

6.5 Introduction

The introduction forms a gateway into the report: the reader can see what question was addressed and how and why the research was done. Broadly speaking, an introduction consists of three parts: the reason for the research, the aim of the research and an outline of the report. This division should be recognizable in the structure of the introduction: an introduction, therefore, should consist of three paragraphs, three paragraph groups, or in the case of a long report, even three sections.

The following abridged example of an introduction will illustrate this. The title of the report is "Selection of an element-analysis apparatus for the Falcon copper mine."

EXAMPLE OF AN INTRODUCTION

Reason

1 Introduction

Element-analysis apparatus is used to determine the metal content of ores. Element analysis is the analysing of a substance with the aim of determining the weight percentage of element X in that substance. The ore should at least have a certain metal content if mining it is to be economically feasible. This so-called "cut-off grade" is dependent on the price of metal and the depth of the ore underground, among other things. As such, it is of paramount importance that the metal content of the mined ore and of the ore that is still to be mined be known at any given point in time. This is achieved by continually taking samples and subsequently analysing them. At the moment the Falcon copper mine makes use of an atomic absorption spectrometer (AAS). This AAS has almost reached the end of its technical life, necessitating the purchase of a new element-analysis apparatus shortly.

Aim

This report answers the question of which element-analysis apparatus would be the best to purchase to replace the present AAS. This will be done by means of a literature study of the apparatuses available. The investigation is limited to devices that can determine the weight percentage of copper in particular. Four options that all satisfy the criteria of atomic absorption spectrometer (AAS) – the inductively coupled plasma mass spectrometer (ICP), the X-ray fluorescence spectrometer (XRF) and the optical emissions spectrometer (OES) – will be examined.

Structural description

The report is set out as follows. Chapter 2 describes the way that the four element-analysis apparatuses work. Then in Chapter 3, the evaluation criteria are set out and the devices are evaluated according to these criteria. Chapter 4 contains the results and recommendation: which apparatus is regarded as the best buy.

6.5.1 Reason for the research

Early in the introduction, the reader should get an idea of why the text is important and why the research was done. You can best do this by giving *background information* describing the *problem* and indicating the *importance* of finding a solution.

Background information

Readers usually need some background information to put the report in the right context. This will often take the form of a sketch of the situation in which the nature of the subject and its place within a larger framework is explained.

BACKGROUND INFORMATION

- The General Intelligence and Security Service (AIVD), which operated from 1949 to 2002 under the name of Domestic Security Service (BVD), is managed by the Minister for Internal Affairs. Between 1949 and now, the world has changed considerably. These changes have not gone unnoticed by the AIVD.
- During a heavy storm on the North Sea last month, 88 containers were washed off a Lebanese container ship. Six of these containers are filled with the extremely toxic agricultural pesticide Apron Plus.

Problem

Presentation of background information should lead naturally to a description of a problem. The problems may sometimes be very serious ones and finding a solution quickly may be critically important. For example, after a fire drill in a chemical factory, it was discovered that half the fire extinguishers were not working properly. The problem does not necessarily have to be a problem in that sense of the word: a report can also have optimisation of a certain computer programme as its aim. The "problem" in this case might be that the existing programme should be faster and more user-friendly.

PROBLEM

- The idea most Dutch people have that the AIVD is a secretive organisation is outdated. The AIVD has developed into a government organisation that aims to give a full and open account of its activities and to contribute to the protection of vital interests within the Dutch community. However, the nature of this task may make it necessary to keep working in secret. The desire for openness and the need for secrecy may be at odds with each other.
- From 16 January onwards, thousands of bags of a particular toxin have washed ashore along the coast of North and South Holland. A number of bags have burst and the sea water and the beach contaminated by their contents.

Importance

Readers are stimulated if they realise that it is important that the problem be solved. Sometimes this is sufficiently clear from a description of the

problem and it is not necessary to pay any additional attention to it. Keep in mind, however, that while the importance of your research is often very clear to you, this might not always be the case for your readers.

