

**Concept of 3C's in Academic Writing and Practical  
Academic Writing Skills for Students and  
Researchers in the Fields of Science and Technology**

**Tutorial Session, IEEE –GCCE 2014  
14:00-15:30, October 08, 2014  
Makuhari Messe.**

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## Outline

- (1) **Basic Difference between Japanese and English**
- (2) **What is Academic Writing?**
- (3) **3C's: Correct, Clear, and Concise**
- (4) **Key Points in Academic Writing**
- (5) **Sample Sentences and Correction**
- (6) **Toward Future English Education**

## Outline

- (1) Basic Difference between Japanese and English**
- (2) What is Academic Writing?
- (3) 3C's: Correct, Clear, and Concise
- (4) Key Points in Academic Writing
- (5) Sample Sentences and Correction
- (6) Toward Future English Education

# Basic Difference between Japanese and English

Item	Japanese	English
Sentence	<b>(S) + Predicate</b>	<b>S + V +( O + C)</b>
Meaning	Requires inference	Logical & Specific
Noun	Many meanings	Specific

## Outline

- (1) Basic Difference between Japanese and English
- (2) What is **Academic Writing**?
- (3) 3C's: Correct, Clear, and Concise
- (4) Key Points in Academic Writing
- (5) Sample Sentences and Correction
- (6) Toward Future English Education

## What is Academic Writing ?

Purpose: **Disclosure of reproducible findings**

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“Scientists report **their findings** and detail their experimental methods in journals, **inviting others to perform experiments to verify or disprove the results**. Each discovery suggests new paths of investigation, leading to the increasingly rapid expansion of scientific knowledge.” (Fran Zimmerman, English for Science, 1989, p.141)

# Characteristics of Academic Writing

1. **Formal: No slang, colloquial expressions, and abbreviations unless previously defined.**
2. **Complete: Each sentence must be complete and grammatically correct.**
3. **Paragraph writing**
4. **Description of objective facts**
5. **No assertive expressions**
6. **Requirement for references**

# Paragraph Structure

## Topic Sentence

**Topic Sentence** = Topic + Controlling Idea

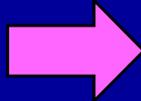
**Supporting Sentence 1**

**Supporting Sentence 2**

...

**Concluding Sentence**

## Academic Writing

- Deals with **specific topics** related to **science and technology**
- Transmits information with **clear purposes**
- Should be **Reader-friendly**
- Is based on **3C's** 
  - Correct
  - Clear
  - Concise

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## 3C's in Academic Writing?

### (1) **Correct**

Write correctly in terms of both **content** and **grammar**.

### (2) **Clear**

Write **reader-friendly** and **Logically!**

### (3) **Concise**

Avoid **redundancy**

## 3C's in Academic Writing?

### (1) Correct

- **Grammatically** correct.
- Agreement with **content**
- Conformity to **punctuation**
- Conformity to **writing rules**
- Correct **spelling**

## 3C's in Academic Writing?

### (2) Clear

- **Reader-friendly**
- **Logically** (rhetorical expression)
- **Consistency.**
- **Abstract noun to verb**
- **Passive voice to active voice**
- **No top-heavy sentences.**
- **No ambiguous pronouns**

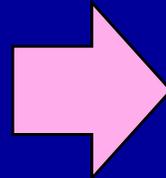
## 3C's in Academic Writing?

### (2) Concise

- **Least redundancy.**
- **Abstract noun to verb**
- **Passive voice to active voice**
- **Participle construction**
- **Inanimate subject construction**
- **Avoid using “It is ... to ...,” and “There is/are ....”**

# Guidelines for Writing English Sentences

**Academic  
writing**



- **Correct**
- **Clear**
- **Concise**

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**English**



**Concrete representation**

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## Basic Academic Writing Skills

### (1) Avoid dangling participle.

工作機械を使用して工作物を機械加工した。

× The workpiece was machined using machine tools.

◎ We machined the workpiece using machine tools.

○ Using machine tools, we machined the workpiece.

## Basic Academic Writing Skills

(2) Use participle construction for a sentence with a cause and effect relationship.

酸素は消費する食物と結合し、体温を保つために必要なエネルギーを発生する。

**[Cause]** Oxygen combines with the food we consume,

thus producing

**[Effect]** the energy we need to maintain our body temperature.

## Basic Academic Writing Skills

### (3) Use standard referring expression patterns.

統計によれば、失業率は急速に増加した。

Statistics **shows that** the unemployment rate has increased rapidly.

