

**Genre-based Approach to Enhancing Secondary Students' English Writing Ability in Science Subjects**

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&

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Lesson 4: What is a scientific report?

**Introduction**

*This lesson should take up the second hour of week four. The students should spend the first hour collecting and discussing the data the have all collected over the previous 2 weeks, as well as any sources they have found with information relevant to their topic of research.*

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|  | ***Task 1: Identifying sections of a scientific research report*** |

*With a good class it may be useful to discuss variations on this outline. For example, sometimes the discussion and conclusion sections may be combined into one section. Also, sometimes the aims of the research may be set out in a separate section following the introduction.*

A report of scientific research is likely to contain at least the following five sections.

* 1. Introduction ( B )
  2. Methods ( C )
  3. Results ( A )
  4. Discussion ( E )
  5. Conclusion ( D )

Paragraphs A to F below describe the contribution to a research report of each section within it. Can you match these descriptions with the above 5 section labels?

1. This section sets out the findings from the analyses of the data. It may include tables or diagrams showing the findings.
2. This section identifies and usually describes the phenomenon that was researched. It also often refers to previous research that has been done on the same or a similar topic. It also usually states the research question(s) that the research was designed to answer or the hypothesis (hypotheses) that the research was designed to test, although sometimes these may come in a separate section labelled Aims.
3. This section tells the reader how the research was carried out. In other words, it explains what kinds of data the researcher(s) collected and how they collected it.
4. This section usually briefly summarizes the most important findings from the research, relates them to the initial research question(s) or hypothesis (hypotheses) and often suggests some implications or applications of the findings. It may also say something about the limitations of the research and give suggestions for further research.
5. This section normally draws attention to the most important, interesting or surprising results. It usually also attempts to interpret and to explain the results. It may also compare the results of the research with results from earlier published studies.

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| Picture 10 | ***Task 2: Identifying some commonly used words and phrases*** |

Here are some words and phrases that often occur in research reports. In which sections of a report are each of them most likely to be found (note the different tenses used)?

collected, illustrates, supports, little is known about, indicates,

was calculated, conclude, were recruited, increased, further research

limitation, shows, previous studies, aims to, fell, test

have shown that, explores, little is known about, confirms,

recorded, suggests, participants, analysed, recommend,

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| *Probable sections in which the words/phrases might occur. Of course, there are no 100% correct answers here. In particular, “suggest”, “support” and “confirm” could occur in both Discussion and Conclusion sections. If students are able to explain logically why they put a word or phrase into a certain section that is fine.* | |
| *Introduction* | *{previous research}: previous studies, have shown that, little is known about*  *{aims}: aim to,  explore, address the following question, test* |
| *Method* | *collected, was recorded, was conducted, participants, analysed, was calculated* |
| *Results* | *increased, fell, illustrate, show, indicate,* |
| *Discussion* | *suggest, support, confirm* |
| *Conclusion* | *conclude, recommend, limitation, further research,* |

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|  | ***Task 3: Identifying which paragraphs belong to which sections*** |

*Note that though explanations of a few words are given at the end of the students’ notes, it is not necessary for students to understand every word in order to complete the task and they should be discouraged from trying to do this. It is also not necessary for the students to understand the details of the statistical tests.*

Below are paragraphs from a report of research into **multitasking** carried out by students in Hong Kong. Paragraphs from the report are out of order. The report originally had just five sections: Introduction (including Aims) > Methods > Results > Discussion > Conclusion.

Read through each paragraph and decide which of the five section of the report it belongs to. Note that sections may have more than one paragraph within them.

Don't worry if you don't understand all the other word in every paragraph. You ought to be able to understand enough to decide which section each paragraph belongs to. If you do need to check the meanings of any words, refer to the glossary at the end of this section.