IMPORTANCE

- It is therefore of the utmost importance for the AIVD to develop a policy that makes the desired openness possible without jeopardising the secrecy that may sometimes be necessary.
- The need to investigate the effect the agricultural pesticide has on surface water is very urgent at the moment. During a collision between a tanker and a barge last month, several barrels of the poison finished up in the Rhine. Ten barrels have not as yet been recovered and the Department of Waterways is deliberating whether a large-scale search is warranted. To make a decision, information about the effects of Apron Plus is essential.

It is sometimes preferable to make the importance of your report clear after delineating the main question. If so, you will need to describe what can be achieved by finding an answer to the main question: you could mention, for example, how the conclusions, insights, analyses or inventories you formulated can be applied. You could also make the importance of your results clear by indicating who the people are that will benefit from them.

IMPORTANCE AFTER MAIN QUESTION

- This report presents a method for the analysis of the internal climate of offices. By using this method, building managers can determine to what extent their own building is a "sick building."

6.5.2 Aim of the research

The aim of the research encompasses the most important question addressed in the report (the *main question*), the way in which the main question is answered (the *method*), and the *preconditions* and *starting points*, which serve to delineate the main question further, and as such, form part of the research aim.

Main question

A carefully formulated main question makes it clear to the readers what they can expect. In the first example that follows, it will not be clear to the reader of the original main question what exactly has been investigated because the terms used are too vague.

MAIN QUESTION TOO VAGUE

The aim of this report is to look *more deeply into* the position of men and women in the computerization industry. Salaries will also *come up for discussion*.

MAIN QUESTION CLEAR

The aim of this report is to compare the position of men and women in the computerization industry. The way jobs are divided between the sexes will be examined and the question of whether there are differences in salary between men and women investigated.

Avoid unclear formulations of the main question. Readers will become confused if you announce that you will "try to find a solution" or that in the report there will be "recommendations if these present themselves." They are not likely to take the report seriously if the writer appears to have little confidence in his own research.

When you see this type of hedging, it is usually because the first version of the introduction was written before the research was completed. At that stage the writer is not sure yet whether he will be successful in answering the main question and whether it will be useful to make recommendations. This being the case, the introduction must be revised after the research is completed.

NOT CONFIDENTLY FORMULATED

This research uses fuzzy logic in attempting to chart the decision strategies of members of the Lower House.

CONFIDENTLY FORMULATED

The research uses fuzzy logic in charting the decision strategies of members of the Lower House.

The main question need not necessarily take the form of a question:

GOOD MAIN QUESTION IN THE FORM OF A STATEMENT

The aim of this report is to present the causes of leaking losses at the propylene storage at the Plastics location in Geleen.

GOOD MAIN QUESTION IN THE FORM OF A QUESTION

This report answers the following question: what are the main causes of leaking losses at the propylene storage at the Plastics location in Geleen?

Procedure

Indicate briefly how you have collected the data for your report (literature study, experimental research, questionnaires, simulation).

PROCEDURE

The application possibilities of photogrammetry in facial reconstructions were investigated by means of a study of the literature and interviews with five plastic surgeons.

Terms and conditions and other parameters

The writer should define the subject of the report carefully, referring on the one hand to the external terms and conditions of the research, and on the other, to limitations on the research imposed by the writer himself. Some types of report (such as design reports) contain a large number of terms and conditions and research parameters. These will usually be set out in a separate chapter entitled "set of requirements" or something similar. In this case, only the main ones are mentioned in the introduction. These serve to give the reader an idea of the restrictions imposed on the research design.

Terms/conditions Because the apparatus has to be used in the operating theatre, reliability of the measurements and durability of the apparatus are essential design conditions.

Limitations The design of the test model does not take into consideration that there may be restrictions on the size of the apparatus.

