Examining the Impact of a Digital Reading Progress Tool on Saudi L2 Learners' Reading Aloud Performance and Proficiency

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Abstract: Few studies have considered the use of digital reading tools for improving the fluency and proficiency of Saudi learners of English as a second language (ESL). Hence, in this study, the researcher investigated the impact of Microsoft's Digital Reading Progress tool on 30 Saudi ESL learners' reading performance and proficiency. The participants were all at the B1 intermediate English language level in academic ESL, according to the Common European Framework of Reference for Languages (CEFR) English language proficiency test. The students were given one reading passage per week, and the researcher examined their performance in reading aloud over a period of four weeks using the Digital Reading Progress tool. The researcher employed a quantitative analysis, including post-assessments, to measure five aspects of participants' reading performance: mispronunciation of words, self-corrections, omissions, repetitions, and correct words per minute. The findings revealed significant improvements in participants' reading performance, fluency, and accuracy, as evidenced by increased accuracy after engaging with the Digital Reading Progress tool, increased scores across the five rated categories, and reduced pronunciation and word omission errors. This study contributes to the growing body of research on technology-enhanced language learning by demonstrating the positive impact of the Digital Reading Progress tool on L2 learners' reading performance and proficiency. The findings have practical implications for ESL instructors in integrating digital tools as valuable pedagogical resources for enhancing L2 reading learning and performance.

Keywords: digital reading, English as a second language, reading aloud performance, reading proficiency, Saudi learners

1. Introduction

Since educational technology is developing rapidly in the digital age, it is crucial to scrutinise how such technology can be applied effectively to enhance second-language acquisition (SLA), particularly regarding the four major second-language (L2) learning skills reading, writing, listening, and speaking. Language educators and practitioners have adopted various digital reading progress tools, recognising their potential advantages for learners. However, this area of technology has remained largely underexplored in the context of English as a second language (ESL) in Saudi Arabia. This research paper presents a comprehensive exploration of the impact of Microsoft's Digital Reading Progress tool on L2 learning, specifically for Saudi learners. This work focused on evaluating the effects of the

tool on learners' reading performance and progress. The researcher analysed five critical components of L2 reading proficiency according to the categories assigned in the Microsoft Digital Reading Progress tool (mispronunciation of words, self-corrections, omissions, repetitions, and correct words per minute (CWPM)), which often prove challenging for Saudi L2 learners.

The main premise of the study was that the use of digital reading progress tools can significantly enhance the reading performance, accuracy, and overall reading comprehension of Saudi L2 learners. The researcher evaluated this hypothesis using a quantitative strategy to gather and analyse the data, which not only provided statistical insights, but also a rich, deep understanding of the learners' reading aloud performance, reading rate and accuracy. The objectives of the study were to assess the impact of the Digital Reading Progress tool on Saudi L2 learners' reading aloud proficiency and comprehension to inform L2 practitioners, language teachers and educational designers about the importance of applying technological innovations to the teaching of L2 reading. Moreover, the researcher offers suggestions for using reading technology to support L2 reading development.

One of the significant contributions of this research is its attention to the geographical context of Saudi Arabia, which is typically underrepresented in studies concerning the use of reading technology to enhance L2 learners' proficiency. Hence, it expands the relevant body of knowledge regarding educational contexts outside the widely examined Western ones. This specific focus has significant implications for educators, policymakers and curriculum designers in Saudi Arabia and other Middle Eastern countries.

This research paper begins by presenting a thorough review of the literature, starting with an overview of L2 acquisition and reading supported by language learning technology and then considering prior research on digital learning tools, L2 reading proficiency and the connection between these two fields. The literature review highlighted a gap in the existing literature, since few studies have examined the impact of digital reading progress tools on L2 learners in Saudi Arabia, and this research sheds light on this underexplored area of L2 learning and teaching.

The researcher employed a quantitative methodology to consider Saudi L2 learners' use of Microsoft's Digital Reading Progress tool over a four-week period and to measure the learners' reading performance following reading aloud practice using established and reliable assessment criteria. The analysis was based on the five standard categories of reading proficiency given in the digital tool to gain valuable insights into the practicalities and challenges of using such technology in an L2 learning context.

This study illuminates the importance of digital literacy in contemporary education, underscoring the potential benefits of integrating technology into traditional learning settings. Reading aloud enhances L2 learners' comprehension of texts, increases their vocabulary understanding, fosters their interest in reading and increases their engagement and motivation (Ariail and Albright 2005). By analysing the effectiveness of this specific tool in developing L2 reading proficiency, this paper contributes significantly to the ongoing development of digital learning tools for enhancing ESL language learning outcomes.

Lastly, this research, while focusing on Saudi L2 learners, is not limited in its implications. Since technology continues to permeate the global educational landscape, the insights and observations presented in this paper are widely applicable. This study raises important questions about the future of technology integration into L2 language acquisition and education.

1.1 Objectives of the study

The study's primary objectives, which centred on examining the influence of digital reading tools on L2 reading acquisition, were as follows:

1. To conduct an in-depth investigation of the role of Microsoft's Digital Reading Progress tool in enhancing Saudi ESL learners' progress in reading aloud.
2. To empirically measure the impact of this digital reading tool on the reading aloud performance of Saudi ESL learners, particularly regarding key reading criteria (i.e. mispronunciation of words, self-corrections, omissions, repetitions and CWPM).

The researcher gathered data from the Digital Reading Progress tool to glean insights into learners' progress over time, including their strengths and aspects of reading aloud that required further support.

2. Literature review
2.1 Overview of L2 acquisition and reading proficiency

SLA, particularly reading proficiency, involves numerous interwoven cognitive and linguistic abilities. L2 reading is not merely a matter of decoding symbols; it is an intricate task requiring the adept deployment of multiple skills (Zhang and Ke 2020), including comprehensive vocabulary knowledge, a solid grasp of grammatical structures and the effective use of comprehension strategies. Reading proficiency can be seen as a mirror reflecting these individual abilities, representing a person's capacity to comprehend and interpret written material effectively in the target language.

Insights into the cognitive processes involved in SLA have been derived from ground-breaking research. For instance, the input hypothesis, articulated by Zyzik (2021), posits that an ideal language learning environment is one in which students are exposed to material slightly beyond their current competency levels. This concept has significant implications for reading proficiency, emphasising the importance of graded reading materials that offer students a blend of familiar and new linguistic elements. Similarly, the interdependence hypothesis (Talebi, Fallahi and Amjadi 2023) suggests that skills gained from a learner's first language can aid the learner's SLA, including reading proficiency. This theory supports the idea that cognitive and academic abilities can be transferred across languages, thus encouraging the integration of native language literacy skills into L2 reading. However, achieving L2 reading proficiency and comprehension relies on more than these cognitive mechanisms. Vocabulary knowledge is essential; without a sufficient understanding of words, the ability to glean meaning from texts is significantly hindered (Zheng, Dong, Huang, Singhal, Che, Liu and Wei 2021).

