

The research and writing process

Initial guidance on research and writing

Supervisors are recommended to advise their students on how to conduct research and write the extended essay, paying particular attention to the following key areas.

When researching the extended essay, students should follow the steps below.

1 Choose an available Diploma Programme subject for the extended essay for the session in question (subject to any restrictions imposed by the school).

2 Read the following materials: the assessment criteria, relevant subject-specific chapter of the *Extended essay guide*, the IB's ethical guidelines and other associated policies where relevant, such as those relating to animal experiments.

3 Set up the Researcher's reflection space (RRS) and use this as the key planning and reflection tool for the extended essay process.

4 Choose a topic and undertake some background reading on it.

5 Formulate a preliminary research question. Try to incorporate an IB command term in the research question if possible.

6 Draw up an outline plan for the research and writing process. This should include a timeline.

7 Begin to identify how and where they will gather source material for their research.

8 Identify which system of academic referencing they will use, ensuring that this meets the minimum requirements for the IB.

9 Set deadlines for themselves that are realistic and take into consideration the school's own internal deadlines.

10 Plan a structure for the essay. This may change as the research develops but it is useful to have a sense of direction from the start.

11 Undertake some preparatory reading in light of the proposed research question. *If students discover that it will not be possible to obtain the evidence needed in the time available, the research question should be changed. This should be done sooner rather than later: students should not lose time waiting and hoping that something will turn up. Students should go back to stage 3, 2 or 1, and choose a new research question that can be answered.*

12 Carry out the research. *The material collected should be assembled in a logical order, linked to the structure of the essay and clearly focused on the research question posed. Only then will students know whether they have enough evidence for each stage of the argument so that they can proceed to the next. Students should be prepared for things to go wrong. Sometimes they may discover something later in the research that undermines what they thought had been established earlier. If that happens, the research plan needs to be revised.*

A note on topic, title and research question

It is important that students understand the distinction between the terms **topic**, **title** and **research question**.

- The **topic** of the extended essay is the subject, issue or theme that you are investigating within a specific DP subject or world studies area of study. The topic, which develops during the initial thinking about the EE, should later be reflected in the wording of the title.
- The **title** of the EE is a clear, summative statement that specifically focuses the topic being researched. It appears on the title page. A title should:
 - be short, descriptive and succinct
 - not be phrased as a question
 - use key words that connect with the topic and the DP subject or world studies area of study
 - attract the interest of the reader.
- The **research question** derives from the title and is expressed as a question that is intended to be answered through researching and writing the EE. It appears on the title page and could also be visible as a header throughout the essay. It should:
 - be clear and focused
 - provide a path through which you can undertake achievable research
 - use key words that connect with the topic, the title, and the DP subject or world studies area of study
 - support the development of an argument.

Developing a research question

All students, regardless of the subject chosen, must frame their research question as a question. A hypothesis or statement of intent is not acceptable. The reason for this is that a question helps students to retain focus throughout the essay.

A research question is a **clear and focused** question centred on a research topic. Research questions usually emerge when questions are asked about a particular issue that a student is interested in or curious about.

A research question helps to focus the research, providing a path through which students will undertake the research and writing process. A clear and well-focused research question, which has a specific aim, will allow a student to work towards developing a reasoned argument within the scope of the task, rather than the kind of “all about” essay that an unfocused research question can lead to.

Sometimes students may need to revise their research question; therefore, a research question should always be considered provisional until they have enough research data to make a reasoned argument.

Supervisors should note that unfortunately the IB is unable to comment on the suitability of individual research questions. This is because the development of an appropriate research question forms part of the assessment. Should supervisors require support or advice with regard to possible research questions, they can access extended essay discussions in the Programme Communities via MyIB.

Five steps to developing a research question



Choose a subject and topic that is of interest.

Deciding on a subject and topic that is of interest and in which the student is personally invested is important if their motivation is to be sustained throughout the process. The student should be able to identify, in a broad sense, what it is that they are interested in and why.



Carry out preliminary reading.

After deciding on a topic of interest students should undertake some general reading around the issue.

Questions they must consider at this stage are:

- What has already been written about this topic?
- Was it easy to find sources of information?
- Is there a range of different sources available?
- Is there a range of views or perspectives on the topic?
- What interesting questions have started to emerge from this reading?



Consider the emerging questions.

The student should now begin posing open-ended questions about their general topic. These questions will usually be framed using the terms "how", "why" or "to what extent".



