



Report Writing Guidance

Version 1

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INTRODUCTION

There is no right or wrong way of preparing and presenting a project report. What follows is a guide to how it might be done.

CONDUCTING RESEARCH

It will not be possible to address all of the issues that will be encountered in undertaking the project but there are several common themes that can be considered.

Planning

A plan (including a time plan) should be developed for the project at an early stage and update this as the project develops.

To enable an apprentice to demonstrate that the range of tasks to be undertaken have been considered then a graphical representation of the project tasks should be used. This can take the form of a network diagram or a Gantt chart. These tools will enable an apprentice to monitor progress as the various tasks are worked through.

What Type of Research?

The type of research an apprentice will need to do will depend on the work-based project topic or research question. An apprentice may need to survey existing literature to get an overview of the knowledge that has been gained so far on the topic and will inform an apprentice research and interpretations. An apprentice may also decide to do:

- Primary Research (for example conducting own experiments, surveys) to gain new knowledge
- Secondary Research (knowledge from other people's research to produce a new synthesis)

An apprentice may do a mixture of both.

Literature Search

A detailed search of relevant literature is an important research task. The literature search will provide background information and describe the current research interest in particular topics. The research techniques used in research literature may suggest appropriate approaches that an apprentice could usefully employ. The research literature should provide direction for the research that an apprentice intends to conduct.

In the review of the literature an apprentice should consider the quality of the literature used; all sources are not the same. The most trusted sources are generally peer-reviewed journals. Where possible an apprentice should use the primary sources of data rather than relying on an interpretation of the research by others.

An apprentice review of the literature should not just be a record of what others have said. An apprentice needs to review this literature, identify common themes and ideas, identify different data sources which support and or contradict one another and the apprentice will develop own understanding and views on the work which has already been conducted.

Data Collection

Most research projects will involve the collection of primary data (i.e. data that has not been available to others before this work was undertaken). This data may come from external sources; if so, an apprentice must acknowledge this fact. Data collection can be a laborious task, so an apprentice must ensure that the data collected is likely to be useful. An apprentice should make sure that the data being collected is required before commencing collect it. This is not a fishing trip don't just collect data in the hope that something interesting may emerge; an apprentice may end up with what is an old supermarket trolley with wheels that don't work. Gathering data takes a lot of time.

Most people are going to use a computer to store their research data. Ensure that a backup copy of data safely stored somewhere safe. Computers can be mislaid or stolen, crash, get infected by viruses, and data can become corrupted, deleted, or lost.

Data Analysis

Analysis of data is a process of inspecting, cleaning, transforming, and modelling data with the goal of discovering useful information, suggesting conclusions, and supporting decision making.

It is important to design and plan data collection methods, as well as knowing how the data is going to be analysed before an apprentice starts the data collection. This will ensure that an apprentice has all the information needed to perform the analysis and that an apprentice collects and store it in an appropriate manner.

It is difficult for people to take in large amounts of data and an apprentice project research may generate hundreds of items of data. To make this information useful the first stage is often to summarise the data. For numerical data, this is often straightforward with mean values being easily calculated. For qualitative data, the summary can be more difficult but an apprentice will need to categorise the data collecting similar data together.

Once an apprentice has summarised the data, it is vital that an apprentice demonstrates understanding of the data collected. Graphs and tables are often useful tools to assist in the presentation of data, however any tables or figures used must be appropriate and suitably labelled, and even then they are not sufficient without a test-based description of the data. The description of the data is the first stage in any analysis; an apprentice must demonstrate understanding of the data and not just provide the information that will enable the reader to interpret the data if they are so inclined.

In reporting results it is not sufficient to just describe data; an apprentice must conduct some analysis of the results. When deciding on the analysis to be conducted an apprentice should go back to the aims and objectives and focus on what is trying to be achieved from the work-based project. The data analysis must be appropriate to the objectives.

The analysis should enable an apprentice to move from a set of data to a description of the process, relationships and interactions in the phenomena being investigated. This may enable an apprentice to suggest a relationship (inductive research) or to confirm or reject a theoretical relationship which has been based on general principles (deductive research). An apprentice should be able to relate this information back to the project aims and objectives

The type of data analysis tools an apprentice will use will be dependent upon the type of data collected. Qualitative data (e.g. results from a focus group) will have to be classified and structured with themes and views extracted. The analysis must reflect and provide insight into the project objectives. It is not sufficient just to present a summary of qualitative

data; the analysis must describe the processes relationships and interactions under investigation.