Similarly, grammatical understanding is critical because it helps in understanding sentence structures, discerning conceptual relationships, and interpreting texts accurately. Since languages are deeply tied to their respective cultural contexts, awareness of these contexts can enhance learners' comprehension of idiomatic expressions, metaphors, and cultural references in the target language (Al Madhoun and Elyan 2020). In summary, achieving L2 reading proficiency is a holistic process, encompassing cognitive processes, linguistic skills, and cultural understanding, which contribute individually and collectively to the development of proficient L2 readers.

2.2 The role of technology in language learning

Contemporary academic investigations have emphasised that digital tools play a crucial role in SLA, especially regarding their potential benefits and limitations for enhancing L2 reading comprehension. The dynamic nature of digital technology and its application to language learning has prompted numerous scholars to research its implications. Such studies have typically employed blends of qualitative and quantitative research methodologies to investigate the effectiveness of digital tools. They have predominantly encompassed categories of tools, such as e-books, digital dictionaries, and annotation software, that offer distinct advantages for enhancing L2 reading skills and have distinct features that aid language learners' comprehension, vocabulary development and holistic language proficiency. Due to their interactive nature, these tools can provide diverse and engaging reading experiences, thus creating an immersive environment that promotes learning and comprehension.

In recent years, e-books have become popular digital resources. They typically integrate interactive elements, such as hyperlinks, multimedia components and glossaries, to craft a more immersive reading experience. Lee, Chen and Cheng (2023) recently examined the influence of digital reading annotation tools embedded within an e-book system. The authors experimentally evaluated the reading comprehension of students who used the annotation tool compared to a control group that used traditional printed books. The results revealed notably superior performance in reading comprehension among students using digital annotation tools. The study shed light on the power of interactive features in e-books, such as annotation tools, to boost readers' engagement and comprehension.

Howlett and Penner-Williams (2020), in their seminal study, investigated how technology-facilitated sheltered instruction affected L2 learners' reading comprehension. Utilizing a mixed-methods research design, including pre- and post-tests and interviews, to measure students' reading comprehension abilities and collect qualitative data, the researchers found that the annotation tool substantially improved students' reading comprehension scores. The authors posited that this improvement was probably due to the interactive nature of the annotation tool, which allowed students to annotate and highlight text, thereby improving their comprehension and retention of the material. Moreover, a study conducted by Ivey and Broaddus (2001), which included 1,765 language learners, showed that reading aloud was the students' favourite reading strategy, as it was more effective than

silent reading in helping the learners to comprehend texts. Likewise, in another study, Clark and Andreasen (2014) examined the attitudes (particularly the negative attitudes) of middle-intermediate students towards L2 reading. The authors found that students who read aloud with their teachers exhibited less stress and better performance in reading comprehension.

Meanwhile, in a contrasting study, Usnatdinovna (2022) examined the effectiveness of digital dictionaries for L2 learners. Comparing a control group that used traditional paper dictionaries with a treatment group that used digital dictionaries, the author found no substantial difference in vocabulary acquisition between the two groups. However, the study showed that the learners who used digital dictionaries had a more positive learning experience, implying that although the direct impact of dictionaries on vocabulary acquisition was similar, digital tools enhanced learners' motivation and engagement. These studies have significant implications for future research and practical applications for L2 reading instruction. Despite the varying results, they collectively suggest that digital reading tools can enhance L2 reading performance by directly impacting comprehension or indirectly increasing motivation and engagement (Usnatdinovna 2022). However, these studies emphasized the need for ongoing research to determine the specific conditions under which these tools are most effective and how they can best be integrated into L2 reading instruction.

Despite the encouraging outcomes of studies that utilised reading tools to test vocabulary learning and language literacy, such as those by Johnson (2023) and Wu, Chen, Shen, Guo, Gau, Li and Long (2023), one must bear in mind that the successful employment of these tools demands careful attention to learners' tendencies, technical abilities, and technology access. Although these tools promise to enhance certain reading skills, the question of their contribution to a comprehensive improvement in overall reading proficiency still remains, requiring continued investigation. The wide range of digital reading tools available today offers thrilling prospects for innovative learning experiences that can significantly impact L2 reading skills when used appropriately and effectively.

2.3 Previous studies on digital reading tools and L2 reading performance
The application of digital reading resources to L2 education has been the focus of multiple empirical studies exploring their multifaceted effects on L2 reading performance. These studies have typically employed rigorous methodologies to yield reliable deductions regarding the efficacy of digital reading resources in enhancing L2 reading proficiency.

A notable contribution to this field of research was a study conducted by Wu et al. (2023), who used an e-book reading annotation system to study its impact on L2 learners' reading comprehension. This research involved utilising the e-book reading annotation system to study its impact on the reading comprehension of L2 learners. The methodology consisted of a quasi-experimental design whereby participants were divided into control and experimental groups, with the latter employing the digital annotation system. Data were gathered through pre- and post-tests and semi-structured interviews. The outcomes revealed considerably enhanced

reading comprehension scores for the participants who used the e-book annotation system, illuminating the potential benefits of interactive digital tools in fostering comprehension and engagement among L2 learners. In contrast, a study by Dore, Shirilla, Hopkins, Collins, Scott, Schatz and Hirsh-Pasek (2019) investigating the use of digital glossaries produced mixed results. The researchers separated the participants into a control group using paper dictionaries and a treatment group using digital glossaries, aiming to measure vocabulary acquisition, which is a crucial aspect of L2 reading proficiency. Although the results showed no significant differences in vocabulary acquisition between the two groups, the learners using digital glossaries reported a more satisfying learning experience. This suggests that even if digital tools do not directly enhance linguistic skills, they contribute to a more engaging and motivational learning environment, indirectly benefitting the learning process.

These studies' have implications for further research and practical applications in L2 instruction. The findings emphasize the potential of digital reading resources to improve L2 reading performance by directly impacting reading skills and reinforcing learners' engagement and motivation. Nonetheless, these studies also stressed the need for additional research to discern the contexts and conditions under which these digital tools are most effective, which the researcher examined in the current study.

2.4. Previous studies on using digital reading tools in ESL contexts

ESL pedagogy has undergone significant alterations due to the integration of digital reading tools into its fabric. Many recent studies have examined their impacts, explored their use in classrooms, enumerated their challenges and evaluated their influences on students' reading achievements and motivation. These digital instruments, from electronic books to web-based dictionaries and digital glossaries, uniquely shape the pedagogical experience.