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| **Multitasking: A Study of Gender Differences**  **A.** Second, a visual-auditory-verbal-motor task-centered experiment (Experiment B) was conducted. Subjects were asked to complete a 14 x 14 word search on the topic “fruits” on the computer while listening to and answering simple single-digit maths questions. Searching for the word served as a visual task while clicking on the mouse to select the words was a motor task. The auditory task was listening to the maths questions, and verbally answering the math questions served as the verbal task. Each test lasted 2 minutes, and the scores were totaled by adding up the number of verbally correctly answered questions and the number of words found.  B. To test the statistical significance of the difference in the average scores of males and females in Experiment A, an independent sample t-test was conducted. The calculated t-value, 2.47, is less than the critical value 12.71 at a 0.05 statistical significance level. The small t-value compared to the critical value indicates that the difference between the males’ and the females’ ability to multitask is not statistically significant.  C. The findings of this study clearly suggest that, contrary to some previous research, there is no statistically significant relationship between the multitasking ability of men and women. However, further research could investigate a range of specific tasks that might show a gender difference in certain kinds of multitasking abilities.  D. The term multitasking refers to doing more than one task at the same time, for example talking on the phone while typing an assignment. Multitasking is common in contemporary life, through the ways we think, the ways we communicate, and in the ways we conduct our everyday lives. Various research studies have identified many factors that can affect a person’s ability to multitask. Such factors range from pressure coming from a person’s environment, such as a coming deadline (Sarmento & Tsai, 2015), to more personal factors such as habits or a natural affinity towards a certain subject (Sanbonmatsu, Strayer, Medeiros-Ward, & Watson, 2013). However, there does not seem to be agreement as to whether gender is related to a person’s ability to multitask. On the one hand, there is literature to support the hypothesis that women are better at multitasking than men (Kuptsova, Ivanova, Petrushevskiy, Fedina, & Zhavoronkova, 2016). On the other hand, there is also literature that supports the hypothesis that there are no great gender differences when it comes to multitasking (Buser & Peter, 2012). This difference in the research findings is puzzling.  E. There are limitations to our study. First, we did not have a lot of information on the personal backgrounds of many of the participants. For example, factors such as whether the participants are frequent game players, or whether their field of study or work assists in their multitasking ability could have influenced their performance. Second, the method of convenience sampling leaves room for sampling bias that could be avoided with the use of random sampling to cover a wider range of the general population in Hong Kong.  F. The purpose of this study is to investigate the relationship between gender and the ability to multitask in a sample of Hong Kong participants. Our hypothesis is that there is no statistically significant difference in the multitasking ability between the genders.  G. On average, the males scored higher than the females in Experiment A, while the females scored higher on average in Experiment B.  H. Multitasking may involve visual tasks, auditory tasks, verbal tasks or motor tasks, with various levels of difficulty (Ohio State University, 2012). Two separate experiments were designed to test two types of multitasking: visual-visual-motor tasks and visual-auditory-verbal-motor tasks.  I. First, a visual-visual-motor task-centered experiment (Experiment A) was conducted to test the visual-visual multitasking ability of the participants. As each level of difficulty increased, additional mini-games were added to the screen to be played simultaneously, with two or more games being controlled by each hand. Each participant was asked to play the games three times. All of the final scores in the games were recorded.  J. The findings support our initial hypothesis that there is no statistically significant relationship between the multitasking ability of men and women. It challenges the findings of previous research which suggested that women are better at multitasking than men (Stoet, O'Connor, Conner, & Laws, 2013; Kuptsova, Ivanova, Petrushevskiy, Fedina, & Zhavoronkova, 2016) and confirms research that found no statistically significant difference between the performance of the two genders (Buser & Peter, 2012).  K. The average score of all the participants on their first try in Experiment A was 42.876. Their average score increased to 46.777 on their second try and continued to rise to 51.185 on their third try. This rise in the scores as more tries were completed can be seen in both genders. This suggests that the participants were able to achieve higher scores with more practice.  L. An independent sample t-test was also conducted test the statistical significance of the difference in the average scores of males and females in Experiment B. The calculated t-value, 2.01, is less than the critical value 12.71 at a 0.05 statistical significance level. The small t-value compared to the critical value indicates that the difference between the males’ and females’ ability to multitask is not statistically significant.  M. The increase in the participants’ performance in Experiment A as more tries were completed seems to indicate that with more practice, the multitasking ability of an individual can improve, regardless of gender. Other research similarly suggests that multitasking ability can be improved though training (Dux, Tombu, Harrison, Rogers, Tong, & Marois, 2009).  N. In Experiment B (visual-auditory-verbal-motor task), the mean scores for males and females were 22.35 and 23.47 respectively, while the median score for males and females were 22 and 22.5 respectively. The scores of males ranged from 16 to 28 i, while the scores of females ranged from 16 to 29.  O. In Experiment A (visual-visual-motor), the mean scores for males and females were 53.3 and 43.4 respectively, while the median scores for males and females were 50.15 and 41.7 respectively. The differences in the scores among individuals, regardless of gender, varied hugely, ranging from approximately 20 to 90. The scores of males ranged from 22.7 to 90.3 in Experiment A, while the scores for females ranged from 22 to 91.3, as shown in Figure 1. |

