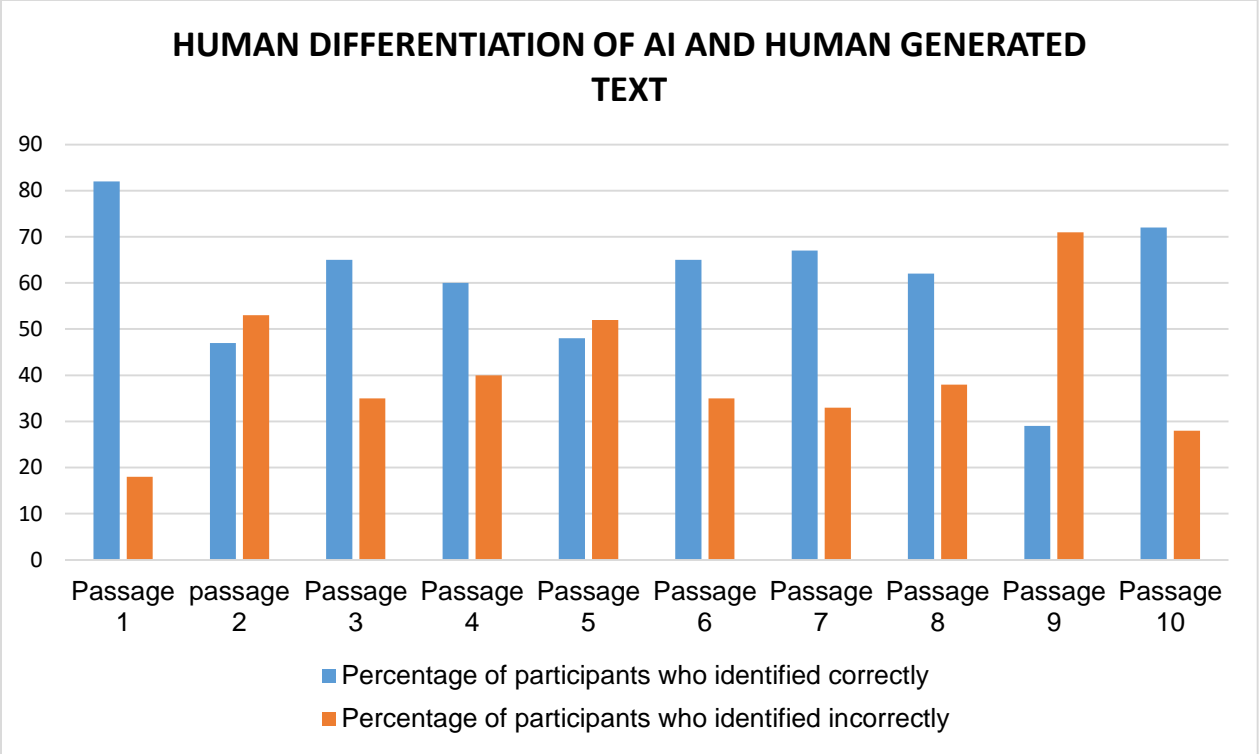


Figure 1: Graph illustrating the percentage of participants who identified each paragraph correctly and incorrectly in school A

Table 2: How did the participants differentiate between human-generated text and AI-generated text in School A?

How did they differentiate between the 2?	%The number of people who identified it in this manner
Do not know how to differentiate between the two.	42%
AI-generated text has more complex wording than human-generated text.	26%
The 2 types of paragraphs differ in grammar.	18%
Human-generated text is more personal than AI-generated text.	6%
AI-generated text shows no emotion	4%
AI-generated text is more informative and detailed	4%

Percentage of reasons for selection

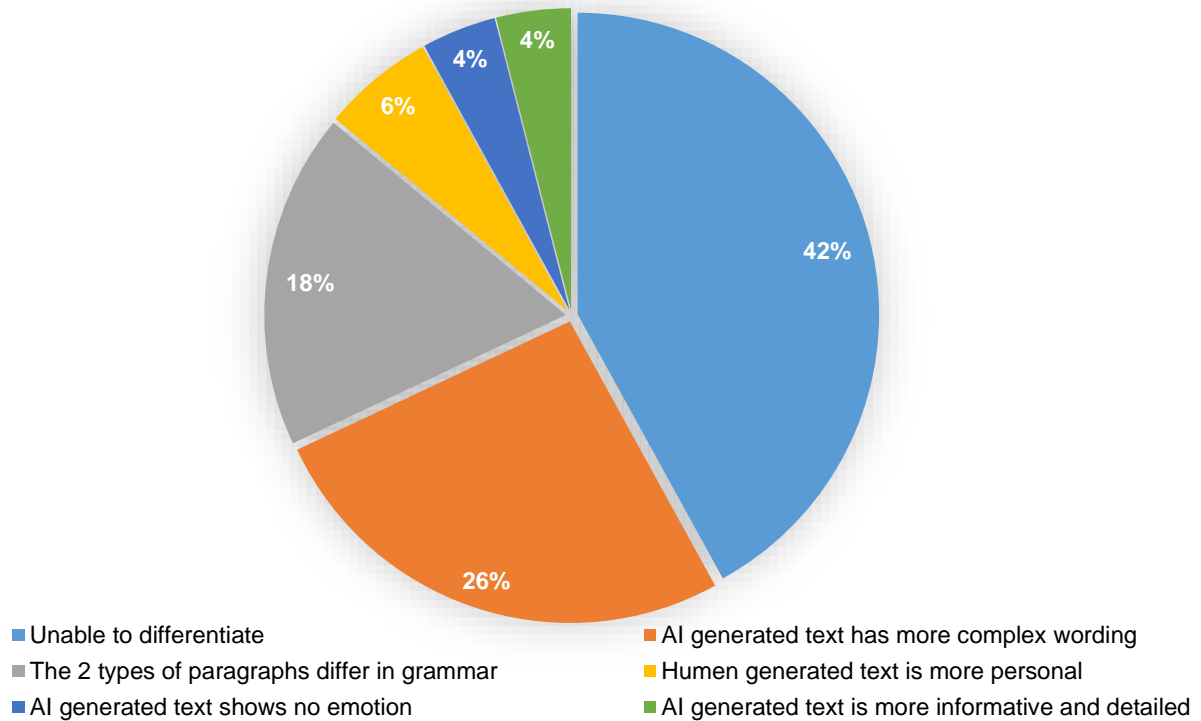


Figure 2: Pie chart illustrating how the participants were able to differentiate between AI-generated texts and humans in School A