Evaluate the question.

Once possible research questions have been posed they should be evaluated. This evaluation should be based on whether the research question is clear, focused, and arguable.

Clear: Will the reader understand the nature of my research? Will it direct the research being undertaken?

Focused: Will the research question be specific enough to allow for exploration within the scope of the task (that is, the number of words and time available)?

Arguable: Does the research question allow for analysis, evaluation and the development of a reasoned argument?



Consider research outcomes.

Once a provisional research question has been decided upon students should start thinking about the direction their research might take. This could be in terms of:

- suggesting possible outcomes of the research
- outlining the kind of argument they might make and how the research might support this
- considering options if the research available is not sufficient to support a sustained argument.

Sample research questions

The following table gives guidance on the difference between unclear and unfocused research questions and those that are appropriately clear and focused, lending themselves to in-depth research.

Unclear, unfocused and unarguable research questions	Clear, focused, narrow research questions lending themselves to in-depth research
What was the impact of Ho Chi Minh's allegiance to Lenin?	To what extent was nationalism the guiding factor in Ho Chi Minh's adoption of Leninism in 1920?
What is the history of Chinese theatre?	How does the legacy of Mei Lan Fang contribute to modern Jingju?
How important is chlorophyll to plant life?	What is the effect of different concentrations of kinetin on leaves aging and the biosynthesis of chlorophyll?
How can the US government's spending policy be reformed?	To what extent did the rising COE prices affect the demand for new and used cars by the consumer population and hence affect the revenue generated by the Singaporean economy for the period 2012–16?

An important note:

A question that is unclear or too broad will result in a narrative overview of the issue or event being discussed and provide little scope for analysis and reasoned argument. The result of this is that examiners will not be able to apply the range of marks available in the assessment criteria, particularly in relation to criterion C (critical thinking).

Writing the extended essay

The structure of the essay is very important. It helps students to organize the argument, making the best use of the evidence collected.

There are six required elements of the final work to be submitted. More details about each element are given in the "Presentation" section. Please note that the order in which these elements are presented here is not necessarily the order in which they should be written.

Six required elements of the extended essay:

1. Title page
2. Contents page
3. Introduction
4. Body of the essay
5. Conclusion
6. References and bibliography

Title page

The title page should include **only** the following information:

- the title of the essay
- the research question
- the subject for which the essay is registered (if it is a language essay also state which category it falls into; if a world studies essay also state the theme and the two subjects utilized)
- word count.

If footnotes have been used for anything other than referencing, the word count stated on the coversheet should include the footnotes, with an explicit statement that the stated word count includes explanatory footnotes.

An important note:

Please note that name of the student or the school should not appear on the title page or on any page headers. This is because the work is assessed anonymously.

The title

The title of your essay should be a clear, focused summative statement of your research, which gives the reader an indication of your research topic. It should **not** be phrased as a research question.

Title	Research question
Negative externalities of consumption: Australian policy on cigarette packaging	How effective has the Australian policy of plain cigarette packaging been in reducing the negative

Title	Research question
	externalities associated with the consumption of cigarettes in X?
Commodification and the body—an ethnographic study of social representations about the human body with relation to organ donation	To what extent can we interpret the negative attitude from laymen towards organ donation as an act of resistance towards the demands of the hegemonic medical model? The case of organ donation in Argentina.
An exploration of evil as a motivating force in drama	How effectively does Christopher Marlowe present his view of evil in <i>Dr Faustus</i> ?
The feasibility of wireless networking in a city-wide context	To what extent is wireless networking a feasible alternative to cabled networking within a whole-city context?

Contents page

A contents page must be provided at the beginning of the extended essay and all pages should be numbered. Please note that an index page is not required and if included will be treated as if it is not present.

Introduction

The introduction should tell the reader what to expect in the essay. The introduction should make clear to the reader the focus of the essay, the scope of the research, in particular an indication of the sources to be used, and an insight into the line of argument to be taken.

While students should have a sense of the direction and key focus of their essay, it is sometimes advisable to finalize the introduction once the body of the essay is complete.

Body of the essay (research, analysis, discussion and evaluation)

The main task is writing the body of the essay, which should be presented in the form of a reasoned argument. The form of this varies with the subject of the essay but as the argument develops it should be clear to the reader what relevant evidence has been discovered, where/how it has been discovered and how it supports the argument. In some subjects, for example, the sciences, sub-headings within the main body of the essay will help the reader to understand the argument (and will also help the student to keep on track). In structuring their extended essay, students must take into consideration the expected conventions of the subject in which their extended essay is registered.