For instance, Wager, Clarke and Enriques (2019) notably explored the application of e-books in an ESL context, observing their potential to support students' reading comprehension and motivation. They compared a group of students that used traditional textbooks with a group that used e-books, revealing significant improvements in reading comprehension scores for the latter group. In addition, the learners who used digital tools demonstrated high motivation and increased interaction with the study materials, suggesting that these tools offer extended advantages beyond merely supporting academic achievement. Such findings contribute to the prevailing argument that digital tools have the potential to revolutionise the ESL educational environment, promote active learning and enhance comprehension, which the researcher attempted to evaluate in this study.

However, the journey towards integrating digital reading tools into ESL classrooms is filled with unique hurdles. Olson, Wise, Ring and Johnson's (2021) research provided additional evidence to support the notion that struggling readers benefit from programmes that provide personalised reading practice and comprehension strategies for story reading. The study highlighted potential barriers to their successful deployment, including inadequate technological infrastructure,

teachers' varying degrees of digital literacy and students' inconsistent access to technology. The research also revealed that despite the evident benefits of these digital tools, more effective utilisation could have been achieved with better teacher training and support. These insights support the need for well-rounded implementation strategies that do not merely introduce tools but address key contextual factors, such as technological support and teacher training. Lee and Kim (2018) examined textual factors that affect L2 reading comprehension in computer-assisted language learning (CALL) environments. They argued that technology-based reading environments negatively impact L2 reading comprehension because the diverse resources that learners are exposed to can affect their attention during the reading of digital texts.

Although digital reading tools offer novel avenues for boosting ESL reading performance and motivation, their successful integration into educational environments demands thoughtful planning. Continuing research is imperative for discovering the most effective methods of deployment and overcoming potential obstacles to successful implementation. Equally crucial is maintaining a balanced perspective that acknowledges the potential benefits of these tools while maintaining awareness of the challenges. Approached strategically, these tools can initiate transformative shifts in ESL instruction, offering students richer and more effective learning experiences.

3. Methodology
3.1 Research design and approach
The researcher used quantitative research methods that involved counting, calculating, and analysing the data using a predetermined number of participants (30 Saudi female students). According to Apuke (2017), quantitative research methods rely on the measurement and analysis of variables to obtain results, and they require the use and analysis of numerical data and specific statistical techniques to address various types of questions, such as how much and how many data need to be analysed. Creswell (2008) further elaborated on this definition, describing quantitative research methods as useful for exploring an issue or phenomenon through the collection of numerical data and subsequent analysis using mathematical methods, particularly statistics. In this study, the researcher introduced the selected participants to Microsoft's Digital Reading Progress tool during face-to-face English language classes. Once the participants understood the tool's functions, the researcher provided them with access to the tool on Microsoft Teams®, enabling them to use it at almost any time. Throughout their practice, the participants received instruction and support to overcome technical difficulties. Initially, the researcher gave the participants a trial run to familiarise them with the required steps and then informed them of the specific time allocated for each reading task. The researcher allowed the participants one week to complete each reading passage, starting with the first passage in the initial week and gradually progressing to subsequent passages until all participants had completed all four passages over a four-week period. Once all the participants had completed the four reading passages, the researcher analysed the data across five different categories

that reflected various aspects of the Microsoft Digital Reading Progress tool (i.e. mispronunciation of words, self-corrections, omissions, repetitions and CWPM).

3.2 Participant selection

Thirty female undergraduate students aged 18–20 years old from a Saudi university, who were taught via blended learning in a general English language course, participated in this research. The study included only female participants due to gender segregation in Saudi education. Convenience sampling was chosen for this study because the aim was to focus on the learners' reading comprehension skills and language proficiency. Therefore, 30 participants were sufficient to obtain satisfactory findings. All the students were studying at the first level in the first semester of the academic year. To assess their English language skills, the students were required to complete eight reading tasks across the first semester, followed by online comprehension assessments. To ensure data reliability, the researcher selected the participants from the general English language course based on their English language level and their agreement to participate in the study; all participants were at the B1 level, indicating an intermediate to upper-intermediate level of English language proficiency according to the European Framework of Reference for Languages (CEFR) English language proficiency test. This level is equivalent to an International English Language Testing System (IELTS) score of 4.4–5. Participants were chosen based on this level because it is a sufficient level to test and examine the language proficiency in second or foreign language acquisition. According to Ellis (1994), the intermediate level is an appropriate level for testing L2 learners' second language competence. Also, to ensure the homogeneity of participants, all learners had the same cultural and educational background, their first language was Arabic, and they were learning EFL/ ESL in Saudi Arabia. Notably, all the students used the same textbook for their general English language course, namely *Cambridge Unlock Textbook 3, Reading and Writing, Second Edition* (Cambridge University 2021). Each reading topic employed in the reading tool was aligned with the corresponding unit covered in *Cambridge Unlock Textbook 3*. The selection of reading passages was based on the themes of the respective units: 'The Environment' for Reading Passage 1, 'Transport' for Reading Passage 2, 'Health and Fitness' for Reading Passage 3 and 'Discovery and Invention' for Reading Passage 4. Participants were instructed to read all four assigned reading passages over a four-week period.

3.3 Description of the Digital Reading Progress tool

To assess the reading proficiency and accuracy of Saudi L2 learners, the researcher employed Microsoft's Digital Reading Progress tool as it is one of the significant and popular tools that is wieldy used recently in the educational field in Saudi Arabia. It is developed by Microsoft and integrated into Microsoft Teams®, which is part of the Office 365® suite of software, this tool assists educators in monitoring and improving students' reading fluency. (https://support.microsoft.com/en-au/topic/getting-started-with-reading-progress-in-teams). It was launched in 2021 as part of Microsoft's comprehensive suite of

education-focused applications and tools designed to enhance instruction and learning in the digital era. The Digital Reading Progress tool allows students to record themselves reading a passage (a feature that can be used flexibly to reduce performance pressure). In this study, the researcher gave the Saudi students a week to complete each task. After recording their readings, they submitted them directly to Microsoft Teams®.

The Digital Reading Progress tool helps educators assess and support students' reading. One feature used in this study was automatic transcription, which allows educators to view students' voice notes alongside the generated transcripts. The researcher used this feature to evaluate Saudi L2 learners' overall performance and to identify any reading mistakes or errors.

Another key component of the tool used in this study was customisable analysis, which allowed the researcher to examine critical reading proficiency metrics for the participating L2 learners. Educators can examine five metrics (i.e. the mispronunciation of words, self-corrections, omissions, repetitions and CWPM. The digital reading tool's automatic report generation feature bases CWPM on the average number of correct words in less than 10 minutes. To align with specific learning objectives, the researcher used these five categories to evaluate Saudi L2 students' reading progress and to facilitate the identification and tracking of students' development over time.

