National Technical University of Athens

Features of academic writing
Defining, exemplifying, classifying, generalising

Week 2

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Academic writing (AW) - general

- The importance of AW:
  - It is a means to assess students' content knowledge.
  - It helps students become members of a larger discourse community.

- Its purpose is to test your understanding of a topic so as to be awarded a grade/a degree.
  - Its success relates to whether your methodology is sound, your findings are adequate, your evidence is valid, and your language and structure are appropriate to the genre.

Some types of academic texts

- Lecture notes.
- Textbooks.
- Lab/technical reports.
- Case studies.
- Research proposals.
- Diploma theses.
- Master dissertations.
- Ph.D. theses.
- Book / article reviews.
- Research articles.
- Poster presentations.

Linguistic features of academic writing

- Formal vocabulary.
- Reporting verbs.
- Specialised technical vocabulary.
- Impersonal constructions with *it* and *there* (that draw the reader's attention to the topic discussed).
- Noun phrases (nominalisations) instead of verb phrases (verbalisations).
- Passive voice (but use it cautiously).
- Cautious language (also called hedging).
- Reference to the work of other writers.

Linguistic features of academic writing : examples

Formal verbs:	'investigate' instead of 'look into', 'establish' instead of 'set up',
Reporting verbs:	demonstrate, examine, argue, conclude, etc.
Specialised technical language:	indenter, gate voltage, decomposition, resistivity, etc.
Impersonal constructions with 'it' and 'there' (that draw the reader's attention to the topic discussed):	It is suggested that …, There is clear evidence for …, etc.
Noun phrases (nominalisations) instead of verb phrases:	the teaching of instead of we taught …, this reflects a number of changes … instead of we changed …, etc.
Passive voice:	these issues are discussed … instead of I discuss these issues …, the mixture was heated … instead of we heated the mixture …,
Cautious language (also called hedging): it is one of the most distinguishing features of academic writing and it refers to how strongly you will express a claim in relation to your supporting evidence. A range of expressions can be used to convey the strength of your argument:	modal verbs/adjectives/nouns/adverbs (e.g. would, might, clear, assumption, probability, certainly, etc.), impersonal constructions that distance the writer from the statements s/he is making: • it seems/appears that/to…, • there is a tendency to/for, expressions that denote shared knowledge: • it has been suggested that…, • it is generally agreed that…,
Reference to the work of other writers (which is done in an academic manner):	Nanoindentation has evolved into a valuable means of determining the mechanical properties of thin films and surfaces in nanometer regimes (Klein, 2009) or [1] {2 types of citations} .

Reporting verbs

- In academic writing it is essential to refer to the research of other writers whose ideas you have used in your writing.
  - One of the most common ways to incorporate these sources into your writing is to use reporting verbs.

- Reporting verbs help to connect the citation to the information cited.
  - Sharpling (2012) **emphasises** that reporting verbs have subtle differences in meaning.
  - Jones (2014) **states** that using the same reporting verb is repetitive[1].

1. Examples from: https://www.eapfoundation.com/writing/references/reporting/

Reporting verbs

- Reporting verbs help the reader understand the relevance of the sources in your writing and can help you to strengthen your argument.

- There is a wide variety of reporting verbs in English to show how you feel about the research and how the authors view their own research.

Strength of reporting verbs

- Consider the following examples.
  - Smith (2016) **assumes** that reporting verbs have different strengths.
  - Smith (2016) **insists** that reporting verbs have different strengths.
- The general meaning is the same for both verbs, i.e. believe.
- However, the verb *assume* is quite weak, while the verb *insist* is much stronger.
- Examples of weak reporting verbs are:
  - admit, doubt, speculate.
- Examples of neutral reporting verbs are:
  - acknowledge, challenge, propose.
- Examples of strong reporting verbs are:
  - support, dispute, recommend.

From: https://www.eapfoundation.com/writing/references/reporting/

Grammar of reporting verbs

- Verb + Noun (noun phrase)
  - The authors show the devastating results of this policy (Smith & Jones 2008,).
  - Croft (2012) indicated her negative opinion of Abbott's proposal.

- Verb + That + clause (i.e. sentence)
  - The authors show that this policy had devastating results (Smith & Jones 2008).
  - Croft (2012) indicated that Abbott's proposal was untenable in her opinion.