Once the main body of the essay is complete, it is possible to finalize the introduction (which tells the reader what to expect) and the conclusion (which says what has been achieved, including notes of any limitations and any questions that have not been resolved).

Any information that is important to the argument **must not** be included in appendices or footnotes/endnotes. The examiner **will not** read notes or appendices, so an essay that is not complete in itself will be compromised across the assessment criteria.

Conclusion

The conclusion says what has been achieved, including notes of any limitations and any questions that have not been resolved. While students might draw conclusions throughout the essay based on their findings, it is important that there is a final, summative conclusion at the end. This conclusion(s) must relate to the research question posed.

References and bibliography

Students should use their chosen style of academic referencing as soon as they start writing. That way they are less likely to forget to include a citation. It is also easier than trying to add references at a later stage. For more information on this, refer to the guidelines in the IB document *Effective citing and referencing*.

Writing the essay takes time but if students have used their Researcher's reflection space and reflection sessions in a meaningful way they should be well prepared to develop their arguments.

Presentation

The extended essay should be written in a clear, correct and formal academic style, appropriate to the subject from which the topic is drawn. Given that the extended essay is a formally written research paper, it should strive to maintain a professional, academic look.

To help achieve this, the following formatting is suggested.

- font, font size and spacing conducive to on-screen marking
- page numbering
- no candidate, supervisor, or school name on the title page, page headers, appendices or acknowledgment pages
- the file size must not be more than 10 MB. (Note that the RPPF is uploaded separately and is **not** part of the overall file size of the essay.)

Submitting the extended essay in the required format will help set the tone of the essay and will aid readability for on-screen assessment by examiners.

Title page

The title page should include the:

- title of the essay
- research question
- subject for which the essay is registered (if it is a language essay also state which category it falls into; if a world studies essay also state the theme and the two subjects utilized)
- word count.

Word counts

The upper limit is 4,000 words for all extended essays.

Please note: Examiners are instructed not to read or assess any material in excess of the word limit. This means that essays containing more than 4,000 words will be compromised across all assessment criteria. Given the holistic nature of the assessment criteria, students who write in excess of the word limit will self-penalize across all criteria. For example, in criterion B, any knowledge and understanding demonstrated beyond the 4,000-word limit will be treated as if it were not present; in criterion C, analysis, discussion or evaluation made beyond the 4,000-word limit will be treated as if the point had not been made.

Supervisors and students should be aware that the e-upload of extended essays will facilitate the automatic recognition of a cut-off point for assessment. Students should ensure that they remain within the word limit and should edit accordingly.

Please refer to the following guidance on what content should be included in the word count.

✔	✘
Included in the word count	Not included in the word count
The introduction	The contents page
The main body	Maps, charts, diagrams, annotated illustrations
The conclusion	Tables
Quotations	Equations, formulas and calculations
Footnotes and/or endnotes that are not references	Citations/references (whether parenthetical, numbered, footnotes or endnotes)
	The bibliography
	<i>The Reflections on planning and progress form</i>
	Headers

Please refer to the document entitled *Assessment principles and practices—Quality assessments in a digital age* for further clarification of word count requirements.

A note for students writing in Chinese and Japanese:

Students writing their extended essay in Japanese or Chinese should use the following conversions.

- Japanese: 1 word = approximately 2 Japanese characters (upper limit 8,000 characters)
- Chinese: 1 word = approximately 1.2 Chinese characters (upper limit 4,800 characters)

When typing in Chinese, word processing software is likely to include the number of characters **and** punctuation in the word count. Students are asked to **not** include punctuation in the word count for assessed work. The word count should only take into account the number of characters typed.

A note about acknowledgments and dedications:

An acknowledgment/dedications page may be included in the EE if this is important to the student, but it must contain no “identifiers”, for example, people should not be detailed in any way that makes the student’s school identifiable. An acknowledgment/dedications page is not a formal requirement of the EE, so it does not contribute to either the word count or assessment.

Illustrations

Presentation and overall neatness are important, and it is essential that illustrative material, if included, is well set out and used effectively. Graphs, diagrams, tables and maps are effective only if they are clearly labelled and can be interpreted with ease.

