CAES 9541
TECHNICAL ENGLISH FOR ELECTRICAL AND ELECTRONIC ENGINEERING

UNIT THREE
WRITING AND DELIVERING AN INTRODUCTION

DESIGNING VISUAL AIDS

UNIT OVERVIEW AND LEARNING OUTCOMES

Overview

An effective introduction is crucial in attracting your audience's attention, identifying a knowledge gap, and facilitating the understanding of the remaining writing or oral presentation. This unit will highlight its importance both in writing and presentation with respect to its purpose, structures and language features which you can apply in your project. Specific to oral presentation, techniques and pitfalls of designing visual aids will also be discussed to help you to clearly and concisely convey the appropriate technical information.

Learning outcomes

By the end of this unit, you will be able to

- identify the purpose and structure of writing an introduction in a report
- distinguish the language choices in an introduction
- draft an introduction for your interim report for your project
- deliver an introduction of an oral presentation
- design effective visual aids

WRITING AN INTRODUCTION

(Warm-up) Critique an introduction (5 mins)

Read the following introduction of an SDP report written by a previous student. Discuss your comments with your partner.

Hint: Think about the purpose of an SDP report as discussed in Unit 1.

Text 1 [1]

TITLE: *Logic Sequence Design and Implementation of a Washing Machine*

1. Introduction

1.1 Background

The earliest electric washing machine first appeared in America. It was a simple washer that consisted of a washing tub and a motor. Rotation of the washing tub was driven by the motor. One of the problems associated with this washer was that water could easily drip into the motor. Dangers like short circuit and electric shock often occurred due to the deficiency in the design of the washing machine. Undoubtedly, the problems of the design of this simple washing machine should be solved and a lot of improvements could be made on this simple washer. Since then, many companies tried to develop their technology in making washing machine. They tried to add more different functions for their washing machines in order to attract more customers.

Latest washing machines are automatic and are controlled by a controller. Timing processes,

3.1 Purpose and structure of an introduction

An introduction

- is an overview of the background, with appropriate references, through which you show
  - what has been done by others in the area
  - what opinions are given in the discussion
  - how these opinions interact
  - current status
  - future directions
- defines problem to be solved (or a research gap to be filled)
- justifies and explain the importance/benefits of your work as a solution to the problem
- states the scope of your work (this can be a separate section if it is substantial)
- outlines deliverables (e.g. experiment results, etc.)
- provides an outline for the remaining parts of the report

TASK 3.1 Identify the purpose and structure of an introduction (15 mins)

Work as a pair. Read an abridged version of an introduction of a technical report/paper below titled *Metallized Foams for Fractal-Shaped Microstrip Antennas* [2]. Identify the features listed in the section.

Additional thoughts: Are you convinced of the benefits/motivations of the project? Is there sufficient general and technical background information?

Text 2 [2]

Title: *Metallized Foams for Fractal-Shaped Microstrip Antennas* A wide variety of new civil commercial telecommunication systems have appeared on the scene. The evolution of such wireless systems conditions the design of antennas, since antenna technology has to evolve in order to fulfill the requirements imposed by wireless systems. Such evolution leads to more-complex antennas, integrating several wireless systems. The metallization of foams thus appears as a very valuable technology for reducing the manufacturing complexity and cost of antennas required by current and future wireless systems [1-7]. Until today, antennas have been built mainly with pieces of metal, especially for low-frequency bands (VHF and UHF under 1 GHz) and have been more frequently realized on printed circuits for higher frequencies (typically, above 1 GHz). Combined with the antenna, the feeding network can be either printed or metallic. As an example, waveguides remain a	

Title: *Metallized Foams for Fractal-Shaped Microstrip Antennas*

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Until today, antennas have been built mainly with pieces of metal, especially for low-frequency bands (VHF and UHF under 1 GHz) and have been more frequently realized on printed circuits for higher frequencies (typically, above 1 GHz). Combined with the antenna, the feeding network can be either printed or metallic. As an example, waveguides remain a very nice solution when a low-loss feed is needed at X band or above. As a consequence, the feed itself is rather bulky and heavy. As a matter of fact, antennas are more or less filer structures in low-frequency bands (dipoles and arrays of dipoles), and printed patches or metallic waveguides and horns for high frequencies. These are mostly heavy and rather expensive. On the contrary, metallized-foam technology appears as a new approach that can lead to:

- Low-weight structures;
- Flat or conformal structures;
- Arbitrary shaped structures, such as fractal geometries;
- New artificial materials, such as electromagnetic band-gap materials;
- Low-cost structures.