Quantitative data lends itself to a wide range of analysis tools depending on the data type and the analysis objectives. It will almost always be essential to be able to provide a summary of quantitative data. In some cases this may be sufficient to enable an apprentice to relate the data back to the aims and objectives and develop a description of the processes, relationships and interactions under investigation.

Charts, graphs, tables and diagrams can all assist in the description and analysis of data. All graphics and tables used must enhance the presentation of the data. They should be self-explanatory and suitably titled, labelled and annotated to ensure that the reader can understand the information presented without reference to the body of the text. It is equally important that the text is understandable without recourse to the graphics and tables.

An apprentice should use an appropriate statistical tools to assist in the demonstration of competence and will increase the confidence that an apprentice should have in the results. The use of appropriate statistical tools will improve the grades that an apprentice can expect to achieve.

The statistical tools that an apprentice use will depend on the nature of the data and what the apprentice is trying to achieve. It is important that the apprentice considers what statistical tools that may be use when designing experiments as this will ensure that the data is collected in the format required for the analysis.

While appropriate use of statistics will add to a project it is not sufficient just crunch numbers. An apprentice analysis must go back to describing the processes, relationships, or phenomena under investigation. This may be assisted and supported by the effective use of statistical analysis but the statistics alone are not sufficient.

PRESENTATION OF WORK-BASED PROJECT REPORT

General

An apprentice is required to submit a project report detailing the research undertaken.

The project report (excluding references and appendices) will have a specified word count which will usually excluding references, appendices and table. Much too short or much too long implies that there was insufficient work on defining the work-based project. Please don't pad it out with wording.

A report should be A4 and be in Arial font size 12 with double line spacing with a footer including apprentice's full name/Unique Learner Number (ULN)/submission date.

The report should be submitted in PDF format.

Content

It is suggested that an apprentice submits a report using a standard research report format.

It is likely that the work-based project report will contain the following sections:

- Title Page
- Abstract
- Contents (*include a word count*)

- List of Tables, Figures, Graphs, Images, Maps, and Illustrations (if any)
- Acknowledgments
- List of Abbreviations (if any – in alphabetical order)
- Introduction
- Background
- Literature Review
- Methodology
- Results and Analysis
- Discussion
- Conclusions and Recommendations
- References
- Appendices
- Bibliography

While the content of many sections may be obvious some notes on the content are given below:

- **Title Page**
The title page should include the full title of the project, full name, Unique Learner Number (ULN) and submission date.
- **Abstract**
Although it goes at the beginning and it cannot write it until the report is finished, the project should contain an **abstract**. This is a brief statement of 150 - 400 words placed at the beginning of the project – so that the reader can quickly grasp what the project is about. It should include main findings and methodology, not just a summary of the objectives.
- **Introduction**
 - The introduction should set the scene for the research. What is the project going to be about? A brief outline of the topic and why it was chosen; what is wanted to find out; how it was tackled, and perhaps how the results fit into the broader picture. It is also the place to include a brief description of the background, context and setting in which the study has taken place.
 - Aims and Objectives should specify what was intended to be done.
 - Justification for the project should highlight the potential benefits of conducting this research.
 - A detailed and realistic project plan that is time bound with definite monitoring points of how the project would be approached. The timescales for conducting the research should be outlined. This plan needs to be either detailed here or referred to and placed in the appendices.
- **Literature Review**
The literature review should be a review of current published information found on the subject under investigation. This may provide a theory or hypothesis framework or model for the research activity to test in the empirical research. It is not enough to report on the other published materials. Analysis should consider if the literature sources, support or contradict one another or particular models.
- **Methodology**
The methodology should describe what the apprentice intends to do and how the apprentice intend to do it. The timescale for conducting research should be outlined.

- **Results and Analysis**

The results and analysis are details of what the apprentice have discovered. These should be more than just the apprentice's raw data; indeed, raw data may be best placed elsewhere (e.g. in an appendix). The apprentice results may include a summary of results, summary statistics, comparisons, graphs, and tables. The results section must not just be a succession of tables and charts, the apprentice must demonstrate understanding of the data by describing it and relating it to the objectives of the study. The trends, relationships and interactions under investigation must be described.
- **Discussion**

This is the main section where the apprentice results should be discussed. This should be more than a description of the results. The apprentice's results should be discussed in relation to the project objectives the current level of knowledge, (discussed in the literature review) and any theoretical models used in the development of the research program. Any concerns over the data should be highlighted. This is a key section of the report where the apprentice can demonstrate ability to analyse data.
- **Conclusions and Recommendations**

The conclusions should be a concise section detailing the outcome from the analysis of the research project. The conclusions must be supported by the discussion and the research results. The apprentice can also consider areas for further research
- **References**