6.5.3 Description of the report's structure

After the main question has been formulated, the report writer should explain how the report will answer the question. The reader must be able to look up the various chapters and sections in the table of contents and be able to understand from the description of how the report is structured why these parts are necessary and what relationship they have to each other. In other words, the section on how the report is structured is where the writer makes the broad outline of his report clear. If various methods are referred to in the individual chapters, the description of the report's structure sometimes includes an explanation of the methods used.

DESCRIBING HOW THE REPORT IS STRUCTURED

In order to answer the main question of this report, Chapter 2 firstly describes what chemicals are present in the surface water and in what concentrations. This was determined after samples were taken from sampling points (see Appendix 1 for the complete results). Chapter 3 will explain how the three purification methods operate. Chapter 4 contains an evaluation of the methods according to legally prescribed criteria. Conclusions as to the method most suitable for purifying the water are to be found in Chapter 5.

6.6 The chapters between introduction and conclusion

The core of the report consists of numbered chapters that are often subdivided into sections. It is a good idea to start each chapter with a *short introduction* in which you give some information about the layout of the chapter. This opens up the report to the readers: if they do not read the whole report they can still get a quick overview of the part they are interested in. The extra information can help them to decide whether they have indeed chosen the right chapter.

The introduction does not always have to be in the form of a complete section: if the introduction consists of two or three paragraphs these do not have to be numbered. If the introduction is longer than this it is better to make it into a section of its own. Do not make it too detailed: a division into subsections or lower should be avoided.

INTRODUCTION TO A CHAPTER

3 THE CHOICE OF CARRIAGE FOR MAGNETIC TRAINS

Several types of carriage are suitable for magnetic trains. At this stage, three types have been sufficiently well developed to permit further analysis (Verkerk, 2009): the WagonStar, the WagonArrow and the WagonClassic. In this chapter, these three types are compared on the basis of cost price, speed, capacity and maintenance costs per kilometre. On this basis a preliminary choice was made.

3.1 The WagonStar

It is sometimes advisable to finish off a chapter with a conclusion or summary. A conclusion is warranted if a problem based question is posed in the introduction to the chapter: for example: "what research method is the most suitable?" The chapter's conclusion should provide the answer to the question. We recommend giving the conclusion an informative heading: for example, "Conclusion: renovate the station."

Only include a summary if the chapter is long (five or more pages, say). But regardless of the length of the chapter, the summary should be very short and concise: at the most, half a page. If you can, present the main results in the form of a table.

6.7 Conclusions

Most readers of the report will at least look at the conclusions. Some readers – decision-makers, for example – will very often skip the main chapters and go straight from the introduction to the conclusions. The next five suggestions may be of assistance in making the conclusions accessible to all your readers.

- 1 *The conclusion should provide an answer to the main question*
There must be a direct link between the main question (as set out in the introduction) and the conclusions. Make sure the conclusions always start with an answer to the main question.

MAIN QUESTION

The aim of this investigation is to compare two systems for sewage treatment – bubble diffusing and counter flow diffusing – with a view to determining what system is most suitable for the sewage treatment plant in Andel. Both systems will be examined for purification efficiency, investment cost and energy consumption.

ANSWER NOT CLEAR

The purification efficiency of counter flow diffusing is 5% higher, mainly because of the longer contact time between bubbles and water. The investment costs of bubble diffusion are, however, considerably lower, mainly because...

ANSWER IMMEDIATELY CLEAR

Bubble diffusion is the most suitable system for the water treatment plant in Andel. The investment costs are 30% lower than for counter flow diffusion. While the purification efficiency of bubble diffusion is lower...

Incidentally, not every report need contain a conclusion. If the purpose of a report is to give a description or an inventory (without an opinion needing to be attached to either), the answer to the main question should follow in the core of the report immediately after the introduction.
For example:

DESCRIPTIVE MAIN QUESTION: NO CONCLUSION NEEDED

This report describes the statutory regulations applicable to data management within municipalities.

The main question is answered when the regulations have been described, so a conclusion is not necessary.