Suggested answer

General background of the topic/
Outline of the problem/Introduce solution

Current status

Problem to be solved /research gap
Motivation of the study

Another important aspect is related to the soldering process for electronic components. As is well known, foams are produced from polymers; their melting temperatures are more or less low. It is important to both choose suitable materials (with high melting temperatures) and to develop a specific soldering process. This aspect was tested initially with PVC (polyvinyl chloride) materials. Various components, such as connectors and varactor diodes, have been soldered, in order to realize either passive antennas with proper connectors and also phase shifters, and active antennas with beam steering. Improvement and extension of the process to other materials is highly desirable, in order to obtain a large spectrum of solutions in term of dielectric constants, dielectric losses, thicknesses, roughness, etc.	Previous works Motivation/ Research gap
Foam-based materials are inexpensive, very light, and have a very low dielectric constant and loss tangent. They are ideal materials for building antennas for certain applications. At present, it is very difficult to use foams, because copper plating and etching affect the dielectric properties. Moreover, implementation of plated-through holes in a porous material is difficult.	Justification of the importance Problem

One of the partners of this project has demonstrated that it is possible to metallize foams. This process has been characterized and is to be applied for foams with low dielectric constant.

Previous work

As an alternative to plating and etching, it could be interesting to develop a process for making antennas on a non-developable surface. For many applications, such automobiles, avionics, and communications, antennas need to be conformal to their supporting surfaces. The most difficult problem is to transfer a pattern onto such a surface with good precision.

Proposed solution to problem

The antenna investigated in this paper was inspired by fractal geometry. Self-similar fractals and other related shapes have attracted many researchers, thanks to their geometrical properties, for designing multi-band and small antennas, multi-band elements and arrays, high-directivity antennas, low-sidelobe and under-sampled arrays [8-43].

The paper is structured as follows. Section 2 explains the European project that funded the research, detailing the main goals. Section 3 describes the properties of the foam used to build the antennas. In Section 4, the fabrication process for metallizing the foam is presented. Section 5 shows the antenna results to validate the foam-fabrication process. Two examples are analyzed: without and with a radome. A description of how this technique reduces mechanical complexity is also given. Finally, Section 6 presents the concluding remarks.

Outline of the report
Scope
Deliverables of the study

3.2 Language choice in an introduction – tense and voice

3.2.1 Use of tense

Different tenses are used in describing

- general phenomena
- existing situation and what has OR has not been investigated in the field
- future plan / work to be done
- aim or organization of the report

Without strictly memorizing the use of specific tenses, try to recognize the tense used for each function.

TASK 3.2 Identify the use of tense (10 mins)

Read the same introduction in the previous task and identify the type of tense used according to its function.

Text 3 [2]

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Until today, antennas have been built mainly with pieces of metal, especially for low-frequency bands (VHF and UHF under 1 GHz) and have been more frequently realized on printed circuits for higher frequencies (typically, above 1 GHz). Combined with the antenna, the feeding network can be either printed or metallic. As an example, waveguides remain a very nice solution when a low-loss feed is needed at X band or above. As a consequence, the feed itself is rather bulky and heavy. As a matter of fact, antennas are more or less filer structures in low-frequency bands (dipoles and arrays of dipoles),

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- Low-weight structures;
- Flat or conformal structures;
- Arbitrary shaped structures, such as fractal geometries;

Suggested answer

Background (past events till now)
Present perfect
General background of the topic
Present