Information and examples of reporting verbs

- For more information and examples of reporting verbs, see:
  - https://www.eapfoundation.com/writing/references/reporting/
  - https://www.adelaide.edu.au/writingcentre/sites/default/files/docs/learningguide-verbsforreporting.pdf
  - https://www.ncl.ac.uk/academic-skills-kit/writing/academic-writing/reporting-verbs/

A word on the overuse of passive structures

- Sometimes students overuse passive voice in their writing, thus resulting in:
  - Lack of clarity and conciseness (in some contexts).
  - Verbosity.

- Although passive voice is not only acceptable but sometimes more appropriate, there are certain contexts in which the use of active voice is preferable for reasons of conciseness and directness.

A word on the overuse of passive structures: examples

- In our current research, attention is directed to finding the mechanism. (11 words)
  - Our current research directs attention to finding the mechanism. (9 words)
- The theory is dependent on five basic postulates. (8 words)
  - The theory depends on five basic postulates. (7 words)
- A reader's attention is increased by the liberal use of figures and schematic drawings. (14 words)
  - A reader's attention increases with the liberal use of figures and schematic drawings. (13 words)

Ergative verbs

- Ergative verbs are verbs that can be both transitive and intransitive. Unlike intransitive verbs, they can have an object and also be used in the passive.
  - He increased the prices.
  - The prices increased.
    - The object in the active sentence is also the subject of the intransitive verb.

- Examples of ergative verbs: increase, decrease, lower, dissolve, start, etc.

A word on the overuse of passive structures

- In the previous examples:
  - The use of fewer words represents a savings of approximately 20%.
  - In a 10-page paper, a 20% reduction → an 8-page paper.
  - The active sentences are a) grammatically correct and b) more concise and thus easier to read than the sentences containing passive voice.

  - Therefore, we tend to use passive voice in AW but without sacrificing clarity.

What to avoid in AW

- In an academic text, the following are often avoided:
  - Personal and direct address to the reader (e.g. you).
  - Contractions: cannot instead of can't.
  - Direct questions (in most contexts).
    - E.g. What can we do to address this issue?
    - This issue needs to be further considered.
  - Adverbs in initial or final positions (the middle position is preferable)
    - *Then* it will be shown how this method can be used.
    - It will *then* be shown how this method can be used.
    - This work relies on previous research *heavily.*
    - This work *heavily* relies on previous research.
  - Numbers at the beginning of a sentence are spelled out.
    - *97 people visited the museum* last week.
    - *Ninety-seven people visited the* museum last week.

Example

- Is the style of the following sentence popular or academic?

  - Many incredible claims have been made about nanotechnological applications, but what exactly does nano mean, and why has controversy plagued this emerging technology?

Example

- The following is a suggestion for changing the style of the sentence to academic:
  - Despite extensive research [1-7] showing important applications of nanotechnology, two key questions that need to be addressed at this stage are, firstly, what the exact meaning of the term *nano* is and, secondly, what aspects of this technology are considered controversial and why [8-10].

  - In the new sentence:
    - Citations are used to support the claims made.
    - Indirect questions have replaced the direct questions in the original.
    - Sensational language (plagued) has been changed.

Cautious language / Hedging

- Hedging refers to language that indicates some degree of caution or tentativeness with regard to the claim made.
- Hedging prevents writers from overstating a claim or over-interpreting their results.
- Without hedging, your writing may sound exaggerated or nonscientific, resulting in a loss of credibility.

- Why is hedging important?
  - To protect the author from being criticised for possible errors or invalid claims.
  - To allow for other opinions or points of view.

Hedging expressions

- How is hedging achieved?
  - Lexical verbs (verbs other than auxiliary verbs) (e.g. *Indicate, assume, propose, estimate, tend to, argue, suggest, appear,* etc.)
  - Modal verbs (e.g. may, might, could, can, etc.).
  - Adjectives that express probability (e.g. *It is certain / likely / probable / possible / unlikely*, etc.)
  - Adverbs that express certainty / probability (e.g. *Apparently, approximately, practically, presumably, relatively, seemingly, etc.)*
  - Constructions with *there is…possibility (e.g. There is a strong / definite / slight possibility that…, etc.*).

Hedging

- For a list of hedging expressions, see separate document on Helios (filename: 'Language for Hedging').