- **Verbs used with that-clause:** show, reveal, illustrate, demonstrate, indicate, suggest
- **Verbs that cannot be used with that-clause:** give, provide, plot, present, summarize, display

## Basic Academic Writing Skills

(4) Use the demonstrative pronoun “this” as an adjective.

コンピュータ・ウイルスは、ホストコンピュータに感染し、時に甚大な損害を与える。

Computer viruses can infect a host computer. **This (infection)** sometimes causes considerable damage.

## Basic Academic Writing Skills

**(5) Use a standard sentence pattern when writing definitive sentences.**

**[Term]** = **[General class word]** + **[Specific characteristics]**

**[Direct current]** is defined as **[an electric current]** **[that flows in one direction.]**

**Verbs:** be denoted by, stand for, be called  
be referred to as , be known as

## Basic Academic Writing Skills

### (6) Avoid using “etc.” unless absolutely needed.

半導体はコンピュータや携帯電話等を使用されている。

△ Semiconductors are used computers, mobile phones, **etc.**

○ Semiconductors are used in information equipment **including** computers and mobile phones.

# Basic Academic Writing Skills

## (7) Use one-word verbs.

<b>bring up</b>	→	<b>raise</b>
<b>come up with</b>	→	<b>develop</b>
<b>figure out</b>	→	<b>determine</b>
<b>get rid of</b>	→	<b>eliminate</b>
<b>go down</b>	→	<b>decrease</b>
<b>keep up</b>	→	<b>maintain</b>
<b>look at</b>	→	<b>observe</b>
<b>look into</b>	→	<b>investigate</b>

## Basic Academic Writing Skills

### (8) Do not use abbreviations.

<b>aren't</b>	→	<b>are not</b>
<b>isn't</b>	→	<b>is not</b>
<b>can't</b>	→	<b>cannot / can not</b>
<b>don't</b>	→	<b>do not</b>
<b>won't</b>	→	<b>will not</b>
<b>you're</b>	→	<b>you are</b>
<b>they'll</b>	→	<b>they will</b>

## Basic Academic Writing Skills

**(9) Do not start a sentence with “and,” “but,” and “so.”**

**and** → **furthermore, moreover, additionally, in addition**

**but** → **however, nevertheless, nonetheless**

**so** → **therefore, thus, consequently, as a result, accordingly**

## Basic Academic Writing Skills

### (10) Use “no” instead of “not ... any.”

屈折光線は存在しない。

× There are **not any** refracted rays.

○ There are **no** refracted rays.

まだ誰も報告書を提出していない

× **Anyone** has **not** submitted a report yet.

○ **No one** has submitted a report yet.

## Basic Academic Writing Skills

**(11) Do not use symbols, Arabic numbers, and abbreviations at the beginning of a sentence.**

× **L/D** is the circumference to the diameter of a circle.

○ **The ratio L/D** is the circumference to the diameter of a circle.

## Basic Academic Writing Skills

**(11) Do not use symbols, Arabic numbers, and abbreviations at the beginning of a sentence.**

× **1877** is the year when Thomas Edison invented the phonograph.

○ **In 1877**, Thomas Edison invented the phonograph.

## Basic Academic Writing Skills

**(11) Do not use symbols, Arabic numbers, and abbreviations at the beginning of a sentence.**

× **Fig. 1** shows a typical impedance curve for a loudspeaker.

○ **Figure 1** shows a typical impedance curve for a loudspeaker.

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## Sample Sentences and Correction

(1) どの原子も1個以上の電子を持っている。

**Original:** Every atom has more than one electron.

2, 3, 4,...

**Correction:** Every atom has **one or more** electron.

**Model Answer:**

Every atom has one or more electrons.

## Sample Sentences and Correction

(2) その容器の重さは50gである。

**Original:** Weight of the container is 50 gram.

**Correction:** **The** weight of the container is 50 grams.

**Model Answer:**

- The container weighs 50 g.
- The container weighs 50 grams.

## Sample Sentences and Correction

(3) バルブは気体や液体の流れを調節する装置である。

**Original:** Bulb is a device to adjust flow of gas and liquid.

**Correction:** ~~Bulb is a~~ **Valves are** devices used to ~~adjust control~~ **the** flow of **a** gas and or **a** liquid.