Past investigations till now
Present perfect

Details of the problem
Present

Justification or proposed solution
Present

Another important aspect is related to the soldering process for electronic components. As is well known, foams are produced from polymers; their melting temperatures are more or less low. It is important to both choose suitable materials (with high melting temperatures) and to develop a specific soldering process. This aspect was tested initially with PVC (polyvinyl chloride) materials. Various components, such as connectors and varactor diodes, have been soldered, in order to realize either passive antennas with proper connectors and also phase shifters, and active antennas with beam steering. Improvement and extension of the process to other materials is highly desirable, in order to obtain a large spectrum of solutions in term of dielectric constants, dielectric losses, thicknesses, roughness, etc.	General information *Present* Previous work *Present perfect* General information *Present*
Foam-based materials are inexpensive, very light, and have a very low dielectric constant and loss tangent. They are ideal materials for building antennas for certain applications. At present, it is very difficult to use foams, because copper plating and etching affect the dielectric properties. Moreover, implementation of plated-through holes in a porous material is difficult.	General information *Present*

One of the partners of this project has demonstrated that it is possible to metallize foams. This process has been characterized and is to be applied for foams with low dielectric constant.	Previous work *Present perfect*
As an alternative to plating and etching, it could be interesting to develop a process for making antennas on a non-developable surface. For many applications, such automobiles, avionics, and communications, antennas need to be conformal to their supporting surfaces. The most difficult problem is to transfer a pattern onto such a surface with good precision.	
The antenna investigated in this paper was inspired by fractal geometry. Self-similar fractals and other related shapes have attracted many researchers, thanks to their geometrical properties, for designing multi-band and small antennas, multi-band elements and arrays, high-directivity antennas, low-sidelobe and under-sampled arrays [8-43].	Past event *past*
The paper is structured as follows. Section 2 explains the European project that funded the research, detailing the main goals. Section 3 describes the properties of the foam used to build the antennas. In Section 4, the fabrication process for metallizing the foam is presented. Section 5 shows the antenna results to validate the foam-fabrication process. Two examples are analyzed: without and with a radome. A description of how this technique reduces mechanical complexity is also given. Finally, Section 6 presents the concluding remarks.	Outline of report *Present*

DO YOU USE ‘I’ OR ‘WE’ IN TECHNICAL WRITING? ANY ALTERNATIVES?

DO YOU USE ‘I’ OR ‘WE’ IN TECHNICAL WRITING? ANY ALTERNATIVES?

No hard-and-fast rules in general

Passive voice as an alternative in general

Emphasis on personal authority or responsibility in rationale or recommendations

TASK 3.3 Identify and explain using and not using first person (10 mins)

Read *Text 4* below and underline the use of first person, dummy 'it', and any subjects that attract your attention. Discuss and explain the possible rationale.

Title: *Where do we go from here? An assessment of navigation performance using a compass versus a GPS unit*

Introduction

The ability to navigate one's environment—that is, wayfinding—is a fundamental human survival skill. Nowhere is this more true than in the military domain, where a misunderstanding of position can result in loss of life from either enemy or friendly fire. Issuing soldiers with basic navigation skills and tools is therefore essential to the operational effectiveness of every unit. The products used for navigation in the UK Armed Forces at present are maps, compass, and Global Positioning System (GPS) units. As handheld GPS units become ever more affordable and accessible, the technology represents a direct rival for the traditional map and compass in the military and elsewhere (Guerrero 2004). For the potential benefits of this new technology to be realised, though, it needs to demonstrably improve navigation performance across a range of users, tasks, and environments. In military operations, navigation decisions during movement are often made under extreme physical and environmental conditions, with inexorable time constraints, and often under fire. As such, soldiers must be highly adept at the task and their tools must be efficient.

