

# A Good Solution to the Problems of Writing an Abstract in English!---Useful Tips on Writing an Attractive Abstract for Engineering Students and Researchers---

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## Abstract

If the abstract of your research paper is inadequate, you cannot convey the new and significant findings of your research successfully to the world. However, it is a hassle for non-native speakers of English to write a good one. This paper aims to (a) show a desirable model of an abstract, (b) compare the model with actual abstracts to enumerate the problems of actual ones, and (c) suggest some clues to the solution. First, we referred to various guides to good abstracts to exemplify a model abstract. Then, we compared the model abstract with actual ones. As a result of the comparison, some problems of actual abstracts stood out in clear relief. The result implies that we need to devise an easy way to write a proper abstract.

**Key Words** : abstract, structure, tense, voice, clue

## 1. Introduction

After you finish a study and writing a research paper (hereafter RP) based on the study, you usually write an abstract. If you write a good abstract, people will read your paper. But if you write a bad one, they will not. In other words, the better abstract you write, the more likely it is that people may read your abstract, and even your paper.

A good abstract provides a brief summary of the findings of the research, and is a stand-alone document that can be understood without reading the paper (Jock Irons 2001).<sup>1</sup>

There are various guides on how to write a good abstract. Also, we can get examples and formats of a good abstract through the Internet.

Generally speaking, however, there are few abstracts that follow the good format. This is because most scientists and engineers do not pay attention to or follow these useful guides and formats. It is a serious problem that you cannot convey them successfully to the world due to an inadequate abstract even if the findings of your research are new and significant.

In order to solve this problem, this paper aims to (a) show a desirable model of an abstract, (b)

compare the model with actual abstracts and enumerate the problems of actual ones, and (c) propose some clues to the solution.

## 2. What is a desirable abstract? <sup>2</sup>

An abstract is a document that most people interested in your research will read first. You must write an abstract in a desirable form to have readers understand your findings successfully. This chapter shows the desirable structure, the proper tenses, and the suitable voice that should be used in an abstract, using the actual examples.

Let us begin with a good example<sup>3</sup>:

- (1)In general, conventional tests designed to evaluate senility and dementia are stressful to examinees.
- (2)This research aims to evaluate whether a discourse analysis can be of use as a new method for assessing the progress of senility and dementia.
- (3)First, we analyzed the discourse of non-demented subjects to clarify the relationship between the frequency of senility elements and their age and sex.
- (4)Then, we examined demented patients'

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conversations to elucidate the relationship of the frequency of senility elements and the severity of their dementia. (5) There was a clear correlation between age and the frequency of senility elements. (6) Also, there was a correlation to some extent between the level of dementia and the frequency of senility elements. (7) The results imply that the proposed discourse analysis has the potential to be used for assessing the progress of senility and dementia.

In what follows, let us analyze it in terms of the structure of an abstract.

### **2. 1. The desirable structure of an abstract**

An abstract must tell readers WHAT you did, WHY you did it, HOW you did it, WHAT you found, and WHAT it means (Jock Irons, 2001). To show these items clearly, an abstract consists of four elements: the introduction, the procedures, the results, and the conclusion. Concretely, you have to state the purpose of your research (introduction), how you operated the study (procedures), the findings (results), and what you get from the findings (conclusion). In some particular cases, an abstract includes the background and a discussion in addition to the above.

Also, an abstract should usually contain about 100 to 200 words. You have to write an abstract within this limitation.

Let us examine each element based on the good example.

You may first tell the background of your research. It usually consists of one (or two) sentences and should not be too long. You can omit it if you do not need it. After the background, you have to show the purpose of your research. Here, you should state what your

research aims to achieve or what your paper describes. Or alternatively, you could state what you did in your research as a whole. You should state the purpose in only one sentence. Sentence (1) in the good example shown above is the background. It is followed by (2), the purpose.

After the background and the purpose, you must explain the methods and the procedures of your research. Sentences (3) and (4) in the model abstract talk about what the authors did as the procedures.

Next, you must show clearly what you found or what you newly produced by your research. You have to emphasize the main result of all. Both (5) and (6) are what the authors found in their analyses. You can also discuss the results. For example, you can compare the experimental results with the ones by the simulation, show the differences if any, or consider the reasons why the differences occurred.

At the end of your abstract, you must concretely interpret and explain your results, emphasizing the validity and the significance of them. You must not conclude your abstract with such an obscure sentence as “We will discuss these results.” The conclusion should contain only one or two sentences. Sentence (7) shows the authors’ concrete view on their results as a conclusion.

So far, we have observed that the good example contains all the necessary and sufficient structural elements for an abstract in the right order. Also, this example consists of 172 words, which meets the restriction on the number of words.

Next, let us examine the proper tenses in the good example.