A coherent referencing system is critical to the report. An inadequate referencing system will lead to an otherwise good report failing. The referencing system must enable any referenced texts to be identified. PIABC Limited recommend that candidates use the Harvard Author-Date referencing system for their report. This system requires that the apprentice identifies the article in the body of the text by the author and provide full details in an alphabetical reference list. More information on referencing is detailed later.
- **Appendices**

Appendices should precede the bibliography. Appendices offer supporting evidence of an apprentice's work. This could for example include raw technical data, additional information on test methods or equipment, charts, or interview transcripts. An appendix is not essential and should only be included if what it contains is of interest to the reader but would otherwise clutter the main part of the work. If not included in detail in the introduction/methodology, then the project plan should be included in the appendices and referred to in the introduction/methodology. **Note: that any appendices are excluded from the word count.**
- **Bibliography**

The difference between references and bibliography is that bibliography refers to all materials which have been consulted when the report is being written. On the other hand, references refer to texts that are directly included in the actual text. It is included at the end of the report, on the last page (or last few pages). Write it down! The apprentice will find it easier to prepare the final bibliography if kept a track of each book or article used as read and taking notes. The apprentice will not remember, and it will take hours to chase up half-forgotten facts in months' time. Start a preliminary, or draft, bibliography by listing on a separate sheet of paper all the sources. Note down the full title, author, place of publication, publisher, and date of publication for each source. When assembling a final bibliography, list the sources (texts, articles, interviews, and so on) in alphabetical order by authors' last names. Sources that do not have authors should be alphabetized by title.

Writing Style

The work-based project is a formal document, and a formal writing style must be used.

Project reports should be written in the third person.

Read scientific journals to get a feel for an appropriate writing style.

As this is a formal document it is important to pay attention to correct spelling and the proper use of grammar. Be careful with automated grammar and spell checking.

The writing style the apprentice should use is important as this helps to clearly convey ideas. The apprentice must ensure that the reader will quickly understand what is being said. Short simple statements are often easier to understand than complex long sentences, with many ideas, provisional statements and clarifications, which however well-crafted and particularly if aided with poor grammatical constructions, can lead the reader on a roundabout journey to the ultimate end point which could have been much more clearly stated, that are at times used by apprentice and at times scientific professionals, due to either a desire to impress with the development of complex ideas, or a failure to edit the text for readability. The use of over complex terminology and language construction should, where possible, be avoided, and care is needed with abbreviations.

Remember keep the report simple and concise. A poorly written report could be the “coup de grâce” on an otherwise good project. Keep the word count in mind – be ruthless and do not write anything that isn’t relevant.

Layout

Good presentation matters – it gives a professional appearance and puts the reader in a good mood. So, it is worth making sure an apprentice has enough time to proofread and get the layout right. The layout of the report should be such that it presents an attractive finished product. Care should be taken to ensure that page breaks, figures and tables are positioned to allow easy understanding and that there are not lingering mistakes and typos.

A section and sub-section numbering system along with appropriate headings should be used to assist in making the presentation of the data clear. A coherent numbering and heading system should be used throughout the report.

Tables and figures are an important method of presenting data. The tables and figures should be able to stand alone without the body of the text. The tables and figures must be suitably labelled and titled to ensure that they can be easily interpreted.

Diagrams, Graphs and Tables

It is often the case that technical information is most concisely and clearly conveyed by means other than words. Imagine how describe an electrical circuit layout using words rather than a circuit diagram. Here are some simple guidelines:

- **Diagrams**
Keep them simple. If possible, draw them specifically for the report. Small diagrams should be placed in the text, as close as possible **after** the text reference. Do not put them **before** the text reference; unexplained diagrams distract the reader. Full-page diagrams and graphs may be placed before or after the text reference, whichever is more convenient for the reader. It can be helpful to group full-page diagrams together at the end of the report, particularly when they are referred to in several places. Each diagram should have a figure number and a caption and should be referred to in the text.

- **Graphs**

Where there is a choice, draw the graph so that it can be read with the page in its normal position. This will always be possible with portrait-style graphs where the y-axis is longer than the x-axis.

The correct way of labelling the y axis (following the technical drawing convention that the text is viewed from the right-hand side) is to have the text running vertically from the bottom of the axis to the top. The axis labels should be positioned centrally, with the text running parallel to the axis.

Mark experimental points clearly with distinctive symbols such as 'x' or '+'. For curves drawn through theoretical points, do not show the points; the curve alone is sufficient. Where several curves are drawn on the same axes, they must be clearly identified on the graph. Either label the curves or use different symbols for the points and a key to the symbols.