School B (Urban area school 2)

Eighty-Three (83) percent of the participants correctly identified the first paragraph on the questionnaire. This paragraph was human-generated. It was the highest correctly identified paragraph. The least correctly identified paragraph was paragraph number nine (9). This paragraph addressing teenage pregnancy was AI-generated. Only Thirty-three (33) participants correctly identified this paragraph. A block was created for the participants to write how they were able to differentiate between AI-generated text and human-generated text.

Thirteen (13) percent of the participants similarly wrote that they were able to differentiate between the two (2) types of text because AI-generated text had more complex wording. Eleven (11) percent of the participants said that Human-generated text was more personal. Nine (9) percent of the participants said that AI-generated text had no emotion. Nine (9) percent of the participants said that AI-generated text was more informative and detailed. Eight (8) percent of the participants indicated that the AI-generated texts and human-generated texts differed in grammar. The remaining Fifty (50) percent of the participants said that they simply did not know how to differentiate between the two.

Five (5) participants identified 20% of the questionnaire correctly, Four (4) participants identified 30% of the questionnaire correctly; Sixteen (16) participants identified 40% of the questionnaire correctly, Twenty-six (26) participants identified 50% of the questionnaire correctly, Thirty (30)

participants identified 60% of the questionnaire correctly, Eighteen (18) participants identified 70% of the questionnaire correctly. Ten (10) participants identified 80% of the questionnaire correctly, Two (2) participants identified 90% of the questionnaire correctly and Three (3) participants identified 100% of the questionnaire correctly. All the participants who identified each paragraph correctly identified using different indicators, One wrote that AI does not show emotion, the other that human-generated text was more personal and the last participant was unable to identify any indicators.

Table 3: Percentage of participants who identified each paragraph correctly and incorrectly in School B

Original passage	Human or AI? (Correct answer)	Participants Who Identified correctly	participants who identified incorrectly
1	Human	83%	17%
2	Human	44%	56%
3	AI	65%	35%
4	AI	50%	50%
5	Human	47%	53%
6	AI	65%	35%
7	Human	63%	37%
8	Human	52%	48%
9	AI	33%	67%
10	AI	68%	32%
Number of participants who identified everything correctly	3		

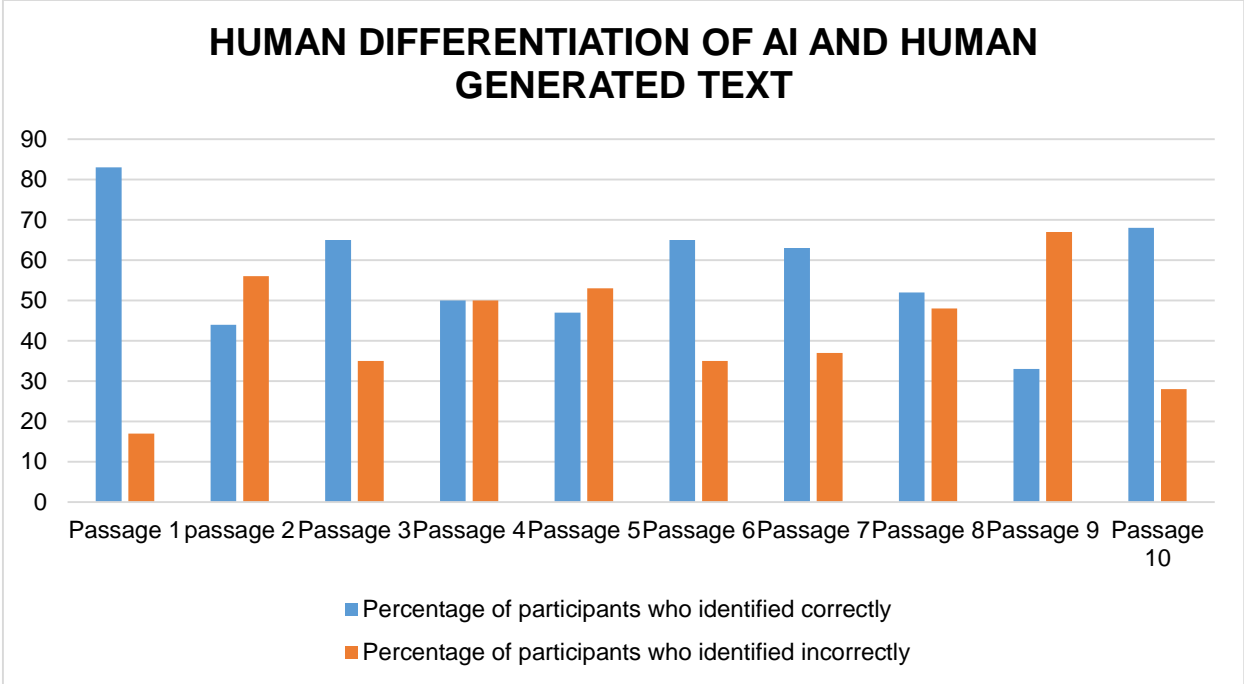


Figure 3: Graph illustrating the percentage of participants who identified each paragraph correctly and incorrectly in School B

Table 4: How did the participants differentiate between human-generated text and AI-generated text in School B?