The Academic Word List (AWL)

- AWL was developed by Averil Coxhead at the School of Linguistics and Applied Language Studies at Victoria University of Wellington, New Zealand.
- It contains 570 word families which appear with great frequency in many academic texts.
- The words in the AWL are not related to a specific academic discipline and are, therefore, useful for all students in the academia.

The Academic Word List (AWL)

- It was originally developed to be used by teachers who were preparing students for tertiary level study or by students who were working alone to learn the words most needed to study at a college or university.

- The 570 words are divided into 10 sublists.
  - The words in the first sublist are the most frequent words and those in the last sublist are the least frequent.
  - Each sublist contains 60 word families except for sublist 10 which contains 30.

The Academic Word List (AWL)

- You will find a .pdf file (filename: AWL_sublists) of this list on Mycourses (from www.eapfoundation.com).

- For more information, see: https://www.wgtn.ac.nz/lals/resources/academicwordlist
- http://www.uefap.com/vocab/select/awl.htm

Appendix 1: Useful phrases in academic writing (1)

- give rise to
- lay emphasis on
- have implications for
- provide clues about
- maintain the status quo
- offer insights
- take for granted
- draw conclusions about
- lie outside the scope of this paper

Appendix 1: Useful phrases in academic writing (2)

- place importance on
- draw on recent research
- laid the foundations of/for
- corroborate the /a theory
- extend the/a theory
- elaborate research
- fall into a category
- provide further opportunities for
- contributed to our understanding of
- submit a paper to an international journal
- heightened the need for

Appendix 1: Useful phrases in academic writing (3)

- a causal relationship
- (a) key finding(s)
- preliminary results
- (an) integral part
- lack of consistency
- area (field) of inquiry
- theoretical framework
- background knowledge
- theoretical considerations
- reliable sources and data

- For more academic collocations, see:
- https://www.eapfoundation.com/vocab/academic/acl/

Appendix 2: logical connectors

Accordingly	For instance	On the contrary
Although	Furthermore	On the other hand
As	Hence	On the whole
as a matter of fact	However	Otherwise
as a result	In addition (to)	Overall
as far as	In brief	Regarding
as long as	In conclusion	Similarly
as to	In contrast	Since
Because	In fact	That is (i.e.)
Consequently	In other words	Therefore
Conversely	In spite of	Thus
Despite	In this case	Whereas
Due to	Likewise	While
Even though	Meanwhile	Yet
Finally	Moreover	
Firstly	Nevertheless	
For example	Nonetheless	
	Notwithstanding	

Appendix 3: Scientific singulars and plurals

- Apparatus, apparatuses.
- Appendix, appendices (more common in academic and scientific contexts), appendixes (more common in less specialised contexts).
- Bacterium, bacteria.
- Basis, bases.
- Criterion, criteria, criterias (less common and in less specialised contexts).
- Formula, formulae (more common in academic and scientific contexts in BR. Eng.), formulas (more common in Am.Eng.).
- Index, indices (more common in mathematical, financial, scientific contexts, and in Br. Eng.) indexes (more common in less specialised contexts).
- Matrix, matrices (more common in mathematical, scientific contexts, and in Br. Eng.), matrixes (more common in less specialised contexts).
- Medium, media.
- Spectrum, spectra (more common in scientific contexts), spectrums (more common in less specialised contexts).

The use of the word *data*

- The word *data* is frequently used with a plural verb in AW:
- **More common:** Data are . . .
- **Less common:** Data is . . .

- Examples:
  - These data show . . .
  - The data imply . . .
  - The data were biased by . . .
  - These data are supported by . . .
  - The data suggest . . .
  - The data reveal . . .

The word *data* with *a singular verb*

- Examples:
  - The profile suggests that the data (*set*) is well converged.
  - Inspection of the data reveals . . .
  - A complete set of data is available.
  - A key feature of the bond length data is . . .

defining, exemplifying, classifying, generalising

Simple (broad/formal) definitions

They usually follow this simple structure:

Concept		***class***		**special features**
	verb form		which	
.....		.....		.....
Alkynes	are (is... means... describes... may be defined as... can be defined as... is defined as...)	hydrocarbons	which	contain one or more carbon-carbon triple bonds
Dissociation	is	a process	which	allows a molecule to split into simpler fragments that may be smaller molecules, atoms, free radicals or ions

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Restrictive and non-restrictive clauses

- Since definitions try to narrow down the meaning of an item, restrictive relative clauses are used in formal definitions.