Every graph must have a figure number and a title. If possible, the title should be placed underneath the graph as with other diagrams, but computer packages for plotting graphs usually put the title at the top.

Make the title informative. Use words and not symbols, and do not reproduce the axis labels. For example, the title "Graph of force against distance" is worthless if the axes are labelled "force, N" and "distance, m". An informative title would be "Graph of lift force against distance from magnet poles". Units are not required in a graph title; the axis labels give this information.

Wherever possible, draw curves smoothly instead of joining the points with straight lines. A problem with computer-drawn graphs is in fitting a smooth curve to experimental data, where the curve does not necessarily pass through all the points.

Tables

Consider whether a table is the best way of presenting the data. Alternatives are graphs, bar charts or pie charts. Dependent tables (small) can be placed within the text, even as part of a sentence. Independent tables (larger) are separated from the text with table numbers and captions. Position them as close as possible to the text reference. Complicated tables should go in an appendix. If a table is chosen, observe the convention that related items are grouped in adjacent rows, with the details listed in columns which progress logically from left to right. Each table should have a table number and a caption and should be referred to in the text.

CITING AND REFERENCING

Apprentices must cite and reference all images, tables, illustrations, and graphs taken from printed or internet sources, as well as blogs, e-mails, wikis, conversations, TV, and radio broadcasts, plus all statements, opinions, conclusions, etc. taken from another writer's work, whether the work is directly quoted, paraphrased, or summarised.

References in the Text

The references in the text should give the name of the author and the date of publication. When direct quotations are being made the page number for the quotation should also be included:

Recent research (Smith, 2014) as indicated that increasing numbers of children have a tablet computer at home.

Alternatively:

Smith (2014) as indicated that increasing numbers of children have a tablet computer at home.

When direct quotations are included:

Johnson (2013, p67) has stated, “Many internet sources used by candidates are unreliable”.

When there are two or three authors give their names in the order listed in the publication:

The importance of sourcing the primary data sources was demonstrated by Smith and Johnson (2014) when they investigated the effects of school holidays on the pricing of holidays.

When there are more than three just list the first:

A recent report (Morse *et al.*, 2014) demonstrated the that house prices were on the rise year on year.

Where the same author name and date are used to refer to more than one publication they must be differentiated from each other by using small case letters after the date:

While Smith (2014a) indicated the increase in wages would affect house prices this was not supported in the follow up report (Smith, 2014b).

Authors do not have to be individuals, corporations and organisations can be cited as authors:

A recent increase in cases of missing dogs (RSPCA, 2014) was caused by increased reporting of incidents.

Where the author is unknown the title of the article should be used instead:

A survey (Car trends, 2012) indicated that car prices have stabilised.

When the date is not available indicate this by writing “no date”:

In guidelines for written reports (House, no date) the importance of determining user requirements was highlighted.

To cite a web page, use the above convention of author or title and date. If the author or the title are not available, then cite the URL:

In the guidance notes written for the PIABC Level 5 Diploma in Packaging Technology Unit 4 Packaging Related Research Project (http://www.piabc.org.uk/piabc/Awards/assign_guide.htm, no date) the importance of a candidate following the suggested report structure was highlighted.

To use secondary sources (i.e. commenting on someone’s views of a publication without having read the original) this must be made clear:

The ICC was the main obstacle to gaining agreement (Vaughan, 1999 cited in Prior, 2012).

Vaughan (1999 cited in Prior 2012) blamed the ICC in the failure to reach an agreement.

The above examples provide examples for the most common types of citation.

References in the Reference List

Full details of all references cited in the text must be provided in the reference section. There are standard conventions for the information that should be provided.

For Books, give author, date, title in italics, edition when appropriate, place of publication and publisher:

Strauss, A. (2010) *The rules of cricket*. London. Sage Publications

Smith, G., Jones, S. and Boycott, G. (1990) *Handbook of cricket for the novice* 3rd edn. Lancaster PA. Penguin Publishing.

When a particular chapter or section of a book is being cited then include information on the author and name of the of the section and the editor and title of the book:

Riley, A (2012) "Basics of polymer chemistry for packaging materials", in Emblem, A and Emblem, H. (ed) *Packaging technology*, Cambridge. Woodhead Publishing Limited.

For the journal article includes the author name, date, article title, title of journal, issue information (volume, part, month or season), and page reference:

Woods, T. (2008) "Why our flagship building programme is failing to fly high", *Energy in Buildings and Industry* (January/February) p14.

When citing on line resources the information provided will depend to some extent on the type of online source being used. The date used should be the date the information was last updated, but include the date when the information was accessed.