How did they differentiate between the 2?	%The number of people who identified it in this manner
Do not know how to differentiate between the two.	50%
AI-generated text has more complex wording than human-generated text.	13%
Human-generated text is more personal than AI-generated text.	11%
AI-generated text is more informative and detailed	9%
AI-generated text shows no emotion	9%
The 2 types of paragraphs differ in grammar.	8%

Percentage of reason for selection

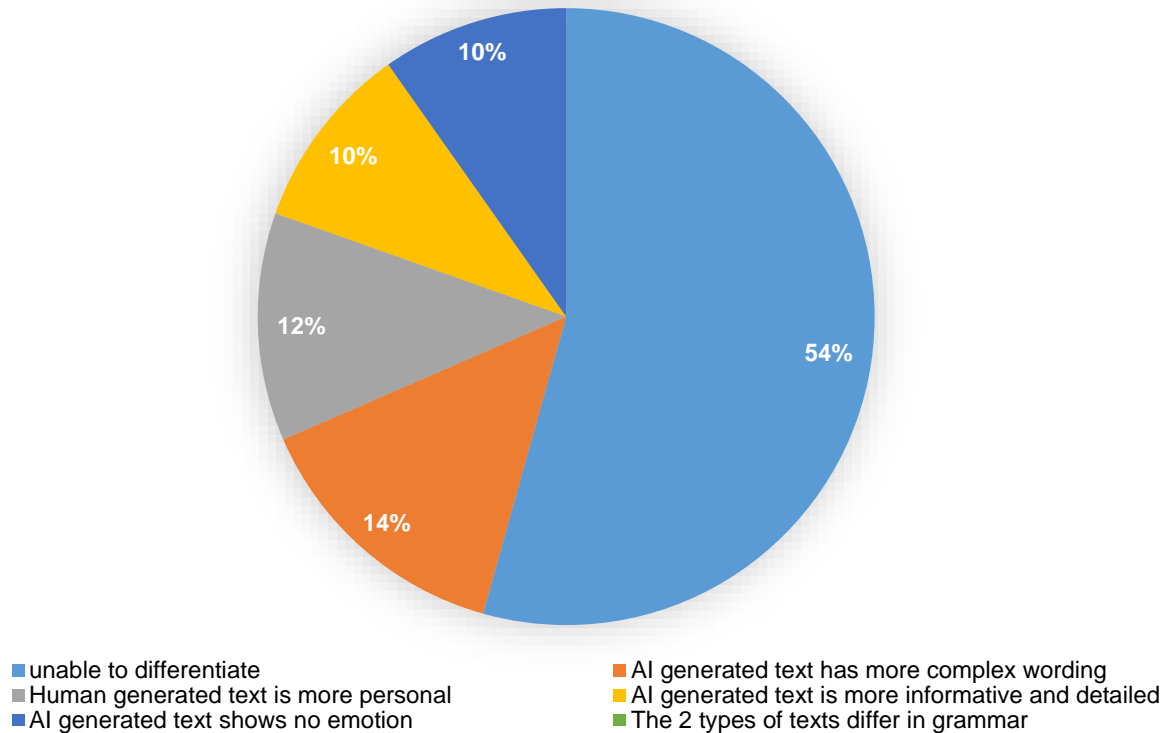


Figure 4: Pie chart illustrating how the participants were able to differentiate between AI-generated texts and human

School C (Rural area school 1)

Eighty-eight (88) percent of the participants correctly identified the first paragraph on the questionnaire. This paragraph was human-generated. It was the highest correctly identified paragraph. The least correctly identified paragraph was paragraph number nine (9). This paragraph addressing teenage pregnancy was AI-generated. Only Thirty-two (32) percent of the participants correctly identified this paragraph.

A block was created for the participants to write how they were able to differentiate between AI-generated text and human-generated text. Fourteen (14) percent of the participants similarly wrote that they were able to differentiate between the two (2) types of texts because AI-generated texts were more informative and detailed than human-generated texts. Ten (10) percent of the participants indicated that the AI-generated texts had more complex wording than human-generated texts. Nine (9) percent of the participants said that the Two (2) types of texts differed in grammar. Five (5) percent of the participants said that AI-generated texts had no emotion. Three (3) percent of the participants said human-generated texts were more personal. The remaining Fifty-nine (59) percent of the participants said that they simply did not know how to differentiate between the two.

Two (2) participants identified 20% of the questionnaire correctly, Three (3) participants identified 30% of the questionnaire correctly; Twenty-five (25) participants identified 40% of the questionnaire correctly, thirty-eight (38) participants identified 50% of the questionnaire correctly, Thirty (30) participants identified 60% of the questionnaire correctly, Nine (9) participants identified 70% of the questionnaire correctly. Three (3) participants identified 80% of the questionnaire correctly, Four (4) participants identified 90% of the questionnaire correctly and no participant identified 100% of the questionnaire correctly.

Table 5: Percentage of participants who identified each paragraph correctly and incorrectly in School C

Numbering of passages on the questionnaire	Human or AI? (Correct answer)	Participants Who Identified correctly	participants who identified incorrectly
1	Human	88%	12%
2	Human	41%	59%
3	AI	68%	32%
4	AI	46%	54%
5	Human	43%	57%
6	AI	55%	45%
7	Human	58%	42%
8	Human	52%	48%
9	AI	32%	68%
10	AI	65%	35%
Number of participants who identified everything correctly	0		