Title: *Where do we go from here? An assessment of navigation performance using a compass versus a GPS unit* Introduction The ability to navigate one's environment—that is, wayfinding—is a fundamental human survival skill. Nowhere is this more true than in the military domain, where a misunderstanding of position can result in loss of life from either enemy or friendly fire. Issuing soldiers with basic navigation skills and tools is therefore essential to the operational effectiveness of every unit. The products used for navigation in the UK Armed Forces at present are maps, compass, and Global Positioning System (GPS) units. As handheld GPS units become ever more affordable and accessible, the technology represents a direct rival for the traditional map and compass in the military and elsewhere (Guerrero 2004). For the potential benefits of this new technology to be realised, though, it needs to demonstrably improve navigation performance across a range of users, tasks, and environments. In military operations, navigation decisions during movement are often made under extreme physical and environmental conditions, with inexorable time constraints, and often under fire. As such, soldiers must be highly adept at the task and their tools must be efficient.	**Suggested answers and teaching notes** General background focusing on the technology. Person not the focus. Highlight particular context

A taxonomy of navigation tools has been proposed by Chen and Stanney (1999). The first category comprises tools, which display one's current position. In the second category, tools can display current orientation, while those in the third category can log one's movements. Tools in category four can demonstrate the surrounding environment, while the fifth and final category consists of guided navigational systems. In the present context, a compass is an example of a tool in the second category, the map is in category four, while a GPS receiver covers all of the first three categories (and a GPS combined with a moving-map display would offer all five capabilities). From this perspective, GPS technologies appear to offer considerable advantages over the map and compass. Furthermore, this taxonomy does not acknowledge the added capability of GPS-based digital maps to define waypoints and program routes in advance. Such a facility allows ''virtual navigation'' and can	Focus on the functions and the environmental constraints

further alleviate the demands on the navigator as well as potentially reducing the possibilities of error. Previous opinion on the relative benefits of GPS is mixed. In favouring GPS, Chen and Stanney (1999) suggest that maps are not always the most effective tool—for instance, giving verbal directions to drivers results in lower reaction times and fewer errors than using a map. In fact, map-reading is the most cognitively demanding level of navigation (Foo et al. 2005), as it is based on a worldcentred representation of the environment, as opposed to the ego-centred viewpoint of normal locomotor guidance (Chen and Stanney 1999). Using a map to navigate can therefore cause problems of mental rotation when we try to translate the world-centred frame of reference into an internal cognitive map. Our wayfinding abilities are very much dependent on developing these internal representations of the world (Boer and Hirase 2000), but	Highlight previous research Generic 'we'

advanced communication technology). However, this was a simulated urban military reconnaissance scenario, rather than a navigation task, with the objective to collect data on hostile and friendly forces in the environment. The results may therefore have been more attributable to the communications technology, rather than the map representation. Indeed, their data suggested that with more than one unit in the field, the command wall actually increased efficiency, as the voice communications bottleneck was avoided.	Up to this paragraph, mostly description without first person

Overall, then, we see that both traditional techniques and GPS technologies have pros and cons for navigation—both generically and specifically in the military domain. Paper maps are certainly light, informative, and have no external power needs—but are limited to providing information about the surrounding environment only. In a stressful fire situation, the extra workload of interpreting the map can lead to errors (Leggatt and Noyes 2000). GPS can reduce such demands by adding position and orientation information, and circumvents any issues of orientation, but perhaps diminishes the development of cognitive maps. Since the evidence to choose between them is equivocal, in the present study we directly compare the effectiveness of an army-issue GPS receiver against the military standard compass in a basic waypoint-plotting task. Given the potential implications for user skill discussed above, experience was varied as an independent variable whilst tasks and environment were held constant. The primary objective of the study is to determine what, if any, trade-offs in performance might ensue, particularly in terms of navigation efficiency and errors in wayfinding.	Use of personal pronoun Not appropriate If 'we' is not the focus

PUTTING IT TOGETHER

3.3 Putting it altogether

Now that you understand the purpose and structure of an introduction, and the rationale for the choice of tense and voice, you can apply them in your SDP report.

TASK 3.4 Draft an introduction of the SDP report (25 mins)

Discuss with your classmates of your project. Identify the main elements based on Section 3.1 which are specific to your project. Write a brief introduction of your SDP report.