For newspapers:

Breckon, J. (2014) "Tried and tested: how schools can learn lessons from evidence-based research", *The Guardian* 24 April 2014 [Online]. Available at: <http://www.theguardian.com/teacher-network/teacher-blog/2014/apr/23/evidence-based-teaching-lessons-education-research> (Accessed: 24 April 2021).

For company or personal web sites:

PIABC (no date) available at: <http://www.piabc.org.uk/piabc/piabc.htm> (Accessed: 24 April 2021)

References to Diagrams, Graphs and Tables

In the main text always refer to any diagram, graph, or table which used.

Label diagrams and graphs as follows:

Figure 1.2 Graph of energy output as a function of wave height.

In this example, the second diagram in section 1 would be referred to by "...see figure 1.2..."

Label tables in a similar fashion:

Table 3.1 Performance specifications of a range of commercially available GaAsFET devices

In this example, the first table in section 3 might be referred to by "...with reference to the performance specifications provided in Table 3.1..."

PLAGIARISM

PIABC regards plagiarism as a very serious issue. Plagiarism is taking or using another person's thoughts, writings or inventions and presenting them as one's own. Apprentices needed to ensure that all work submitted to be assessed within their work-based project is their own work.

If an apprentice uses other people's work than it must be properly cited or referenced. If an apprentice does not cite or reference someone else's work, then this is called plagiarism. Dependent upon the amount of work which has been plagiarised an apprentice risk having their work-based project failed by the panel of assessors.

The following are examples of plagiarism:

- Downloading text from the web, without reference to the original source or using quotation marks and without using the material to answer the question or to support an argument.
- Quoting, re-writing, or scanning information from books without adequate reference.
- Copying information from colleagues and including this as if it were own work (whether modified or not).

The apprentice may work as part of a team which could include technical internal or external support however the work-based project report will be the apprentice's own work and will be reflective of their own role and contribution.

While discussing others work is an important part of an apprentice's research but the information must be referenced properly and written in an apprentice's own words or put into quotation marks. It is difficult to produce definitive guidelines for exactly what is or is not acceptable. To avoid any misunderstanding, always put quotations from other authors within quotation marks and give full references to every source used, even if not quoting directly from it.

The apprentice may work as part of a team which could include technical internal or external support however the report will be the apprentice's own work and will be reflective of their own role and contribution. Therefore, all work, statements, images, charts or ideas that are presented as an apprentice's own (i.e. not referenced) must be an apprentice's own work.

PIABC regards this as cheating and it can have serious consequences, even if it is unintentional.

Citing and referencing section above gives guidance for apprentices when using someone else's work.

When the work-based project report is submitted, the employer and the apprentice should verify the submitted work is that of the apprentice, authenticating the apprentice's contributions to the project. This is achieved by an employer sign-off and the apprentice

submitting with the work-based project a covering sheet, which an apprentice confirms compliance with the following statement:

“I declare that this work-based project is my own work. Where sources such as the internet, books and the work of others has been used; these sources have been fully acknowledged within the text and included in the references and bibliography on the last page. Any assistance given by others has been included in the acknowledgements.”

COMMON ERRORS

Project reports are often let down with poor attention to detail in one or more areas. The following failings have been noted by examination markers in recent candidate research reports.

Reports can be let down by failings in the underlying scientific approach:

- No primary research; reliance on secondary research only.
- Not measuring is thought to have been measuring (e.g. measuring consumers stated preferences rather than behaviour).
- Not replicating results. Without replication of experimental results there can be little confidence in the observed outcome.
- Too small a sample size. While some research methods may require a small sample size this will have an impact on the reliability of the results.
- Limited information captured during interviews. In-depth interviews must be that, they need to yield a substantial amount of detailed information.
- Collecting too much information and being unable to conduct the analysis. The appropriate analysis of the information is the key element of the report. Only collect information which is going to be analysed and know how the data is going to be processed before starting to collect it.
- Selective analysis of information to justify particular positions. Do not ignore inconvenient data just because it does not fit with the current preferred theory.

The poor presentation of data can undermine its value:

- Poor structure. Try to assist the reader by providing a clearly structured logical approach to the report. Related items and ideas should be grouped together.
- Poor cohesion between aims and objectives and the work carried out. As the project is undertaken there may be circumstances that require modification to the aims and objectives. It is vital that stated objectives are directly related to the work undertaken.
- Tables and charts not sufficiently labelled. All tables and charts should have suitable labelling and titles to ensure that they can be understood without referencing back to the main body of the text.
- No plan included in the report. A detailed and realistic plan that is time bound with defined monitoring points needs to be outlined.
- Poor referencing and bibliographies.