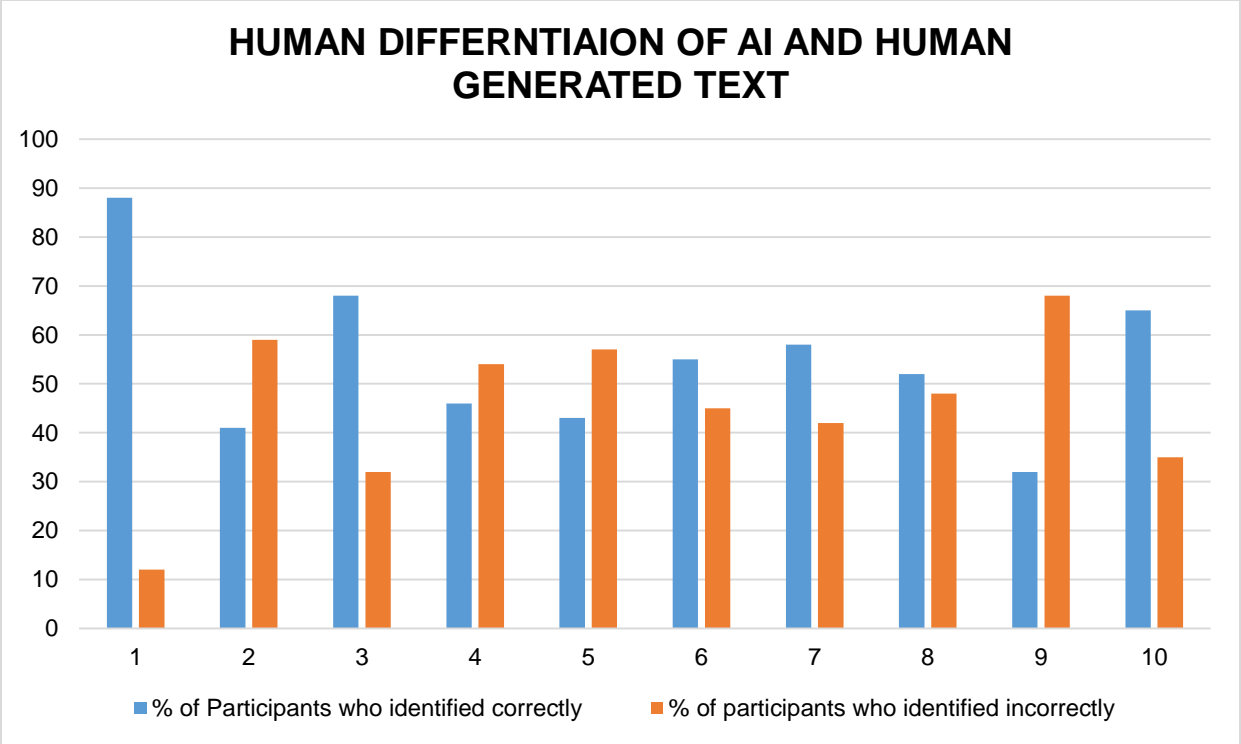


Figure 5: Graph illustrating the percentage of participants who identified each paragraph correctly and incorrectly in School C

Table 6: How did the participants differentiate between human-generated text and AI-generated text in School C?

How did they differentiate between the 2?	%The number of people who identified it in this manner
Do not know how to differentiate between the two.	59%
AI-generated text is more informative and detailed	14%
AI-generated text has more complex wording than human-generated text.	10%
The 2 types of paragraphs differ in grammar.	9%
AI-generated text shows no emotion	5%
Human-generated text is more personal than AI-generated text.	3%

Percentage of reason for selection

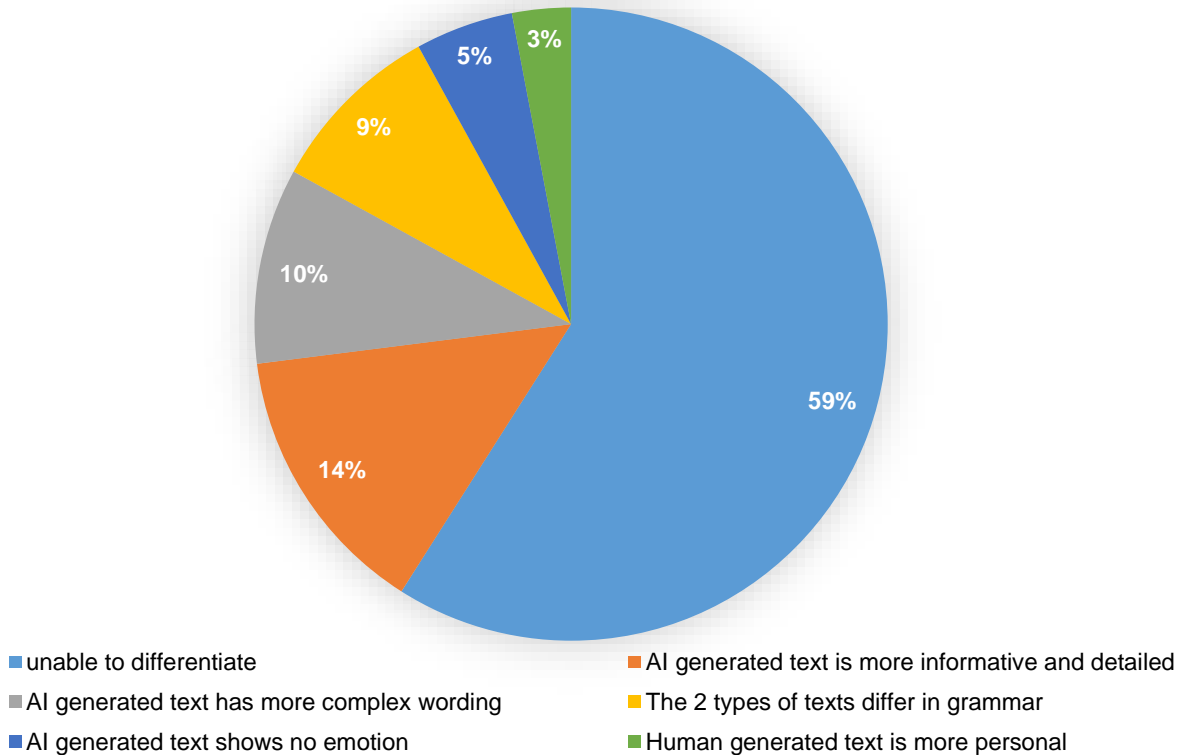


Figure 6: Pie chart illustrating how the participants were able to differentiate between AI generated texts and human in School C

School D (Rural area school 2)

Seventy-nine (79) percent of the participants correctly identified the first paragraph on the questionnaire. This paragraph was human-generated. It was the highest correctly identified paragraph. The least correctly identified paragraph was paragraph number five (5). This paragraph addressing the negative effects of social media was human-generated. Only Thirty-three (33) percent of the participants correctly identified this paragraph.