Any labelling should contain the minimum information to ensure the examiner understands the significance of the map, chart, diagram or illustration. It must not include commentary, as this will be considered as part of the essay discussion and thus included in the word count.

All such material that is incorporated into the extended essay must be directly related to the text and acknowledged where appropriate. The use of photographs and other images is acceptable only if they are captioned and/or annotated and are used to illustrate a specific point made in the extended essay. Students should be advised to use illustrations with caution as excessive use may detract from the discussion in the essay. They should only be used if they are relevant and appropriate to a point being made as part of the argument of the essay.

Tables

The use of tables should be considered carefully and are only really appropriate in certain subjects. Tables must not be used in an attempt to circumvent the word limit.

Headers

Students may wish to use the header function for their research question, so that it appears on each page. This may help retain focus.

Footnotes and endnotes

Footnotes and endnotes may be used for referencing purposes and if this is the case will not be included in the word count of the essay. If information is contained in a footnote or endnote and is not a reference, this **must** be included in the word count. In order to avoid confusion and unwittingly exceed the word limit, students are advised to avoid using footnotes or endnotes other than for referencing purposes unless it is appropriate.

One appropriate use of footnotes is for the placement of the original quotation (where the original quotation is in a language other than the language of registration). This use of footnotes would not need to be included in the word count.

As footnotes and endnotes are not an essential part of the extended essay students must take care to ensure that all information with direct relevance to the analysis, discussion and evaluation of their essay is contained in the main body of it.

An essay that attempts to evade the word limit by including important material in footnotes or endnotes will be compromised across the assessment criteria. Please note that footnotes and endnotes are added to the word count as they are encountered.

Appendices

Appendices are not an essential part of the extended essay and examiners will not read them, or use any information contained within them, in the assessment of the essay. Students must take care to ensure that all information with direct relevance to the analysis, discussion and evaluation of their essay is contained in the main body of it. Appendices should therefore be avoided except in the following instances:

- an exemplar of a questionnaire or interview questions
- an exemplar of permission letters
- group 1, category 1 essays: copies of poems or short stories (of less than three pages)

- group 1, category 3 essays: excerpts from newspapers, advertisements and transcripts of speeches
- language acquisition, category 1 and 2: excerpts from newspapers, advertisements, transcripts of speeches, etc
- language acquisition, category 3: excerpts or copies of poems or short stories (less than 3 pages)
- an external mentor letter, where one has been used
- raw data or statistical tables for experimental sciences (this should not include any analysis or conclusions).

Students should not continually refer to material presented in an appendix as this may disrupt the continuity of the essay and examiners are not required to refer to them.

Reliance on external resources

Irrespective of the subject, the extended essay should be a complete piece of independent research, modelled on an academic journal/research paper, which can exist and be understood on its own, without the need to access external links, such as hyperlinks, or accompanying material such as DVDs.

Examiners will not access any material contained in an external source when assessing an essay. Material that is pertinent to the argument being made must be contained in the essay itself to be considered by examiners in their assessment of it.

As with appendices, if information central to the argument is included in the external link, it is treated as though the point has not been made and as such could affect different criteria, for example, criterion C (critical thinking), depending on the quality of the other analyses.

Specimen materials

Specimen materials used in, or produced by, investigations do not form part of the extended essay and must **not** be submitted. Photographic evidence may be submitted in place of such material.

Academic honesty

Research practices when working on an extended essay must reflect the principles of academic honesty. The essay must provide the reader with the **precise** sources of quotations, ideas and points of view through accurate citations, which may be in-text or footnotes, and full references listed in the bibliography, which, regardless of the system used, must ensure the minimum requirements.

Producing accurate references and a bibliography is a skill that students should be seeking to refine as part of the extended essay writing process. Documenting the research in this way is vital: it allows readers to evaluate the evidence for themselves, and it shows the student's understanding of the importance of the sources used.

Failure to comply with this requirement will be viewed as academic misconduct and will, therefore, be treated as a potential breach of IB regulations.

For further information, see *Academic honesty in the IB educational context* and *Effective citing and referencing*.

Bibliography

A bibliography is an alphabetical list of every source used to research and write the essay. Sources that are not cited in the body of the essay but were important in informing the approach taken should be cited in the introduction or in an acknowledgment. The bibliography **must** list only those sources cited.