- Non-restrictive relative clauses provide extra information about the subject of the main clause and can be used to expand definitions.

Restrictive and non-restrictive clauses: example

- Restrictive:
  - Alkenes are hydrocarbons which contain one or more carbon-carbon triple bonds.

- Non-restrictive:
  - A nucleophilic substitution reaction, which commonly occurs in aliphatic chemistry, is a reaction in which a nucleophile reacts with a compound displacing another nucleophile.

Examples of problems with simple definitions

- The following definition offers examples rather than defining the term *fluid*.
  - Both liquids and gases are fluids.
    - Examples may follow the definition of a term, but they should not replace it.

- The following definition is incomplete (as an academic definition) since it omits the general class of the term defined.
  - Enthalpy is the sum of the internal energy **E** plus the product of pressure **p** and volume **V.**
    - It could possibly be found in a dictionary.

Extended definitions

- They provide more information than a simple definition.
- Facts, classifications, examples, or even images, may be employed in an extended definition.

Exemplification

- Providing examples to define a term or to illustrate a point is particularly common in academic writing.

- Some common expressions that are used for exemplification are:
  - It is shown / exemplified / illustrated by …
  - It shows / exemplifies / illustrates this. …
  - For example, / instance, …
  - Typical / Important examples are …
  - The following are examples of …
  - The following is a case in point …
  - … transferable protons such as …

Generalisations

- They are very important in academic writing and are very useful for starting off a piece of writing or a paragraph.

- They allow the writer to introduce the main properties of a concept in one statement -the generalisation- the details of which can then be further developed in the text using:
  - Definitions.
  - Classifications.
  - Examples.

Generalisations

- When we write we move from a general statement to a more specific statement, since a generalisation often needs to be supported by evidence.

Generalisations: example

- Look at this example from Bailey (2011) where the generalisation is followed by more specific information that supports it.

Generalisation	Support	Development > Specific
Since the mid-twentieth century there has been a remarkable increase in international trade.	The reasons for this are a combination of international agreements such as GATT, better transport and improved communications.	China has played a significant part in this process, with its international trade growing by 16 times in just 20 years, while its GDP increased by nearly 10 per cent per year.

Bailey, S. 2011. *Academic Writing: A Handbook for International Students* (3rd ed.). New York: Routledge, p. 138.

The language of generalisations

- In academic writing, it is important to avoid generalisations that cannot be supported by evidence/research:
  - Students learn a second language easily.

- It is advisable to use a more cautious statement and provide reference to relevant research:
  - Students tend to learn a second language easily [1-3].

The language of generalisations

- Unless there is evidence to show 100% certainty, academic writers do not tend to use absolute generalisations.

- Instead, they use hedging expressions that reflect their level of certainty about a statement and help them avoid overgeneralisations.
  - Remember hedging allows us to distinguish between facts and claims.
  - We use it when it is necessary to make decisions about our stance on a particular subject or the strength of the claims we are making.

Absolute and non-absolute generalisations

Degree of certainty	Quantity	Frequency	Probability	
Complete	All	always	definitely undoubtedly	will is-are must/have to
High	a majority many/much a lot (of)	usually normally generally as a rule	presumably probably	should would ought to
Partial	some/several a number (of) several a minority (of) a few/a little	often frequently occasionally	possibly perhaps maybe	can could may might
Low	no/none/not any	seldom rarely hardly ever never		

Classifying

- Classification involves grouping elements into categories on the basis of one or more criteria.

- It is important to explicitly mention:
  - What you are classifying.
  - How you are classifying it.
  - Which groups or categories you have identified.

Classifying: examples

- EM radiation is classified into types according to the frequency of the wave. These types include, in order of increasing frequency, radio waves, microwaves, infrared radiation, visible light, ultraviolet radiation, X-rays and gamma rays.

- Polymers may be further classified depending upon whether there are single, double or triple bonds along their backbone.

The language of classification

X can be	divided into further divided into	two	groups. These are …
X	consists of comprises	two	categories. classes.
X (may be)	classified	according to … on the basis of …	
X and Y are	classes types categories	of Z.	