### **2. 2. The proper tenses that should be used in each element**

Each element in an abstract has to have a proper tense. Thus a good abstract should have a

desirable tense pattern. Some abstracts, however, do not follow this pattern, which makes them hard to read and understand. It is important to pay attention to which tense to use for each element.

Let us look at the tenses for each element one by one.

When you show the background of your research, you must use the present tense, as in (1), or the present perfect tense, as in (8) below:

- (8) Aluminum alloy has been used as a trim weight in recent years.

When you state the purpose, you must use the present tense or the past tense. If you choose to focus on what your research tries to achieve or what your paper shows, you should use the present tense, as in (2). If you choose to focus on what you did in your research as a whole, you should use the past tense, as in (9) below:

- (9) I carried out rotating bending fatigue tests to investigate the influence of radical nitriding on the fatigue properties of SNCM439 steel.

When you state the procedures of your research and experiments, you must use the past tense, as in (3) and (4).

When you show the results of your experiments, questionnaires, or test operations, you must use the past tense, as in (5) and (6). If you give consideration to or have a discussion on the results as well, however, you must use the present tense, as in (10) below:

- (10) We attribute the concurrence of the experimental results and the ones by simulations to high accuracy of the

experiment.

When you conclude your abstract, you must use the present tense, as in (7).

### 2.3. The suitable voice that should be used in an abstract

Generally speaking, passive sentences are difficult to read and understand in most cases, because the verb is apart from the subject, as shown in (11):

- (11) Tip leakage vortex cavitations originating from the tip clearance of an oscillating hydrofoil were observed experimentally.

Therefore, you should avoid using the passive voice in these cases.

You should, however, use it in some particular cases. For example, when you do not have to or should not care about the subject, and when you do not know the subject, you should use the passive voice.

When you remark, “Because the temperature was precisely controlled, the device remained undamaged,” you can also remark, “Because one of my assistants precisely controlled the temperature, the device remained undamaged.” The latter sentence uses the active voice, so that the readers may think that the person who controlled the temperature had to be the assistant. However, the point is not who controlled the temperature but that the device remained undamaged. Therefore, you should use the passive voice here.

Also, when you remark, “The lab’s computer was stolen,” you can also remark it with the active voice as “Someone stole the lab’s computer.” Because you do not know who stole it or do not

care who it was, however, you should use the passive voice in this case, too.

Since an inanimate subject construction with the active voice shown below produces an effect of crispness in style, you should use such a construction as much as you can:

- (12) This paper presents an image proceeding techniques in order to predict the shape of a levitated aspherical droplet.

### 3. Some examples of an inadequate abstract

In the previous chapter, we showed an example of a good abstract and analyzed it in terms of the structure, the tenses and the voice for each structural element.

This part introduces three inadequate examples and considers why they are not proper based on the requirements that a good abstract needs to meet.

Let us examine the first example below:

(13)Spine biomechanical research and testing are important for development of spinal surgery and spinal fixation devices. (14)All spinal motions can be resolved three translational and three rotational components. (15)Therefore, there is a need for 6-axis spinal testing system.

(16)This paper reports on the 6-axis cervical vertebra tester with load removal mechanism that is composed partly of ball bearings and free sliding mechanism. (17)Research for the flexural stiffness and viscoelasticity in “pure” loading method needs fast load removal mechanism. (18)Ball bearings and free sliding mechanism provides load removal ability easier and faster than electric motors or motorized linear stages.

(19)In this study, to investigate the effectivity of load removal mechanism and the capability of this tester, flexural stiffness properties of pork pig cervical spine were evaluated.

This example consists of 125 words, so that it meets the requirement of the number of words in an abstract. Although this example is fine in terms of the tense for each element, it is structurally deficient.

Sentences (13), (14), and (15) state the background. These do not follow the requirement that the background part of an abstract should contain only one or two sentences.

Sentence (16) describes the purpose of the research, and is considered to be in the adequate position of the structure.

Both (17) and (18) seem to explain something related to the research and the experiment. But they are not the procedures, which should appear here structurally by rights. Nor are they the other necessary elements in an abstract. That is why they are inadequate.

The purpose of the research is stated again in (19). The purpose must be on the top of an abstract or follow the background. Therefore, this sentence is not proper in terms of the structure.

Let us move on to the next one below:

(20)In Ogaki, Gifu, Green-Volume-Ratio (GVR), an original index is applied on establishment of the city environment plan and the master plans for parks and open spaces. (21)GVR is a ratio of green quantity in three-dimensional space, and can grasp quantity of green as practical numerical value in comparison with a conventional planar measurement (Green-Coverage-Ratio or

Green-View-Ratio). (22)This study considered a new way of thinking, future directionality and problem by introduction and survey of existing circumstance of GVR. (23)And began to development of the Calculating System of GVR.