It is important to note that the Digital Reading Progress tool can be used in various contexts, apart from ESL settings. The integration of the tool into Microsoft Teams® was useful for assessing and supporting Saudi students' reading, thereby enhancing both instruction and learning outcomes.

3.4 Data collection procedures

The researcher adopted a systematic approach to data collection using the Microsoft Digital Reading Progress tool over a period of four weeks. The participants were instructed to complete four assigned reading passages on Microsoft Teams® using the Microsoft Digital Reading Progress tool, with the aim of evaluating learners' progress in L2 reading proficiency. The researcher prepared four reading passages extracted from *Cambridge Unlock Textbook 3* that were suitable for the Saudi L2 learners' proficiency level and made them available on Microsoft Teams®. Each week, the researcher assigned one passage for learners to read and record using the Microsoft Digital Reading Progress tool. The readings, once submitted, were automatically transcribed, and analysed according to the five predetermined reading proficiency metrics: mispronunciation of words, self-corrections, omissions, repetitions and CWPM. Following this systematic method was crucial to ensure a valid quantitative analysis and reliable study outcomes. According to Pathak (2008: 37), 'the data collected from samples and through an administration of various tools do not lead to interpretation, unless edited, classified and tabulated in the form of needing to test hypothesis and consequents interpretation and generalization'. Upon completion of all tasks, the researcher extracted the data related to these criteria from the tool and generated a table for each passage, documenting the frequency of occurrences for each criterion for each student. This enabled the researcher to

quantitatively evaluate each learner's reading proficiency across different passages. Finally, the researcher compared and analysed the data from all four weeks to track changes in reading proficiency over time and across the four texts.

3.5 Data analysis techniques

The present study's data were obtained from reports generated by the Digital Reading Progress tool, which documented students' task completion on the website of the reading tool. The researcher then used quantitative methods to analyse the results according to the previously mentioned five distinct criteria mispronunciation of words, self-corrections, omissions, repetitions and CWPM as discrete variables. The researcher evaluated each student's performance for each reading passage and recorded and computed the frequency of occurrences for each criterion, resulting in a count matrix. Descriptive statistics were used to calculate the means and mean absolute deviations (MADs) to provide a comprehensive overview of each student's performance across different reading categories within a given week.

Furthermore, the researcher assessed the overall group performance over the course of four weeks for each reading passage. To conduct a statistical analysis of the linguistic research data, with a specific focus on various performance metrics, the researcher employed Python libraries, which involved loading and analysing the data for each week, then comparing the total counts for each criterion for each week to investigate which criteria had the strongest predictive power for CWPM across all students. This quantitative analysis provided rigorous empirical insights into the students' reading proficiency and progress.

3.6 Data loading procedures

For each week's data, the researcher developed an iterative loop across the four data frames and, for each repetition, calculated the statistics for several performance metrics using Python, including the average accuracy rates and MADs for all five categories of proficiency examined in this study. The researcher prepared well-organised tables for each week's results, indicating the corresponding week numbers, and including average values and MADs for the performance metrics for each week. These procedures allowed the researcher to obtain statistical summaries for each week of linguistic data, which provided valuable insights into the performance metrics related to the criteria (i.e. mispronunciations, self-corrections, omissions, repetitions and CWPM).

4. Results

Tables 1–4 and figure 1&2, provide an accurate analysis of the reading proficiency measures in this study. Table 1 illustrates Saudi learners' reading aloud performance and progress across the five categories in the first week after starting their practice.

Table 1. The reading performance of Saudi learners in the first week

Student Number	Accuracy Rate as a Percentage	Number of Mispronounced Words	Number of Self-Corrected Words	Number of Omitted Words	Number of Repeated Words	CWPM
1	91	4	0	1	2	83
2	94	3	0	1	0	93
3	96	2	0	2	0	129
4	91	6	3	1	0	84
5	88	9	2	0	4	82
6	87	6	3	2	2	83
7	85	3	2	1	1	100
8	85	5	1	2	4	89
9	86	4	5	1	3	102
10	94	2	4	0	0	95
11	90	5	0	3	0	91
12	89	4	2	2	1	85
13	98	1	0	1	0	93
14	91	6	4	3	1	78
15	88	8	2	4	1	95
16	96	7	0	1	2	108
17	97	2	1	0	1	125
18	79	8	2	0	4	57
19	94	4	0	0	4	100
20	87	8	4	2	5	89
21	98	1	3	1	0	123
22	77	8	0	7	3	57
23	95	4	0	0	2	100
24	89	4	2	1	1	78
25	84	3	1	5	0	86
26	90	2	0	0	0	107
27	89	6	3	3	1	90
28	76	10	4	1	0	77
29	90	2	0	2	0	95
30	98	4	1	1	0	129

Table 1 shows the number of errors Saudi learners made during their reading practice using the digital tool. The first reading topic was 'The Environment', which was included in their course book *Cambridge Unlock Textbook 3, Reading and Writing,* and the results are for students' progress recorded in week 1.

Table 2. The reading performance of Saudi learners in the second week

Student Number	Accuracy Rate as a Percentage	Number of Mispronounced Words	Number of Self-Corrected Words	Number of Omitted Words	Number of Repeated Words	CWPM
1	92	5	0	2	5	119
2	95	3	1	2	0	155
3	88	1	1	0	1	129
4	92	1	0	0	0	118
5	94	4	1	0	1	128
6	89	4	3	1	1	124
7	84	2	1	1	0	99
8	89	3	0	1	3	110
9	97	2	4	1	2	102
10	92	2	0	0	2	125
11	98	0	0	1	1	101
12	79	3	0	0	1	59
13	90	2	0	0	1	154
14	96	0	0	0	1	120
15	98	3	1	0	0	127
16	86	5	0	0	2	88
17	95	2	1	0	1	124
18	87	4	1	0	3	126
19	75	3	3	0	5	99
20	79	6	0	2	5	100
21	95	2	6	1	0	123
22	98	2	1	1	0	109
23	91	4	0	0	2	100
24	91	5	0	3	1	107
25	82	2	0	2	0	123
26	95	3	0	2	1	104
27	98	0	3	0	1	144
28	88	6	5	0	2	112
29	93	2	1	0	0	102
30	99	0	2	1	0	133

Table 2 further details students' reading proficiency for the second reading topic, 'Transport', as recorded in the second week.