**Model :** Valves are devices used to control the flow of a gas or a liquid

## Sample Sentences and Correction

(4) MとNはゼロ以外の自然数を意味する。

**Original:** M and N mean natural numbers  
except for zero.

**Symbols at beginning**

**Correction:** **The symbols** M and N mean  
natural numbers except for zero.

**Model Answer:**

**The symbols M and N denote natural  
numbers except for zero.**

## Sample Sentences and Correction

(5) この実験から学ぶべきものはありません。

**Original:** We don't have anything to learn from this experiment.

**Correction:** ~~We do not have anything~~ **Nothing can be** learned from this experiment.

**Model Answer:**

- **Nothing can be learned from this experiment.**

## Sample Sentences and Correction

(6) 彼はその金属板の厚み測定を実施した。

**Original:** He conducted the measurement of  
the thickness of the metal plate.

**Redundant**

**Correction:** He ~~conducted the~~ **measured**ment  
of the thickness of the metal plate.

**Model Answer:**

- He measured the thickness of the metal plate.

## Sample Sentences and Correction

(7) 光合成とは植物が食物を生産する過程のことである。

**Original:** Photosynthesis is process which plants manufacture food.

**Grammar Prob.**

**Correction:** Photosynthesis is **a** process **through** which plants manufacture food.

**Model Answer:**

Photosynthesis is a process through which plants manufacture food.

## Sample Sentences and Correction

(8) そのスピーカーは距離 2mで84 dBの音圧レベルを再生する。

**Original:** The speaker generates the sound pressure level of 84 dB at distance of 2 meter.

**Correction:** The **loudspeaker** generates produces the **a** sound pressure level of 84 dB at **a** distance of 2 meters.

**Model Answer:** The loudspeaker produces a sound pressure level of 84 dB at a distance of 2 meters.

## Sample Sentences and Correction

(9) 潤滑材を使用すれば動作がさらに向上する。

**Original:** Further improvement in operation can be effected by using a lubricant.

**Redundant**

**Correction:** ~~Using a lubricant can further improvement in operation can be effected by using a lubricant.~~

**Model Answer:**

Using a lubricant can further improve operation.

## Sample Sentences and Correction

(10) 資源を効果的に動作させるプログラムが必要である。

**Original:** Programs that allow the resources to operate effectively are needed.

Top heavy

**Correction:** **You need** programs that allow the resources to operate effectively ~~are needed.~~

**Model Answer:**

**You need programs that allow the resources to be operated effectively.**

## Sample Sentences and Correction

(11) 探照灯や自動車のヘッドライトからでる光線は、直進するようにみえる。

**Original:** The lights seem to go straight which is radiated from searching light or automotive head lights.

**Correction:** ~~The~~ **A beam of** lights seems to ~~go~~ **travel** straight ~~which~~ **when it** is radiated from ~~a~~ **searching** light or ~~an~~ **automotive head** lights.

**Model Answer:** A beam of light from a search light or an automotive head light appears to travel straight.

## Sample Sentences and Correction

(12) 現状の光学顕微鏡はその研究には向かないので、  
その会社は新しい光学レンズを開発した。

Dangling

**Original:** Being unsuitable for the study, the company has developed a new optical lens.

**Correction:** **The current optical lens being unsuitable for the study**, the company has developed a new optical lens.

**Model Answer:** The company has developed a new optical lens because the current optical microscope is unsuitable for the study.

## Sample Sentences and Correction

(13) 電気は物質の加熱や部屋の照明, また機械の駆動に使われる。

Inconsistent

**Original:** Electricity is used for heating, light for room, and driving machine.

**Correction:** Electricity is used ~~for~~ **to** heating substances, ~~lighting for~~ rooms, and ~~driving~~ machines.

**Model :** Electricity is used to heat substances, light rooms, and drive machines.

## Sample Sentences and Correction

(14) DNA配列の活動がそんなに不安定だとはすべての人が予期しなかったことである。

**Original:** Every person did not expect that the DNA  
has such an uneven activation.

**Correction:** ~~Every person did not~~ **No one expected**  
that activity of the DNA sequences ~~has such an~~  
~~uneven activation~~ **was so unstable.**

**Model :** No one thought that activity of DNA  
sequences was so unstable.

## Sample Sentences and Correction

(15) 自然のホルモンは、人体の中で明確な目的をもち、  
ており、主要な働きの1つが生殖能力である。

**Original:** As natural hormone has clear roles in a human body, one of the main contribution is reproductive capacity.

**Correction:** As natural hormones have clear roles in a **the** human body, one of the main **functions** ~~contribution~~ is reproductive capacity.

## Sample Sentences and Correction

**(15)** 自然のホルモンは、人体の中で明確な目的をもち、  
ており、主要な働きの1つが生殖能力である。

**Model :**

**One of the main functions of natural hormones in human bodies is reproductive capacity.**

## Sample Sentences and Correction

(16) 熱伝達の3つのモードである伝導, 対流, 放射は, 温度変動を決定するのに利用される。

**Original:** The conduction, the convection and the radiation, which are three modes of the heat transfer, are used for deciding the temperature variation.