DELIVERING AN INTRODUCTION IN PRESENTATION

3.4 Oral Presentation – Delivering an introduction

The structure of an introduction in a presentation should be similar to that in writing. Remember what you have learnt in this unit regarding the essential elements in an introduction to arouse an interest in the audience, justify your work, and provide an outline for the rest of the presentation.

STRUCTURE OF INTRODUCTION IN A PRESENTATION

TASK 3.5 Identify the main components in an introduction (15 mins)

Watch a number of clips of presentation made by former engineering students. Identify the structure of an introduction. Exclude the pronunciation and grammatical mistakes. Do you think these students provide an effective introduction?

FEATURES IN THE INTRODUCTION

- Greet the audience
- Introduce yourself
- Give the title of your presentation
- Provide background information and motivation of your topic

  e.g. Statistics / Interesting findings
- State the focus (which aspect?) of your presentation
- Illustrate the outline of your presentation
- Inform the audience when they may ask questions (optional)

DESIGNING VISUAL AIDS

DESIGNING POWERPOINT SLIDES

TASK 3.6 Critique PowerPoint slides (15 mins) (p.49)

Consider the following PowerPoint slides. Can you identify any problems with the design? What do you need to pay attention to when you design your PowerPoint slides?

DESIGNING POWERPOINT SLIDES

Identify the problems with the following slide.

The ISO 9000 family
- international quality management standards and guidelines

ISO 9001:2000
- specifies requirements for a quality management system
- aims to enhance customer satisfaction
- organized in a user-friendly format
- used for certification/registration by organizations seeking recognition
- Consist of 4 areas of requirements
  - Systemic Requirements
  - Management Requirements
  - Resource Requirements
  - Realization Requirements

Strength:

- Clear contrast between background color and font color

Weaknesses:

- Should have only ONE main theme for each slide (so the AIM can be removed to another slide)
- Inconsistent language pattern (puts, at the focus, make; To, To, Maintenance)
- Spelling mistake (Maintainence)
- Inappropriate choices of font colors (ie. Not exactly sure if the words in red or green should deserve more attention)
- Why capitalize E in Easier?

VISUAL AIDS – SLIDE 1

Weaknesses:

- **Should have one main theme only**
- **Distracting background**
- **Lines of text**
- **Inconsistent language pattern (specifies, aims, organized, used, consist)**
- **Need to show hierarchy of bullet points (e.g. indentation of the 4 points under "consist of 4 areas of requirements")**

VISUAL AIDS – SLIDE 2

DESIGNING POWERPOINT SLIDES

Identify the problems with the following slide.

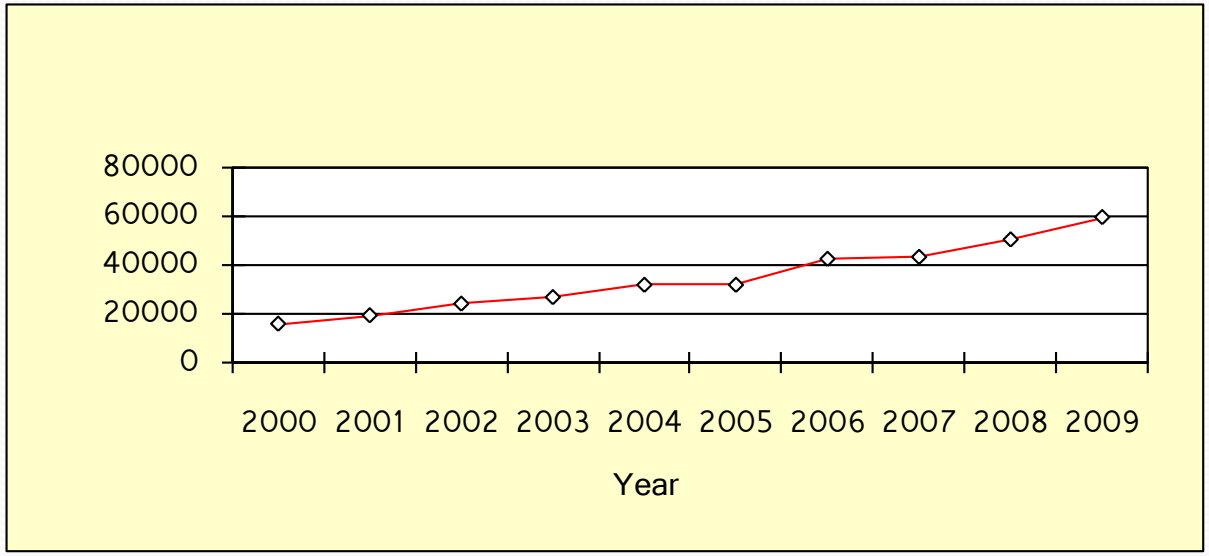
5. Well established legal system and high public security