- 2 *Conclusions should be understandable independently*
The conclusions should be understandable for somebody who has not read the rest of the work apart from the introduction. These global readers may not be familiar with terms that are introduced in the core chapters of the report. If a term is indispensable to the conclusion it will have to be redefined again.

NOT UNDERSTANDABLE INDEPENDENTLY**Conclusion**

The "BS 7510 information security concerns within the health sector" norm, which specifies hospital procedures, is not systematically complied with. This will create risks for patients, particularly with the introduction of EPR, which most hospitals are working on at the moment.

UNDERSTANDABLE INDEPENDENTLY**Conclusion**

Hospitals do too little to limit the risks to patients that are inherent in the introduction of ICT. The security of ICT applications and devices is below par: the norm (BS 7510 information security concerns within the health sector) is not complied with systematically. A case in point is the Electronic Patient Record (EPR) with which many hospitals are experimenting at the moment. It has been shown that unqualified people can easily gain access to patient data.

- 3 *Conclusions should follow on directly from earlier chapters*

The conclusions should not come as a complete surprise for a reader who has read the whole report. In other words, the reader should be able to easily locate the basis for the conclusions in the preceding chapters. Implicitly, no new subjects should be broached in the conclusion either. If you have only discussed technical feasibility in a report on dyke reinforcement in South Limburg, the conclusion should not deal with the environmental consequences.

- 4 *Conclusions should be concise*

Readers who look up the conclusion section should be able to see at a glance how many conclusions there are: every conclusion should be numbered or be in a separate paragraph. Each paragraph or numbered point should also be formulated in such a way that the key aspects of the conclusion are at the start of the sentence.

WELL-ORGANIZED CONCLUSIONS**5 CONCLUSIONS**

The improvement in the quality of the letters written by the Mitsubishi Movemaster robot arm has been achieved in two ways.

- The grip the robot has on the pen has been strengthened: the pen is now virtually immovably fixed in the gripper. The average deviation from the standard letter form has been greatly reduced.
- The UP and DOWN routines have been adjusted. Lifting and lowering of the pen is now problem-free. The distorted action previously apparent has been completely eliminated.

Thorough additional analysis on two other points has shown that no improvement can be made on the solutions already chosen.

- Adding extra points to the letters and subsequently making the robot move from point to point has not reduced the distortion. In fact, it even increased.
- Research into the connection between the speed of the pen and the quality of the letters showed that the best results are achieved with the current speed (10mm/s).

5 Conclusions should be accurate

Writers who want to make things easy for their readers sometimes state in their conclusions that one alternative is cheaper, more efficient or more accurate (better, in other words) than the other. The actual facts are not listed, merely the writer's evaluation. The reader, however, usually does want the factual data as they are likely to be crucial to decision-making. It is permissible to give the factual data in the conclusions in a more global form than in the previous chapters. If the costs have been calculated at €10,117.25, in the conclusion, this can be rounded off to just over ten thousand euros.

INSUFFICIENTLY ACCURATE

To achieve a reduction in noise pollution by train traffic in 2016, all goods trains should be fitted with silent brake systems. This will also reduce investment in noise screens and home insulation.

SUFFICIENTLY ACCURATE

In order to achieve the desired reduction of 7 decibels in noise pollution by train traffic in 2016, all goods trains will be fitted with silent brake systems. During the next five years this will mean a reduction of hundreds of millions of euros in investment in noise screens and home insulation.

6.8 Recommendations

Recommendations are advice to the reader to take a certain course of action, and as such, always involve actions that are practicable. If the aim of the text is to give advice, the text often only contains recommendations and no conclusion. Your conclusions and recommendations could each form separate chapters or be included in the one chapter. If the latter, it must be immediately clear to the reader what the conclusions are and what the recommendations are. Follow the three guidelines below.