(24)As a result, we obtained Ratio of Relative Greening as a new evaluation method of GVR. (25)In addition, we discovered that it was possible to calculate a green volume from only height, by correlation between a green volume and a height of tree. (26)And the calculating System of GVR that made from this study enabled improvement of accuracy and simplification of calculation for GVR.

This example contains 150 words, which meets the limitation on the number of words in an abstract. But it is inadequate in terms of the structure and the tenses.

Sentence (20) describes the background. It is structurally adequate and its tense is also proper.

Sentence (21) gives an explanation of GVR. This is none of the elements that should be contained in an abstract. That is why this sentence is unnecessary.

Sentence (22) states the purpose. This sentence follows the background, so it is proper structurally. Since the subject of (22) is *This study*, however, the sentence should have a present-tense verb such as “aims to” to express what the study tries to achieve. Therefore, it is proper in terms of the structure but not of the tense.

Sentence (23) seems to show the purpose, as well. However, the purpose should be shown in only one sentence, even when you have more than one purpose. Thus, this sentence is inadequate.

Sentences (24) and (25) describe the results, and are considered to be adequate in terms of both the

structure and the tense.

Sentence (26) concludes the abstract. Although adequate structurally, it is inadequate in terms of the tense. The conclusion has to have the present tense in any case.

Let us see the last example shown below:

(27)This paper reports on loading mechanism of R/C member subjected to torsional force and axial force (tension and compression). (28)Experimental conditions are the length of moment arm into 0.17m, 0.25m and 0.35m, and the level of the axial force into 20kN(tension), 50kN(compression) and 100kN(compression). (29)From the experimental result, it is observed that the torsional loading capacity and the torsional angle are changed by the axial force.

This example consists of only 66 words, which does not satisfy the minimum number of words required in an abstract. Although the structure is not proper, the tense used for each element in it is adequate.

Sentence (27) shows the purpose. This is adequate structurally.

Sentence (28) explains the conditions of the experiment. Because they are none of the necessary elements, (28) is unnecessary.

Sentence (29) states the conclusion. This is also proper with regards to the structure.

This example is so short that it includes only two necessary elements: the purpose and the conclusion. As this example shows, you cannot get the importance of your research across to the readers if you do not show every necessary element in your abstract.

#### **4. The problems of abstracts written by the students**

In order to know bad points of abstracts written by students exactly, we analyzed 230 abstracts in the graduation research papers by the students who graduated from Tokuyama College of Technology in 2005, 2006, and 2007. Of these, 78 had a larger number of words than the limitation, and 6 had less than the minimum number.

Regarding the structure of an abstract, 21 abstracts lacked the purpose and 138 lacked the conclusion. In other words, about 10% of the abstracts lacked the purpose and 60% lacked the conclusion. Also, we found that the students tended to write the background of their research more than they should state. In addition, they tended to state unnecessary things in their abstracts.

In terms of the tenses, many of the students used the wrong tenses for each structural element. That made their abstracts hard to read and understand.

With regard to the voice, the students used a large number of passive voice sentences, which should actually be active ones.

## 5. As a conclusion

Since there are various deficiencies in the students' abstracts, it is very difficult to read and understand them. This situation clearly shows that we need to devise an easy way to write a proper abstract.

In this final chapter, let us propose a few clues to solve the problem as a conclusion.

First of all, it can be a good idea to utilize the data bases of accepted English abstracts and papers on the Internet. You can find natural English sentences and phrases that can be used in your own abstract.

You can also use a kind of worksheet as an effective tool to help you write an abstract easily. The worksheet consists of several questions about your research such as “What does your research aim

to do?”, “What did you do in the experiment?”, and “What did you find as a result of the experiment?” You are to answer the questions in simple English. The worksheet also contains tips on what you should be careful in writing the answers. When you finish answering all the questions, you will have automatically completed a desirable abstract.

Last but not least, it is essential that the writers of an abstract have basic English skills such as fundamental grammatical knowledge and minimum vocabulary.

## Notes

1. There are three kinds of abstracts: RP abstracts, conference abstracts, and the ones that occur in an abstracting journal. RP abstracts are a brief summary of your paper and usually placed at the beginning of an RP. Conference abstracts are written for an academic conference. Specifically, you write them in order to impress the review committee when you apply to an academic conference, and, if accepted, appeal to as large an audience as possible. You do not have to have a paper on which your abstract is based. The third kind is typically written by a professional abstractor and occurs in an abstracting journal. This paper works only on RP abstracts.
2. In writing an English sentence, you have to take into account grammatical items such as word order, and the usage of definite and indefinite articles. This paper, however, focuses on the contents of an abstract and how they are structured, and the tense and the voice that should be used in each structural element in an abstract.
3. Each sentence in the examples is numbered for convenience.

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