A block was created for the participants to write how they were able to differentiate between AI-generated text and human-generated text. Five (5) percent of the participants indicated that the AI generated texts had more complex wording than human generated texts. Four (4) percent of the participants said human generated texts were more personal. Three (3) percent of the participants wrote that AI generated text generalises. One (1) percent of the participants said that the Two (2) types of texts differed in grammar. One (1) percent of the participants said that AI-generated texts had no emotion. The remaining Eighty-six (86) percent of the participants said that they simply did not know how to differentiate between the two.

Three (3) participants identified 20% of the questionnaire correctly, Six (6) participants identified 30% of the questionnaire correctly; Twenty-nine (29) participants identified 40% of the

questionnaire correctly, twenty-four (24) participants identified 50% of the questionnaire correctly, Twenty (20) participants identified 60% of the questionnaire correctly, Sixteen (16) participants identified 70% of the questionnaire correctly. Eleven (11) participants identified 80% of the questionnaire correctly, Five (5) participants identified 90% of the questionnaire correctly and no participant identified 100% of the questionnaire correctly.

Table 7: How did the participants differentiate between human generated text and AI generated text in School D?

Numbering of passage on questionnaire	Human or AI? (Correct answer)	Participants Who Identified correctly	participants who identified incorrectly
1	Human	79%	21%
2	Human	54%	46%
3	AI	67%	33%
4	AI	48%	52%
5	Human	33%	67%
6	AI	55%	45%
7	Human	54%	46%
8	Human	53%	47%
9	AI	39%	61%
10	AI	69%	31%
Number of participants who identified everything correctly	0		

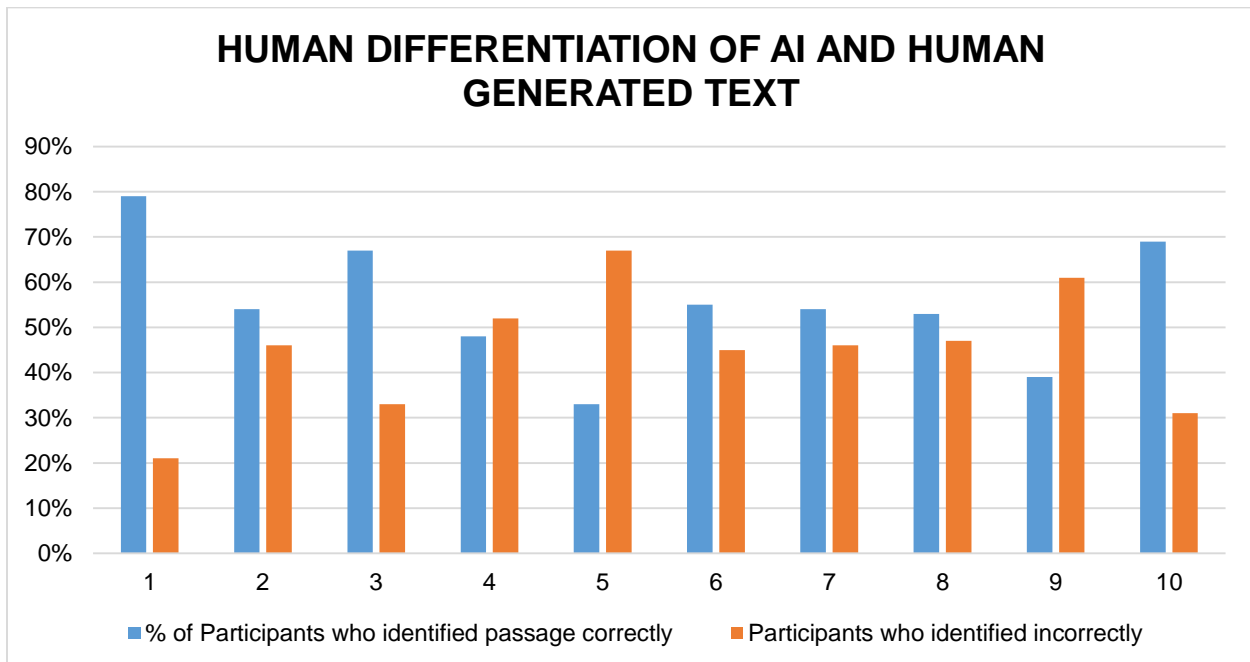


Figure 7: Graph illustrating the percentage of participants who identified each paragraph correctly and incorrectly School D

Table 8: How did the participants differentiate between human generated text and AI generated text in School D?