1 Recommendations should follow on from the conclusions

If the report includes conclusions as well as recommendations, the recommendations should follow on directly from the conclusions. In other words, they should constitute a translation of the conclusions into recommended actions.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Research was done into why in the Netherlands only 62% of the passengers in the back seat wear a seatbelt whereas 95% of the drivers and front seat passengers do. The research yielded the following results:

- 1 Many people do not wear a seatbelt out of habit; they forget to put it on or consider it too much trouble. However, once putting a seatbelt on has become a habit, people do not abandon it easily: use of a seatbelt becomes automatic.
- 2 Knowing what the possible consequences of not wearing a seatbelt are does not have a bearing on whether a seatbelt is worn or not. [...]

6.2 Recommendations

To promote the use of the seatbelt in the back of the car, the following measures are recommended:

1 An education campaign aimed at children

Because wearing a seatbelt is automatic behaviour, the education campaign should be aimed at making wearing a seatbelt automatic. Children are an important target group in this respect. In order to encourage them to wear the seatbelt, we recommend developing some sort of gadget for reminding them that is placed inside the car. For example, it could be something the children can click onto their seatbelts. These would be distributed to schools by teams that have been formed for this purpose.

Mass media means such as billboards and TV commercials should be used as a back-up. [...]

2 Recommendations should be practicable

The action you recommend should be capable of being carried out by your readers, or at least, by some of them. Recommendations for further research are not useful for a public consisting only of those who will carry out the proposals.

The writer should not exceed the terms of his or her assigned task. A student of aviation and aeronautics wrote in the report of his practical assignment that the department where he had done his practical should be re-organized, a recommendation that had nothing to do with his assignment. The result was that his other recommendations, practicable ones, were taken less seriously by his readers.

3 Recommendations should be concrete

Making recommendations is only useful if they are so concrete that it is clear to the readers what they should do. The classic recommendation that further research is required is almost always too vague. Indicate exactly what has to be examined further and why.

RECOMMENDATION TOO VAGUE

Apart from looking into storing dredgings on an island in the Hollands Diep, it is recommended that other potentially feasible options be investigated: for example, underwater storage.

RECOMMENDATION CONCRETE

Apart from looking into storing dredgings on an island in the Hollands Diep, the possibilities of underwater storage should also be investigated. The dredgings are dumped in a dredged trench and covered by clay or a plastic film. We recommend investigating the feasibility of this option, since the main disadvantage of storing on an island – skyline pollution – is avoided.

6.9 Bibliography

A bibliography is not intended to impress the readers: only include sources that you refer to in the text. Readers will form an idea of the quality and topicality of the report on the basis of the bibliography. They can see whether leading and recent publications have been used and they can check the publications to test whether your data is accurate.

Various style systems, including IEEE (Institute of Electrical and Electronics Engineers) and APA (American Psychological Association) have a prescribed layout for the bibliography and references. Every scientific journal has rules for the bibliography and references. Software packages such as Endnote make it possible to follow a certain system exactly or to change over from one system to another.

A bibliography should preferably be ordered alphabetically. This enables a quick overview and makes looking up publications very easy. With a numbered list in which the order in which publications are referred to in the text is the organizational principle, the publications of each individual author are not grouped together and looking for specific publications is more difficult. Precise instructions for using sources and referencing are found in Chapter 4.

6.10 Appendices

Appendices are a good way of keeping the core of the report clear and short: all detailed calculations, data relating to apparatuses, programme listings and the like can be included in them. A technical report without appendices is the exception, not the rule.

Keep the following in mind when making your appendices.

- *Appendices should be independently readable.* An appendix should always have a clear title that is included in the table of contents. If there are a number of appendices then they should be numbered. If the data that you have added are not immediately understandable, a short introduction at the start of the appendix is recommended.
- *The text should be understandable without the appendices.* Do not force your readers to leaf backwards and forwards between text and appendix. Only include in the appendix data that are not relevant for all readers and make sure that the text is an understandable unity without the appendices. It is sometimes a good idea to include a simplified version of a table in the text and a detailed one in the appendix.