**Correction:** ~~The~~ **C**onduction, ~~the~~ convection, and ~~the~~ radiation, which are **the** three modes of ~~the~~ heat transfer, are used ~~for deciding~~ **to determine** ~~the~~ temperature variation.

## Sample Sentences and Correction

**(16)** 熱伝達の3つのモードである伝導, 対流, 放射は, 温度変動を決定するのに利用される。

### Model :

The three modes of heat transfer—conduction, convection, and radiation—are used to determine temperature variation.

## Sample Sentences and Correction

(17) 燃料電池は、化学エネルギーを蓄えておらず、燃料の化学エネルギーを変換して電気を作る。

**Original:** A fuel cell doesn't have chemical energy and converts fuel to chemical energy to produce electricity.

**Incorrect**

**Correction:** ~~A Fuel cells~~ ~~doesn't~~ ~~do not~~ ~~have~~ ~~store~~ ~~chemical energy~~ ~~and~~ ~~but~~ ~~converts~~ ~~fuel to~~ ~~the~~ ~~chemical energy~~ ~~of a fuel~~ ~~to produce~~ generate electricity.

## Sample Sentences and Correction

(17) 燃料電池は、化学エネルギーを蓄えておらず、燃料の化学エネルギーを変換して電気を作る。

### Model :

Fuel cells, in which no chemical energy is stored, convert the chemical energy of a fuel to generate electricity.

## Sample Sentences and Correction

(18) その化合物2グラムが100 mlの蒸留水と5 mlの濃硫酸との混合液に加えられた。

**Numerical rep.**

**Original:** 2 grams of ~~the~~ compound was added to mixed liquid of 100ml of distilled water and 5ml of concentrated sulfuric aid.

- **Correction:** ~~2~~ **Two** grams of the compound was added to ~~mixed liquid~~ **a mixture** of **100 ml** of distilled water and **5 ml** of concentrated sulfuric aid.

## Sample Sentences and Correction

**(18)** その化合物2グラムが100 mlの蒸留水と5 mlの濃硫酸との混合液に加えられた。

### Model :

Two grams of the compound was added to a mixture of 100 ml of distilled water and 5 ml of concentrated sulfuric acid.

## Sample Sentences and Correction

(19) 一般に合成洗剤は界面活性を示す。そのため、皮膚には刺激物質となり、生態系には破壊をもたらす。

**Original:** Typically, the synthetic detergent shows the surface activity. Therefore, it is the irritant substance for the skin, and brings destruction for ecological system.

**Correction:** Typically, ~~the~~ synthetic detergents shows ~~the~~ surface activity. Therefore, ~~it is~~ **they are considered as the irritants substance to** for the skin and ~~brings destruction for~~ **destroy the** ecological system.

## Sample Sentences and Correction

**(19)** 一般に合成洗剤は界面活性を示す。そのため、皮膚には刺激物質となり、生態系には破壊をもたらす。

### Model :

In general, synthetic detergents show surface activity. They, therefore, irritate the skin and can destroy the ecological system.

## Sample Sentences and Correction

(20) 私たちの体温は、ほぼ37°Cになる様に調節されている。これは体で発生する熱と、体から逃げていく熱がバランスされているためである。

**Original:** Human body temperature is controlled around at 37 deg. C, it is a result of balance between the heat produced in our body and the heat going out of our body.

Spell out

Ambiguous

**Correction:** Human body temperature is controlled **at** around at 37°C. ~~deg. C~~, **This control** ~~it is a result of~~ **results from a** balance between the heat produced ~~in~~ **by** ~~our~~ **the** body and the heat going our of ~~our~~ **the** body.

## Sample Sentences and Correction

**(20)** 私たちの体温は、ほぼ $37^{\circ}\text{C}$ になる様に調節されている。これは体で発生する熱と、体から逃げていく熱がバランスされているためである。

### Model :

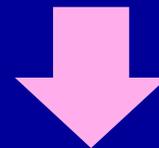
Our body temperature is adjusted to be at around  $37^{\circ}\text{C}$ . This is because our bodies maintain a balance between the heat produced by the body and heat dissipated by the body.

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## Future English Education

- **From passive to active skills**  
⇒ **Emphasis on writing and speaking**
- **Academic writing skills**  
(Translation from **Japanese to English**)
- **Oral presentation skills**



**New English education curriculum**

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Researchers in the Fields of Science and Technology**

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