How did they differentiate between the 2?	%The number of people who identified it in this manner
Do not know how to differentiate between the two.	86%
AI generated text has more complex wording then human generated text.	5%
AI generated text generalises	3%
The 2 types of paragraphs differ in grammar.	1%
AI generated text shows no emotion	1%
Human generated text is more personal then AI generated text.	4%

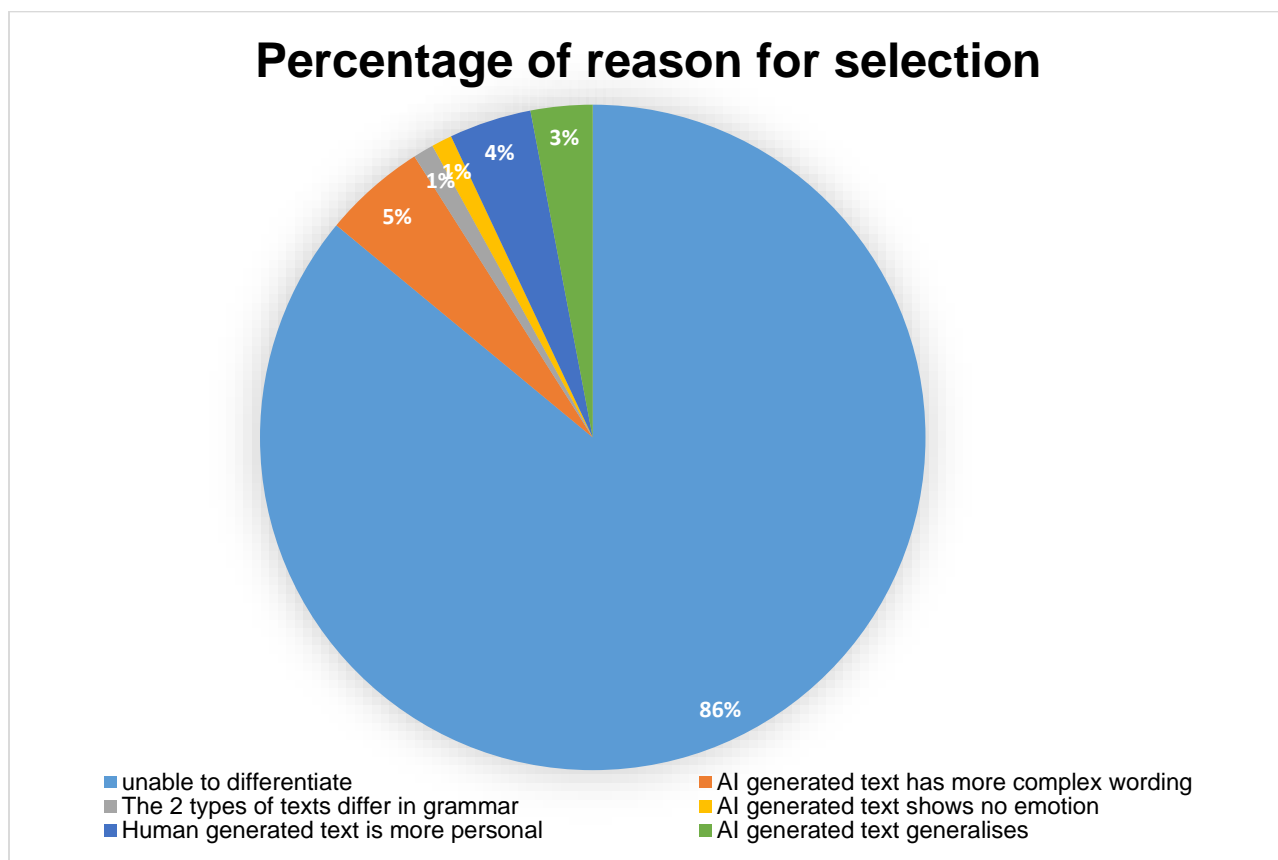


Figure 8: Pie chart illustrating how the participants were able to differentiate between AI generated texts and human in School D

Discussion

After carrying out the experiment, it was brought to my attention that a majority of the participants found it difficult to differentiate between AI-generated text and text written by humans. The first paragraph was the highest correctly identified throughout the whole study. Eighty-Three (83) percent of the participants correctly identified this paragraph addressing pregnancy. All Four (4) schools (A,B,C,D) found this paragraph the easiest to identify. The least amount of people correctly identified paragraph nine (9). This paragraph addressing teenage pregnancy was AI generated. Only Thirty-three (33) percent of the participants correctly identified this passage. Three (3) schools (A,B,C) found this paragraph to be the hardest to identify, School D however found paragraph Five to be the hardest to identify. This indicated how difficult it actually is to differentiate between AI generated text and human generated text; it also shows that some passages of text are easier to identify than others. Learners from both rural and urban area schools faced challenges in AI and human-generated texts differentiation.

A block was created for the participants to write how they were able to differentiate between AI-generated text and human-generated text. Fourteen (14) percent of the participants similarly wrote that AI-generated text has more complex wording than human generated text. Nine (9) percent of the participants wrote that they were able to differentiate between the two (2) types of text by focusing on the grammar of the passages. Seven (7) percent of the participants said that AI-generated text was more informative than human-generated text. Six (6) percent of the participants indicated that human-generated text was more personal. Four (4) percent of the participants said that AI-generated text showed no emotion. One (1) percent of the participants analysed that AI-generated text generalises. The remaining Fifty-nine (59) percent of the participants said that they simply did not know how to differentiate between the two.

Only learners from the schools located in urban areas were able to correctly identify each passage (1 from school A and 3 From School B). This indicates that where the school is located is a factor that affects the results. Urban area schools can better differentiate between AI generated text and human generated text.

Less than One (1) percent of the learners were able to correctly identify every passage of text. To be precise 0,89 percent. This stresses how difficult it is to recognise AI generated text.

For further investigation, the paragraphs mentioned in this study were entered into two websites, which are said to tell the users whether the pieces of text they enter are human generated text or AI generated. Website A identified one Human generated text as AI generated and two AI generated texts as human generated. Website B identified two human generated texts as AI generated and two AI generated texts as human generated. It also identified two human generated texts as co-written meaning these passages had parts written by AI as well as a human. The fact that A identified three passages incorrect and B identified six passages shows emphasises how difficult it is to tell AI generated text apart from human generated text.