- Benefits of the companies are well protected by law in HK
- HK's public security is the highest in world
- ➔ safe for using HK for re-export
- The marine accident to port activities ratio is the lowest in HK (1:1787 in 2009)

DESIGNING POWERPOINT SLIDES

Identify the problems with the following slide.

Weaknesses (Cont'd)



- Rised from 15985 to 59640 **(increase 273%)**

- **Not to include too many points on a slide**
- **Include key words only, NOT lines of texts**
- **Highlight key words for attention**
- **Think about which kind of visual is right for you (graph?)**
- **Should be uncluttered**
- **Use at least 20-pt letter/font size**

GENERAL RULES OF DESIGNING VAS

- **Should have clear topic/title on each slide**
- **Should not contain irrelevant/distracting graphics**
- **Make sure no spelling/grammatical mistakes**
- **Show a clear hierarchical structure of points**
- **Use consistent language style/pattern (esp. bullet points)**

GENERAL RULES OF DESIGNING VAS

Do not use visuals to repeat what you can say with words

Do not use too many visuals

Do not READ from visuals

Make sure the audience understands the visuals

Face the audience as much as possible

Do not block the audience's view

GENERAL RULES OF USING VAS

PUTTING IT TOGETHER

TASK 3.7 Critique your PowerPoint slides of the Diagnostic Presentation (15 mins)

Select a few slides (preferably with technical details) from your presentation from your diagnostic presentation. Improve them with what you have learnt in this lesson. Present it to another student. Also give feedback to the other student using the template "Peer Review of Visual Aids" provided.

Peer Review of Visual Aids

Creators of the Visual Aids: _____

Assessor: _____

Check points of Visual Aids

	Good	Need Improvement	N/A
Layout of slides			
❖ A clear topic/title on each slide			
❖ A suitable number of points on a single slide			
❖ Not too wordy or lines of text			
❖ Clear color contrast of background against font			
❖ No irrelevant/distracting graphics/animations			
❖ Good use of visuals (e.g. graphs/charts/diagrams)			
❖ Font size large enough			
Language of slides			
❖ Clear hierarchical structure of points			
❖ Parallel sentence patterns with bullet points			
❖ Accurate grammar and spelling			
Language of describing slides			
❖ Refer the audience to the relevant slide			
❖ Highlight the relevant part of the visual for attention			
❖ Accurate description of figures			

Overall Grade: ☐

KEY POINTS TO REMEMBER

- Purpose of an introduction: Arouse audience attention, identify motivation, and outline the remaining text
- Essential elements include: background, research gap/problem(s) to be solved, motivation of the study, scope, deliverables, and outline.
- Use past tense to highlight specific literature and past studies (report of findings)
- DO NOT indiscriminately use present tense and passive voice
- DO NOT se first persons unless there is a highlight of the writer(s)
- Characteristics of a PowerPoint slide design: focus, clarity, conciseness, aesthetics.
- Always 'speak' to refer and highlight content on a PowerPoint slide. Content on a slide does NOT speak for itself!

REMINDER

Improve the “introduction” of your project for your SDP Report (5 Mar 2018)