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|  | ***Task 4: Sequencing paragraphs*** |

Now order the above paragraphs within each section, paying attention to the logic of the text and any clues such as conjunctions or pronouns.

Finally compare your ordering with the order of the paragraphs under the different sections in the original report. If there are any differences, decide whether the way your group ordered the paragraphs could also be possible. Be ready to explain why you ordered the paragraphs in the way you did.

*Have students do the sequencing task in groups. If this seems too difficult for them then present the original sequence of paragraphs within each section and just have them order and label the sections.*

*Make it clear that some variation in the sequence of paragraphs is possible and give them time to explain why they sequenced paragraphs in a certain order (if different from the original).*

**Correct Order:**

Introduction:

D

F

Methods:

H

I

A

Results:

G

O

B

N

L

K

Discussion:

J

M

E

Conclusion:

C

Glossary

**Task 1**

Analysis (分析) *verb*: An analysis is a process in which you examine something very carefully in order to explain it or discover exactly what it consists of.

Diagram (圖表) *noun*: a simple plan that represents a machine, system of idea that is often drawn to explain how it works.

Phenomenon (現象) *noun*: Some thing that exists and can be seen, felt, tasted. Especially something unusal or interesting.

Data (數據) *noun*: information collected to be examined and used to help decision-making.

Initial (最初的) *adectivej*: Of or at the beginning.

Hypothesis (假設) *noun*: An idea or explanation for something that is based on known facts but has not yet been proved.

Precise (準確的) *adectivej*: Exact and accurate.

**Task 2**

Multitasking (同時做多件事) *noun*: A person’s ability to do more than one thing at a time.

Visual (視覺的) *adjective*: Relating to seeing.

Motor (運動神經的) *adjective*: Relating to or concerned with muscular movement.

Auditory (聽覺的) *adjective*: Relating to hearing.

Verbal (語言的) *adjective*: Relating to speech.

Statistical significance (統計上重要的) *adjective*: Important information based on study of numbers and facts.

Average (平均) *noun*: A single value that summarizes or represents the general significance of a set of uneuqal values.

Contemporary (現代的) *adjective*: Existing or happening now.

Puzzling (令人不解的) *adjective*: Difficult to explain or understand.

Limitation (限制) *noun*: The act of controlling and especially reducing something.

Bias (偏袒) *noun*: The action of supporting or opposing in an unfair way.

Simultaneously (同時的) *adverb*: Happening at the exact same time.

Independent (獨立的) *adjective*: Not influenced or controlled in any way by other people, events, or things.

Training (訓練) *noun*: The process of learning the skills needed to do a particular job or activity.

Individuals (個人) *noun*: A single person or thing.