Table 3. The reading performance of Saudi learners in the third week

Student no.	Accuracy Rate as a Percentage	No. of Mispronounced Words	No. of Self-Corrected Words	No. of Omitted Words	No. of Repeated Words	CWPM
1	93	4	0	3	4	145
2	90	4	0	1	0	112
3	98	3	1	0	1	126
4	99	1	0	0	0	156
5	97	3	1	0	1	130
6	90	0	0	1	1	124
7	95	2	0	1	0	99
8	88	3	0	1	1	115
9	97	1	3	1	2	140
10	90	1	0	0	2	125
11	99	0	0	0	0	156
12	77	4	1	1	1	78
13	88	3	0	0	1	110
14	96	0	3	0	1	125
15	98	0	3	0	0	132
16	88	4	0	0	2	104
17	94	2	1	4	1	133
18	88	2	1	0	3	130
19	82	3	2	1	4	103
20	80	2	0	2	7	105
21	94	1	3	0	0	120
22	90	1	1	0	0	124
23	95	1	0	0	3	111
24	91	5	0	3	1	107
25	82	1	0	0	0	102
26	95	2	1	0	0	108
27	98	0	0	0	3	145
28	90	5	3	0	4	120
29	94	3	0	0	3	130
30	99	0	1	1	0	160

Table 3 shows that the students significantly improved their reading proficiency levels after practising their third reading task. The reading passage was entitled 'Health and Fitness' and the table illustrates the Saudi learners' progress across the five categories in the third week.

Table 4. The reading performance of Saudi learners in the fourth week

Student no.	Accuracy rate as a percentage	No. of mispronounced Words	No. of self-corrected words	No. of omitted words	No. of repeated words	CWPM
1	92	5	0	2	1	145
2	95	3	1	2	0	155
3	99	1	0	0	1	126
4	98	3	1	0	0	156
5	97	1	0	0	1	128
6	90	0	0	1	1	124
7	92	2	5	0	0	117
8	90	1	0	1	1	120
9	97	2	0	1	2	141
10	94	4	1	1	3	124
11	99	0	0	0	0	156
12	87	3	11	0	1	116
13	84	7	0	3	1	114
14	96	4	3	6	1	126
15	98	0	3	0	0	132
16	93	3	1	1	2	120
17	95	2	1	4	1	134
18	98	2	1	1	0	109
19	98	2	1	1	0	108
20	84	11	1	2	5	103
21	95	4	4	0	1	118
22	95	2	4	4	0	125
23	95	0	0	0	0	111
24	93	3	1	1	0	108
25	84	1	0	0	5	98
26	97	2	1	0	0	133
27	95	4	12	0	2	144
28	95	4	3	0	4	121
29	95	5	0	0	1	133
30	99	0	1	0	0	159

Table 4 illustrates Saudi learners' performance following their reading practice in week 4, which was related to the 'Transport' topic. The data revealed a significant difference in their reading proficiency, especially in the accuracy rate, which dramatically increased.

The results presented in these four tables were prepared using Python libraries to analyse the data on Saudi learners' performance across a period of four weeks. Figure 1 illustrates the average values and MADs for the Saudi learners' performance according to each of the five criteria for the four reading passages.

Week	Average Accuracy Rate	MAD of Accuracy Rate	Average Mispronunciation	MAD of Mispronunciation	Average Self-correction	MAD of Self-correctinn	Average Omission	MAD of Omission	Average Repetition	MAD of Repetition	Average Correct Words per Minute	MAD of Correct Words per Minute
1.0	89.733333333	4.0	4.7	2.0	1.6333333333	1.5	1.6	1.0	1.4	1.0	93.4333333333330	8.5
2.0	90.833333333	4.0	2.7	1.0	1.1666666666	1.0	0.7	0.0	1.4	1.0	115.4666666666670	11.0
3.0	91.833333333	3.5	2.03333333333	1.0	0.8333333333	0.0	0.66666666	0.0	1.533333333	1.0	122.5	13.5
4.0	93.966666666	2.5	2.7	1.0	1.8666666666	1.0	1.033333333	0.5	1.13333333	1.0	126.8	9.0

Figure 1. Overall average rates and MADs for the tested reading criteria
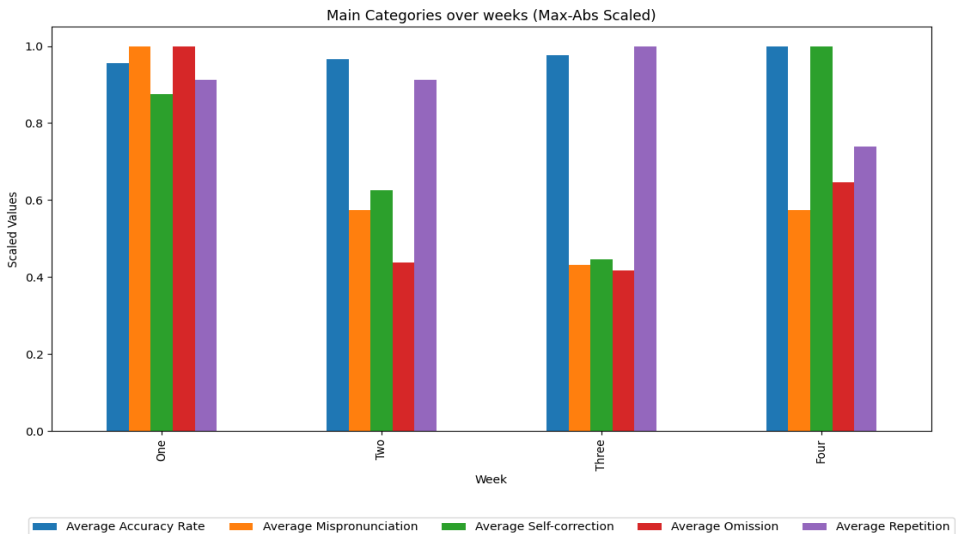
Figure 2. Saudi learners' reading aloud progress across the five categories evaluated

4.1 Interpretation of the results

The data gathered over the four-week period revealed significant results for Saudi L2 learners' use of digital learning tools.

In the first week, the average accuracy rate was 89.73%, with an MAD of 4 points. This suggests a commendable initial performance with moderate variance across students. The average mispronunciation rate was 4.7, with an MAD of 2 points, indicating a good reading proficiency level. Additionally, the average self-

correction standard in the same week was 1.63, with an MAD of 1.5 points, suggesting that students were moderately successful in identifying and rectifying their errors at the beginning of their practice. However, the average scores for omissions and repetitions per minute were relatively low, at 1.6 and 1.4, respectively. Finally, the average CWPM was calculated as approximately 93.4, indicating a reasonable initial reading speed.