Your task

- Evaluate the following extended definitions on the basis of the following criteria:
  - Do they contain an appropriate simple definition?
  - Is the structure of the definitions appropriate?
  - Do they contain relevant examples?
  - Have the students used their own words or have they copied phrases/sentences from the original texts without changing them? Please exclude technical terms/phrases from this.

- On Helios, you will find the original texts students used to write the extended definitions that follow.

Extended definition CE: Alkenes

- In organic chemistry, alkenes are a class of hydrocarbons, compounds containing only carbon and hydrogen, that contain at least one carbon-to-carbon double bond. They are unsaturated, because they have one or more double bonds in their chemical structure. Another term used to describe alkenes is olefins, however alkene is generally used. Alkenes appear almost everywhere in nature, for example as ripening hormones or as pigments in fruits. The presence of the carbon-carbon double bond, does not allow any rotation around it and, therefore, exhibit geometric (cis-trans) isomerism. All major reactions of the alkenes are focused on the double bond, such as electrophilic additions, where the exposed electrons in the pi bond react with electrophilic H+ and the position of H+ is determined by Markovnikov's rule.

Extended definition ECE: Capacitors

- A capacitor may be defined as a configuration which stores energy. The energy, which has been provided from an outside source, causes the transfer of equal but opposite charges on each of the conductors respectively. This causes an electric field and consequently potential difference between the conductors. In fact by providing more charge the potential difference is proportionally increased. The ratio of these two quantities is called capacitance and research teams have recently created nanoscale capacitors with higher rates of it.

Extended definition ME/NAME: Phase rule

- The phase rule of Gibbs is the value of the degrees of freedom of a complex system which contains two or more homogenous substances in thermodynamic equilibrium. Each substance which is contained in the system is in a phase that could be liquid, gas, or a solid crystal. This system could define its intensive state of equilibrium when its temperature, pressure and the other fundamental values are specified.

Extended definition MME: Igneous rocks

- Igneous rocks are also known as magmatic, metamorphic or pyrogenic rocks. They are formed from magma solidification in the inner part of the Earth's crust. Under conditions of very high temperature and pressure, magma is crystallised and its final consistency is silicon (Si) and oxygen, forming silica tetrahedron (SiO_2). Also, apart from these two basic minerals, crystallised magma is enriched with other secondary minerals like potassium (K), sodium (Na), magnesium (Mg) and iron (Fe). As a conclusion, igneous rocks are found only in places near volcanoes irrespective of whether there has been an eruption or not..

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The simple definition of alkenes contains a definition of hydrocarbons as part of the definition of alkenes, which is not acceptable.

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The next sentence contains some more details; however, the following sentence contains some general information that is not appropriate after the more detailed information concerning saturation. The information concerning the term 'olefins' would be more appropriate at the end of the extract.

Extended definition CE: Alkenes

- In organic chemistry, alkenes are a class of hydrocarbons, compounds containing only carbon and hydrogen, that contain at least one carbon-to-carbon double bond. They are unsaturated, because they have one or more double bonds in their chemical structure. Another term used to describe alkenes is olefins, however alkene is generally used. Alkenes appear almost everywhere in nature, for example as ripening hormones or as pigments in fruits. The presence of the carbon-carbon double bond, does not allow any rotation around it and, therefore, exhibit geometric (cis-trans) isomerism. All major reactions of the alkenes are focused on the double bond, such as electrophilic additions, where the exposed electrons in the pi bond react with electrophilic H+ and the position of H+ is determined by Markovnikov's rule.

The next sentence contains examples that constitute more detailed information and, therefore, need to come after the explanation of the alkenes, thus being more appropriate at the end of the extract.

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The following sentences contain details regarding the definition of alkenes and should be mentioned earlier on after the simple definition rather that at the end.

Overall, the definition is inappropriate:

1. No appropriate simple definition of alkenes is given.
2. The structure of information is problematic

Extended definition ECE: capacitors

- A capacitor may be defined as a configuration which stores energy. The energy, which has been provided from an outside source, causes the transfer of equal but opposite charges on each of the conductors respectively. This causes an electric field and consequently potential difference between the conductors. In fact by providing more charge the potential difference is proportionally increased. The ratio of these two quantities is called capacitance and research teams have recently created nanoscale capacitors with higher rates of it.

The simple definition is appropriate in that it contains a class and some general defining features. However, the defining features are far too general to naturally lead to the next sentence (see next slide). Moreover, the use of cautious language, i.e. 'may be defined', is not particularly relevant here since, from a general perspective, it is possible to define capacitors as such.