Conclusion

After I did my analysis, I discovered that my hypothesis was partially correct. Over Ninety-nine (99.11) percent of the participants could not correctly differentiate between AI generated text and human generated text on all passages. Only Four (4) participants were able to get 100% of the questions correct. This indicates that it is possible for humans to differentiate between AI

generated text and human generated text however the chances of this happening are very low. To be more precise, there is less than a One (1) percent chance of this happening.

All Four (4) learners attend schools located in urban areas. This indicates that when it comes to AI and human generated text differentiation, the location of schools attended by the learner does play a role. It is easier for learners attending urban area schools to recognise AI generated texts than learners attending schools located in rural areas.

From the information received from the participants, it is now known that it is extremely difficult to differentiate between texts generated by AI and texts written by humans, however, there are certain clues that hint to people how passages of text were generated.

The most commonly indicated clue was that that AI generated text used more complex wording than human generated text. Fourteen (14) percent of the participants pointed this out. Fifty-nine (59) percent of the participants could not find anything that could help in differentiating between the Two (2) types of text.

It could be safely said that some passages of text are easier to identify than others. The first paragraph was the highest correctly identified throughout the whole study. Eighty-Three (83) percent of the participants correctly identified this paragraph addressing pregnancy. All Four (4) schools (A,B,C,D) found this paragraph the easiest to identify. The least amount of people correctly identified paragraph nine (9). This paragraph addressing teenage pregnancy was AI generated. Only Thirty-three (33) percent of the participants correctly identified this passage. Three (3) schools (A,B,C) found this paragraph to be the hardest to identify, School D however found paragraph Five to be the hardest to identify.

After analysing, the information obtained doing this study I can conclude that it is possible to differentiate between AI generated text and human generated text however the chances of this happening are extremely low.

Limitations and errors

I suspect that by not taking into account other factors such as participants' home language, race, religion and the amount of time they spend recreationally reading could increase the accuracy of the results. This study could be modified by increasing the number of participants and diversifying the selection of participants.

Recommendations for future research

The research that has been undertaken for this study has highlighted a number of topics on which further research would be beneficial.

The current study can be interpreted as a first step in the research on human's ability to identify AI generated texts. However, the results of this study should be treated with caution due to the few number of participants and lack of focus on the participants' home language and the duration of time, they spend recreationally reading.

Future research could further examine the effects of these different factors on the results of the study. It could also contribute to a deeper understanding of key features, which help in identifying AI generated passages of text.

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Appendix 1

Questionnaires that the participants answered (with reordered numbering):

Instructions

1. Read paragraph
 2. Indicate whether you think it was generated by an Artificial intelligence chatbot or by a human
 3. When you are done with all ten paragraphs write down why you choose AI for the ones you did and Human for the others.
- ❖ Please note you will be given 60 seconds for each paragraph

Paragraphs	Human or AI
1. Being a parent can make it harder to get an education or find a job. Juggling the responsibilities of being a parent with work, school and a social life can be tiring. It can also be very difficult to get child care, and almost impossible to get affordable child care. These difficulties can make it hard to cope financially, and can make you feel lonely and apart from your family and friends.	
2. Too much screen time can also take away from reading, studying, learning activities, play, and exercise. Digital media can also show alcohol and drug use, smoking, and sexual behaviour. Your child may see these things before they are emotionally ready to understand these issues. And before they can make good decisions.	
3. AI has the potential to be a significant threat to jobs, as it can automate many tasks that were previously done by humans. As AI systems become more advanced and sophisticated, they can increasingly perform complex cognitive tasks in addition to routine physical tasks. This means that jobs that were once considered safe from automation are now at risk, such as those in the service industry, transportation, and even some professional roles such as accounting and legal services. While AI can create new jobs and opportunities, there is a growing concern that the displacement of human workers will outpace the creation of new jobs, leading to widespread unemployment and economic disruption.	
4. Social media has had a significant impact on body image, particularly among young people. The constant exposure to images of idealized body types, often heavily edited and filtered, can create unrealistic beauty standards and lead to negative body image. Studies have shown that social media use is associated with increased body dissatisfaction, eating disorders, and other mental health issues related to body image.	
5. Social media can expose users to hundreds or even thousands of images and photos every day, including those of celebrities and fashion or fitness models, which we know leads to an internalization of beauty ideals that are unattainable for almost everyone, resulting in greater dissatisfaction with body weight and shape.”	

<p>6. Inequality in the workplace refers to the unequal treatment of employees based on their gender, race, ethnicity, age, disability, sexual orientation, or other personal characteristics. This can manifest in various forms, including pay disparities, limited opportunities for advancement, discrimination in hiring, promotion or termination decisions, and a lack of diversity in leadership positions. Inequality in the workplace not only violates basic principles of fairness and justice but also undermines productivity, innovation, and overall organizational performance.</p>	
<p>7. Despite decades of progressive efforts, there's still a great deal of inequality in workplaces across the country. In recent years, the government, employees, and many businesses have worked to stamp out issues involving salary discrepancies between genders. They've also sought to ensure men and women receive equal treatment. It's one of the leading topics in the modern business world, so it's essential your business understand all current laws and your commitments to staff members.</p>	
<p>8. AI, as it is called, is coming to your home, your job, your life in ways you never thought possible. At least, that is what computer experts are saying. AI has the ability to improve your life and take care of tasks both menial and major. It also might eliminate your job and the jobs of many people you know.</p>	
<p>9. Teen mothers are more likely to experience health problems during pregnancy and childbirth, and they also face increased social and economic challenges. They may struggle to complete their education, find employment, and provide financially for their child.</p>	
<p>10. Too much screen time can have negative effects on children's physical and mental health. Excessive screen time has been linked to obesity, poor sleep, eye strain, and posture problems. It can also have an impact on children's cognitive development, memory, and attention span. Additionally, prolonged exposure to screens can lead to social and emotional difficulties, such as decreased empathy and communication skills.</p>	
<p>Why did you make the choices which you made?</p>	