By week 2, the results showed encouraging progress, with the average accuracy rate slightly increasing to 90.83%. However, the MAD remained consistent at 4, implying a similar degree of variation in the data. There was a marked decline in the average mispronunciation rate from 4.7 in the first week to 2.7 in the second week, with the MAD decreasing to 1, revealing a remarkable improvement by only the second week of practice in terms of mispronunciations. Furthermore, the decrease in self-corrections, omissions and repetitions corroborated the upward trend in performance. A notable increase in CWPM to 115.5 confirmed this progress.

This trend of overall improvement for the five reading proficiency criteria continued in week 3. The average accuracy rate increased to 91.83% and the MAD concurrently decreased to 3.5 compared to 4 in the first two weeks, signifying some consistency in students' performance. Remarkably, the averages for self-corrections and omissions decreased to 0.83 and 0.67, respectively, both with MADs of zero, displaying markedly enhanced reading proficiency. Nevertheless, a slight increase in repetitions indicated an area of linguistics that needed to be focused on and further analysed in the following two weeks. CWPM was another area with an increased rate of 122.5 in the third week.

By the final week (week 4), the data revealed an impressive average accuracy rate of 94%. However, a reduction in the MAD for accuracy to 2.5 was recorded, indicating greater uniformity in the students' performance. The average for mispronunciation errors held steady at 2.7 compared to the previous two weeks, but self-corrections increased, possibly hinting that the students became more conscious of their linguistic errors. In addition, the averages for omissions and repetitions slightly increased but remained relatively low. CWPM peaked at an average of 126.8 words, indicating remarkable speed progress.

In summary, the progress results across the four weeks revealed substantially enhanced linguistic accuracy, pronunciation, self-corrections and reading speed. Additionally, the increase in self-corrections in the final week was another significant improvement. Thus, the overall trend was positive, reflecting successful reading strategies and dedicated learning efforts.

5. Findings and discussion

The researcher assessed the impact of a digital reading progress tool on Saudi L2 learners' reading aloud proficiency and performance. The Digital Reading Progress tool provided valuable insights into accuracy rates, mispronunciations, self-corrections, omissions, repetitions and CWPM. This discussion examines the data gathered across the four weeks and analyses the observed trends and improvements in the different aspects of reading proficiency. One of the main reading criteria for

this tool was learners' accuracy. According to the data, Saudi L2 learners showed a significant improvement in accuracy over a four-week period. Initially, they exhibited a high frequency of errors, including mispronunciations, omissions, and repetitions, but as they became more familiar with the tool and received feedback on their performance, their accuracy rates gradually improved. This finding corresponds with studies proving that the use of digital learning tools effectively improves students' linguistic knowledge. According to Yuksel and Tanriverdi (2009), ESL learners' language knowledge significantly improved in terms of reading comprehension and fluency due to the use of computerised reading texts. Biancarosa and Griffiths (2014), in their research on the use of technology to support e-reading, emphasised its positive impact on a range of reading skills. They found that L2 learners showed enhanced spelling and fluency compared with learners who depended on structured L2 reading in classes, alone and without extra resources, such as digital reading tools.

Another important aspect of reading proficiency assessed in this study was Saudi L2 learners' mispronunciation rates. The Digital Reading Progress tool allowed the researcher to identify and track mispronounced words, providing valuable insights into learners' pronunciation skills. The data indicated that the learners struggled with accurate pronunciation at the beginning of the study, particularly in week 1, when they started the first applied reading passage, resulting in relatively high mispronunciation rates. According to Nor, Hashim and Md. Yunus (2019), digital reading tools that incorporate recorded audio may improve pronunciation because learners can read aloud and recognise their pronunciation mistakes. Consequently, Nor et al. (2019 :239) suggested that 'when students read aloud and note their pronunciation, they may want to make personal notes about words that they have difficulty pronouncing. They can then check the pronunciation and meaning of the word in a dictionary later'.

However, it is important to note that learners' pronunciation skills may not significantly improve through audio e-reading alone, unless they are provided with appropriate feedback and monitoring in class, as the assessment of Saudi learners' pronunciation could be affected by their accent and their mother tongue. For example, spoken with an Arabic accent, 'I won't' can sound remarkably like 'I want'. Therefore, an improvement in pronunciation skills does not necessarily reflect and generalise improvement in overall reading proficiency. Nevertheless, The Digital Reading Progress tool evaluated in this study provided learners with immediate feedback on their pronunciation with the correct pronunciation, allowing them to receive instant real-time counts of their pronunciation errors while reading. This was reflected in their self-correction rates, which showed remarkable improvement by the end of the last week of the study. This suggests that the digital tool facilitated the learners' ability to self-correct their pronunciation, leading to improved overall reading proficiency. Self-corrections are important for L2 learning because they show metalinguistic awareness and enhanced engagement in learning. Thus, because the Digital Reading Progress tool provided immediate feedback to Saudi L2 learners, it allowed them to correct their mistakes independently. The data showed a trend towards improvement in the students' self-correction skills over a

period of four weeks, accompanied by an inverse decrease in mispronunciations. As they advanced, the learners showed decreasing rates of self-corrections, instead relying heavily on the feedback provided. However, as their development progressed, they exhibited increased independence in identifying and resolving their own errors, leading to a greater number of self-corrections.

Many studies have investigated the ability of similar electronic reading tools to provide struggling readers with practice opportunities and personalised feedback. The results were encouraging (Biancarosa and Griffiths 2014). Moreover, Olson et al. (2021) presented additional evidence to support the notion that struggling readers benefit from programmes that provide personalised electronic practice in different areas, such as story reading and comprehension strategies. The positive results of that study aligned with the Saudi learners' use of the Digital Reading Progress tool, which encouraged the development of their self-monitoring and self-correction skills. It is important to note that some participants may need additional support for self-corrections. They may read texts without noticing the mistakes they make, which indicates a lack of awareness that needs to be recognised to develop their overall L2 proficiency.