Extended definition ECE: capacitors

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The next sentence lacks coherence in that reference to "each of the conductors" should have already been made in the previous sentence.

Extended definition ECE: capacitors

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The following two sentences relate to the previous one in a coherent manner. However, this information is too detailed, given that no adequate definition of capacitors has been provided.

Extended definition ECE: capacitors

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In the last sentence we have both a definition of the term capacitance, which is related to capacitors but not needed here, and reference to recent research. The problems are that: a) joining these two unelated types of information is inappropriate, b) reference to research needs to be more detailed and c) this reference to research is unnecessary in this context.

Overall, this is NOT a good example of an extended definition in that it mainly lacks coherence and, to a lesser extent, relevance of information.

Extended definition ME/NAME: Phase rule

- **Sample student answer A**
  - The phase rule of Gibbs is the value of the degrees of freedom of a complex system which contains two or more homogenous substances in thermodynamic equilibrium. Each substance which is contained in the system is in a phase that could be liquid, gas, or a solid crystal. This system could define its intensive state of equilibrium when its temperature, pressure and the other fundamental values are specified.

Where is the class in the academic definition????
We are only given the defining features.

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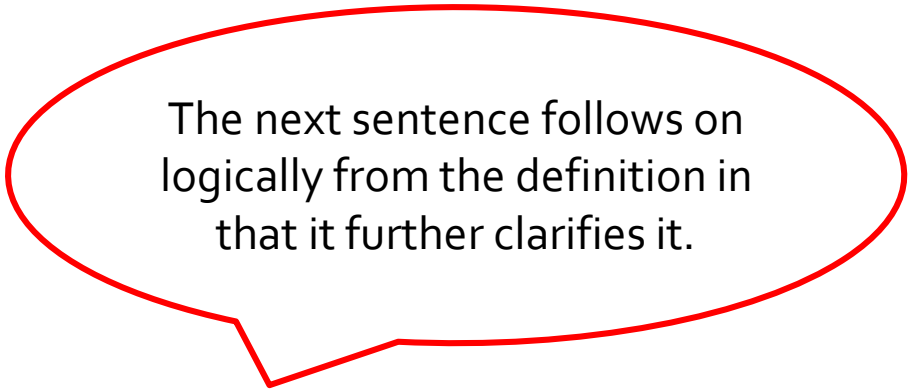

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The last sentence gives further details

Overall, the definition is good. But:
1. No class in the simple definition.
2. Too short.

Extended definition MME: igneous rocks

- Igneous rocks are also known as magmatic, metamorphic or pyrogenic rocks. They are formed from magma solidification in the inner part of the Earth's crust. Under conditions of very high temperature and pressure, magma is crystallised and its final consistency is silicon (Si) and oxygen, forming silica tetrahedron (SiO_2). Also, apart from these two basic minerals, crystallised magma is enriched with other secondary minerals like potassium (K), sodium (Na), magnesium (Mg) and iron (Fe). As a conclusion, igneous rocks are found only in places near volcanoes irrespective of whether there has been an eruption or not.

This is not an appropriate simple definition, since it only mentions other terms by which the phrase 'igneous rocks' is also known..

Extended definition MME: igneous rocks

- Igneous rocks are also known as magmatic, metamorphic or pyrogenic rocks. They are formed from magma solidification in the inner part of the Earth's crust. Under conditions of very high temperature and pressure, magma is crystallised and its final consistency is silicon (Si) and oxygen, forming silica tetrahedron (SiO_2). Also, apart from these two basic minerals, crystallised magma is enriched with other secondary minerals like potassium (K), sodium (Na), magnesium (Mg) and iron (Fe). As a conclusion, igneous rocks are found only in places near volcanoes irrespective of whether there has been an eruption or not.

The following sentences referring to the formation of igneous rocks are coherent but what is the point of this detailed reference to magma when the point is to discuss igneous rocks?
A categorisation of igneous rocks based on composition and texture, which is discussed in the original text, would be much more relevant to the task.

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The phrase 'as a conclusion' is quite an overstatement here; to use this phrase, you need to analyse a topic to some extent (at least 3 paragraphs).
Overall, the text lacks focus as well as an appropriate simple definition of 'igneous rocks'.