Appendix 2

Original numbering of passages:

Human generated text

1. Being a parent can make it harder to get an education or find a job. Juggling the responsibilities of being a parent with work, school and a social life can be tiring. It can also be very difficult to get child care, and almost impossible to get affordable child care. These difficulties can make it hard to cope financially, and can make you feel lonely and apart from your family and friends.
2. Too much screen time can also take away from reading, studying, learning activities, play, and exercise. Digital media can also show alcohol and drug use, smoking, and sexual behaviour. Your child may see these things before they are emotionally ready to understand these issues. And before they can make good decisions.
3. Social media can expose users to hundreds or even thousands of images and photos every day, including those of celebrities and fashion or fitness models, which we know leads to an internalization of beauty ideals that are unattainable for almost everyone, resulting in greater dissatisfaction with body weight and shape.”
4. Despite decades of progressive efforts, there’s still a great deal of inequality in workplaces across the country. In recent years, the government, employees, and many businesses have worked to stamp out issues involving salary discrepancies between genders. They’ve also sought to ensure men and women receive equal treatment. It’s one of the leading topics in the modern business world, so it’s essential your business understand all current laws and your commitments to staff members.
5. AI, as it is called, is coming to your home, your job, your life in ways you never thought possible. At least, that is what computer experts are saying. AI has the ability to improve your life and take care of tasks both menial and major. It also might eliminate your job and the jobs of many people you know.

AI generated paragraphs

6. Teen mothers are more likely to experience health problems during pregnancy and childbirth, and they also face increased social and economic challenges. They may struggle to complete their education, find employment, and provide financially for their child.
7. Too much screen time can have negative effects on children's physical and mental health. Excessive screen time has been linked to obesity, poor sleep, eye strain, and posture problems. It can also have an impact on children's cognitive development, memory, and

attention span. Additionally, prolonged exposure to screens can lead to social and emotional difficulties, such as decreased empathy and communication skills.

8. Social media has had a significant impact on body image, particularly among young people. The constant exposure to images of idealized body types, often heavily edited and filtered, can create unrealistic beauty standards and lead to negative body image. Studies have shown that social media use is associated with increased body dissatisfaction, eating disorders, and other mental health issues related to body image.
9. Inequality in the workplace refers to the unequal treatment of employees based on their gender, race, ethnicity, age, disability, sexual orientation, or other personal characteristics. This can manifest in various forms, including pay disparities, limited opportunities for advancement, discrimination in hiring, promotion or termination decisions, and a lack of diversity in leadership positions. Inequality in the workplace not only violates basic principles of fairness and justice but also undermines productivity, innovation, and overall organizational performance.
10. AI has the potential to be a significant threat to jobs, as it can automate many tasks that were previously done by humans. As AI systems become more advanced and sophisticated, they can increasingly perform complex cognitive tasks in addition to routine physical tasks. This means that jobs that were once considered safe from automation are now at risk, such as those in the service industry, transportation, and even some professional roles such as accounting and legal services. While AI can create new jobs and opportunities, there is a growing concern that the displacement of human workers will outpace the creation of new jobs, leading to widespread unemployment and economic disruption.

Appendix 3

Can humans Recognise Text Produced by artificial intelligence chatbots ?

Dear Participant

You are invited to participate in a research study titled “Can humans recognise text produced by artificial intelligence chatbots” .This study is conducted by a grade 11 pupil named Lethabo Molobi. The Zinniaville Secondary School learner is in the process of doing this research study for the Eskom Science expo. The purpose of the research is to see if participants can correctly identify whether a human wrote different passages of text or AI (artificial intelligence) chatbots.

If you wish to participate, you will be presented with a questionnaire. You will need to state whether the paragraph you just read was human generated or AI generated. Then you will be asked to write down why you choose AI for the ones you did and human for the others .You will be given 60 seconds to decide between each paragraph. A stopwatch will be used to time all participants.

Your participation in this research project is completely voluntary and you may decline altogether if you do not wish to take part. There are no known risks to participating in the project beyond those encountered in everyday life. Your responses will remain confidential and anonymous. The data from this research will be kept under lock and key and reported only as a collective combined total without any names attached to the final report. No one other than myself as a researcher will know your answers to the questionnaire.

If you agree to participate in this project, you will then be given instructions as to how to go about it at the time agreed upon of taking part. It should take approximately ten (10) minutes for the process to be completed.

If you have any questions about this project, feel free to contact Ms Lethabo Molobi at 076 606 9952.

Please complete below to give consent of participation.

I _____ consent to taking part in the above mentioned research study at own accord.

Participant's signature

【評語】 130009

This study addresses a very important and up-to-day issue regarding the use of open AI. The research purpose is clear and the research design is overall comprehensible.

There are some concerns that need to be taken into consideration in the further study. First, In literature review, no citations are specified. It is not known if the statements shown in the literature review section came from other research studies or just the author's personal opinions. No description about the questionnaire can be found in the text. The researcher need to present research tools clearly including the development and the test of reliability of the tools.

There is no control for students' reading or comprehension ability. The study involves a test of differentiating human or AI generated texts. Accordingly, students' reading ability might be an important factor affecting their performances. A test of reading or text comprehension ability is therefore needed to control the possible influence. Even though

the researcher claims that participating students are high achievers, the uncertainty is high because different schools might have different grading systems.

For data analysis, the data were analyzed separately for each school, but Why? When data are presented separately, information is not structured and consequently readers will have difficulty making inferences from the data. Some statistical comparisons, such as the t-test comparison between the performances of urban and rural schools, should be performed so that a trend of student performances can be generalized. Without the statistical analysis, conclusion or inferences drawn from the data made by the researcher would be weak.