Furthermore, apart from accuracy and mispronunciation rates, the Digital Reading Progress tool allowed for the analysis of learners' omissions and repetitions. L2 reading omissions refer to the unintentional exclusion or omission of linguistic elements, such as words, phrases, or grammatical markers, during L2 reading (Bernhardt 2005). This phenomenon can arise from factors such as limited proficiency, unfamiliarity with the language structure or challenges in processing the text. The data in this study revealed a decline in both omissions and repetitions as the learners engaged with the tool over a four-week period. Primarily, the learners exhibited a higher frequency of omissions and repetitions in the last two weeks, suggesting difficulties in maintaining fluency and comprehensibility throughout the four weeks. However, as the Saudi learners received feedback and had more practice using the digital tool, their ability to minimise omissions and repetitions improved, suggesting that the digital tool positively influenced the learners' reading fluency and rhythm. This finding contradicts the study conducted by Lee and Kim (2018), who found that textual factors in technology-based reading environments, specifically CALL environments, impacted L2 reading comprehension. The study focused on the potential for omitting key information in digital texts, and the main findings revealed that the digital environment had a negative impact on L2 readers' ability to grasp important details and maintain a coherent understanding of the text. Nevertheless, this could be attributed to several factors related to the digital reading environment. L2 learners may have benefitted from fewer distractions on the screen, such as hyperlinks and advertisements. Additionally, the layout and presentation of text on the screen may have caused difficulty in maintaining a clear understanding of the content. However, since the Saudi learners were less exposed to these factors in the focused, guided texts examined in this tool, their reading omissions and repetitions significantly improved by the last week of the study. These findings highlight the importance of considering textual factors and the design of technology-based reading

environments in L2 instruction. Thus, educators and developers should be aware of the potential drawbacks of digital platforms, particularly the increased risk of omitting key information, and take steps to lessen and mitigate these issues. Providing learners with explicit instructions and strategies to help them navigate digital texts effectively is beneficial for improving L2 reading proficiency and accuracy.

Finally, the researcher assessed Saudi learners' CWPM using the Digital Reading Progress tool. The data indicated a gradual increase in reading speed throughout the four weeks. Initially, the learners read at a relatively slow pace but gradually improved over the four weeks. This significant increase indicates that the Digital Reading Progress tool contributed to enhancing Saudi L2 learners' reading fluency. Improved reading speed is an essential aspect of overall reading proficiency, and the results suggest that the tool effectively supports learners in developing their reading skills. This accords with White's (2004) assertion regarding the use of technology to increase L2 skills that language learners need to have a degree of independence and autonomy, especially in distance learning contexts, to develop their ability to participate in learning experiences that can satisfy their individual learning needs. This could be applied to the Saudi learners who participated in this study and showed a significant improvement in their L2 reading overall proficiency according to different criteria.

In summary, the analytical findings indicate that using the Digital Reading Progress tool had a positive effect on Saudi L2 learners' reading proficiency. The observed improvements in accuracy, pronunciation, self-corrections and reading speed demonstrated the tool's efficacy in fostering development in these areas. However, it is crucial to note that the slight increase in self-corrections during the last week may require additional attention since students may become more aware of their own mistakes and require intervention to ensure continued progress, although this might affect their reading fluency. Nonetheless, the overall trend indicates that reading strategies reinforced by the Digital Reading Progress tool were effective.

5.1 Implications of the findings for the L2 reading digital progress tool

Further research could be conducted in different areas to examine digital reading progress tools. For example, other studies could be conducted to investigate the long-term effects of different language learners' proficiency levels. In addition, researchers could conduct comparative studies and explore pedagogical implications that take individual differences into account. Moreover, researchers could examine transferability to other language skills, such as writing, listening and speaking, using digital tools to evaluate the generalisability of using the tool across diverse ESL learners. Addressing these issues would contribute to a more thorough comprehension of the potential benefits and effective implementation of digital tools in L2 language learning contexts.

5.2 Limitations of the study

Although this study provided valuable insights into the proficiency and performance of female Saudi L2 learners who used the Digital Reading Progress tool, it is important to acknowledge that the findings may not be generalised to other ESL contexts and genders. Examining the tool's effectiveness across diverse language learning settings and considering both male and female learners could yield additional insights. Moreover, expanding the study to include a larger and more diverse pool of participants would enhance the robustness and applicability of the findings.

6. Conclusion

In conclusion, the current study sheds light on the effectiveness of the Microsoft Digital Reading Progress tool in improving Saudi L2 learners' reading aloud proficiency and progress. The findings revealed substantial improvements in multiple reading skills, including accuracy, pronunciation, self-corrections, omissions, repetitions and CWPM. The results indicate that the implementation of the Digital Reading Progress tool positively influenced Saudi L2 learners' accuracy over the four weeks of this study. Their significant improvement was not limited to accuracy but was evident in other linguistics areas, such as the repetition and omission of words. These findings underscore the tool's effectiveness in supporting learners in their quest for enhanced reading skills. Further research and interventions can build upon these findings to optimise the use of digital reading tools, not only for Saudi L2 learners, but also for different types of ESL learners.

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Appendix 1

Sample of Saudi Students' Reports from the Microsoft Digital Reading Progress Tool
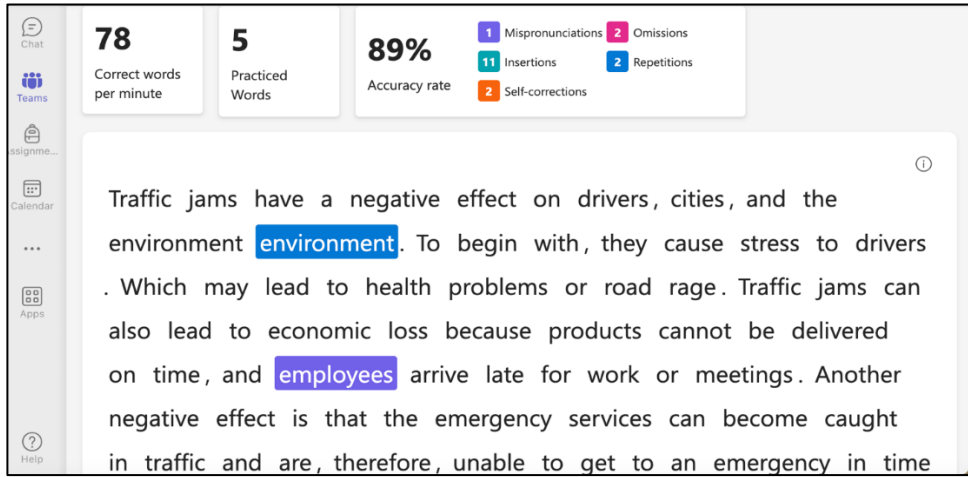### Different students' reading proficiency scores are illustrated
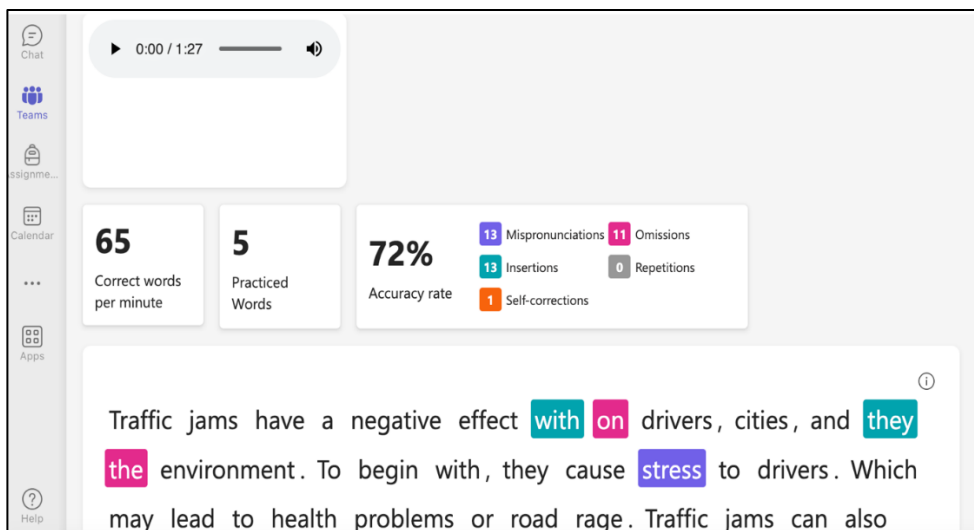
Sample Report (1)

Sample Report (2)

Sample Report (3)

Appendix 2

Samples of reading passages employed in this study

'The Environment' reading passage 1

The Upsala Glacier in Argentina used to be one of the biggest glaciers in South America. In 1928, it was covered in ice and snow, but now the glacier is melting at an annual rate of about 200 m, so the area is covered in water. This is evidence of **global warming**.

1 In the last 100 years, the global temperature has gone up by around 0.75 °C. This may not sound like much, but such a small increase is causing sea levels to rise and **threatening** the habitat of many species of plants and animals. An increase of 2 °C in global temperatures could result in extinction for 30% of the world's land species.

2 The Northwest Passage is a sea route which runs along the northern coast of Canada between the Atlantic and Pacific Oceans. In the past, it was often difficult to use because the water was frozen; however, increasing temperatures and the subsequent deglaciation[1] have made it easier for ships to travel through this route. The trouble is that the melting of the ice is leading to loss of habitat for the polar bears and other species which live in this area.

3 Experts predict that global sea levels could rise by 30.5–122 cm by the end of the century. Consequently, some areas that were land a few hundred years ago are now under water, and many low-lying islands may be under water in the future.

4 As a result of the changing **climate**, the world's **ecosystems** are also changing faster than ever before. More than one-third of the world's mangrove forests[2] and around 20% of the world's coral reefs[3] have been destroyed in the last few decades. Forests are being cut down to provide land for food because human population is growing at such a rapid rate. Approximately a quarter of the land on Earth is now used for growing food. As a result of the higher temperatures and higher levels of carbon dioxide in the **atmosphere**, plants are producing more pollen, which could lead to more cases of asthma, a medical condition which makes it hard to breathe.

5 What is causing climate change? The main **cause** is the huge amount of **greenhouse gases**, such as methane and carbon dioxide (CO_2), in the atmosphere, but the reason for this is the world's population – you and me. As the population increases, more land is needed to provide food and energy. Burning **fossil fuels** for heating, lighting, transport, electricity or manufacturing produces CO_2. Furthermore, humans breathe out CO_2 while trees 'breathe in' CO_2 and produce oxygen, so by cutting down trees, we are increasing the amount of CO_2 in the atmosphere and reducing the amount of oxygen. As a result of human activities, CO_2 levels are now at their highest in 800,000 years.

6 The biggest challenge we all face is to prevent further environmental disasters. We must do something before it is too late. We need to reduce the amount of CO_2 in the atmosphere. We need to stop burning fossil fuels and start using renewable energy. We can get enough energy from renewable fuels, such as solar energy, hydroelectric energy or wind power, to be able to stop using fossil fuels completely.

[1]**deglaciation** (n) the melting of a glacier

[2]**mangrove forest** (n) large areas of trees and other plants which grow next to oceans, e.g. in Florida and Bangladesh

[3]**coral reefs** (n) colourful underwater ecosystems built by tiny animals

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'Transport' reading passage 2

1 Traffic congestion is a serious problem in cities worldwide. There are simply too many **vehicles** competing for too little space. The company TomTom, which does research on traffic in cities worldwide, estimated that in 2015 the average commuter wasted 100 hours during the evening rush hour alone. In addition to wasting people's time, traffic jams have many other negative effects. Therefore, **governments** everywhere are working hard to find solutions to this problem.

2 Traffic jams have negative effects on drivers, cities and the environment. To begin with, they cause stress to drivers, which may lead to health problems or road rage[1]. Traffic jams can also lead to economic losses because products cannot be delivered on time, and employees arrive late for work or meetings. Another negative effect is that **emergency** services can become caught in traffic and are, therefore, unable to get to an emergency in time. Finally, traffic congestion negatively affects the environment. Traffic congestion wastes **fuel**, which in turn produces more carbon dioxide through car exhaust[2] and contributes to the greenhouse effect. Taken together, all these effects have a serious negative impact on the quality of people's lives.

3 Because of these serious effects, it is important for cities and governments everywhere to take steps to reduce road congestion. The most obvious solutions involve **engineering**. This means building more roads with wider lanes so that more cars can travel at the same time, as well as constructing tunnels and bridges to guide drivers around congested areas. However, the costs for engineering solutions are extremely high. Another problem is that more roads may actually result in more traffic. In short, engineering solutions have both advantages and disadvantages.

4 Other, more creative, solutions to the congestion problem are to increase the tax on fuel or to make people pay to travel in the centre of a city or on a motorway. If governments increase the cost of driving, people will think more carefully about using their cars. However, taxing fuel and roads may mean that some people cannot afford to drive their cars, and they may have to give up their jobs. Also, governments may not want to increase the fuel tax too much if the tax is unpopular with voters.

5 A more popular solution, therefore, would be to promote other forms of transport, like ferries, cycling and underground trains. One suggestion is to encourage people to **cycle** more. Although cycling has obvious health benefits and does not pollute the air, it is not **practical** in every climate and can prove dangerous in heavy traffic.

6 Another possibility is to persuade people to use buses, although they are inconvenient for some people. A related option is a park-and-ride system which allows people to drive to the outskirts of cities, park, and then take a bus to the city centre. This allows some flexibility for car drivers and reduces congestion in the centre of the city. A disadvantage for people who work late shifts[3] is that many buses do not run at night.

7 Overall, cities are using a variety of methods to tackle the problem of traffic congestion. Most of the methods have advantages as well as disadvantages. We should encourage alternative forms of transport because they reduce the amount of traffic on the roads and also have a positive effect on the environment.

[1]**road rage** (n) violence committed by angry drivers in traffic
[2]**exhaust** (n) smoke that comes out of a car as a result of burning petrol
[3]**late shifts** (n) work hours that are late in the day or at night