Citations

A citation is a shorthand method of making a reference in the body of an essay, either as an in-text citation or footnote/endnote. This must then be linked to the full reference at the end of the essay in the bibliography. A citation provides the reader with accurate references so that he or she can locate the source easily. How sources are cited varies with the particular referencing style that has been chosen. Page numbers should normally be given when referencing printed material and this is especially so in the case of direct quotations. For some styles this will also be in the citation, in others in the full reference. Once again, it is important to emphasize that there must be consistency of method when citing sources.

Referencing

A reference is a way of indicating to the reader, in an orderly form, where information has been obtained. A reference provides all the information needed to find the source material. References must be cited because they acknowledge the sources used, and enable the reader to consult the work and verify the data that has been presented.

References must be given whenever someone else's work is quoted or summarized. References can come from many different sources, including books, magazines, journals, newspapers, emails, internet sites and interviews.

There are a number of different styles available for use when writing research papers; most are appropriate in some academic disciplines but not others. The supervisor or school librarian should help the student decide on a style for the particular subject of the essay. It is important to remember that whatever style is chosen, it must be applied consistently and in line with the IB's minimum requirements. When choosing the style, the student needs to have a clear understanding of how it is to be used before embarking on the research task. The style should be applied in both the final draft of the essay and in the initial research stages of taking notes. This is good practice, not only for producing a high-quality final product, but also for reducing the opportunities and temptation to plagiarize.

The IB's minimum requirements are summarized in the document entitled *Effective citing and referencing*.

Referencing sources not in the language of submission

An extended essay can use sources in languages other than that of submission where appropriate. In these situations, the IB advises that the sources be used as necessary, and that

1. When referred to in the body of the extended essay as a quotation, the translation is given and the original quotation is placed as a footnote.
2. When a source is acknowledged in the bibliography, it should be referenced in its original language. Where there is no official published translation, the student should write a brief summary alongside the source in the language of submission of a) the title, b) name of the author, c) the focus of the work and d) any other relevant details. This way, the examiner can assess the relevance and suitability of the source as required.
3. The translation of the text should be done by the student if there is no official translation. The supervisor should help ensure as best as possible that the translation is accurate and representative of the original text. If the student finds the translation task beyond their capabilities, then it is advisable not to include that source in his/her research. In selecting sources, the nature of the subject in question needs to be considered—for example, in a language acquisition essay, it is vital that students work mostly with authentic materials in the target language.

Referencing online materials

References to online materials should include the title of the extract used as well as the website address, the date it was accessed and, if possible, the author. With regard to electronic sources, the requirement of the IB for date stamping supersedes the requirements of the chosen referencing system. In other words, all electronic sources must be date stamped by including the date the student accessed the resource (for example, accessed 12 March 2016). Caution should be exercised with information found on websites that do not give references or that cannot be cross-checked against other sources. The more important a particular point is to the essay, the more the quality of its source needs to be evaluated.

Accessing sources: technology literacy—using electronic sources

Using the internet as a resource for finding information is more and more commonplace, and it is a tremendous resource. However, it must be used critically and with care. One important thing to be aware of is that unlike resources found in a library in printed form, those found on the internet may not have been through a review or editing process.

Students should:

- know appropriate search engines to use
- not rely exclusively on sources found on the internet
- have a clear and focused research question to help them search more directly on the internet (given the amount of information available it is easy to be overwhelmed)
- critically evaluate the reliability and validity of the information presented on the internet
- keep a detailed record of all references, in accordance with the IB's minimum requirements, ensuring that the URL of where the source was located is written down correctly. This includes recording the date that the site was accessed. The Researcher's reflection space (RRS) is a good tool for supporting this practice.

The following table contains a series of questions students can apply to determine the reliability and validity of information presented on the internet. It could equally apply to print resources.

Desirable source attribute	Questions to consider in order to determine this
Authority	<ul style="list-style-type: none"> • Is the author of the information identified? • If the author has chosen to remain anonymous, why might this be? Is this significant in terms of your evaluation of the information presented? • Is there enough information available to establish the author's credibility? • Is the author affiliated to an academic institution or credible organization? • Is the author qualified to write about the subject?
Audience appropriate	<ul style="list-style-type: none"> • Who is the intended audience? • Does the information presented appropriately address the target audience? • Is the information relevant to your area of research?
Reliability and credibility	<ul style="list-style-type: none"> • Does the information appear to be valid and well researched? • Can it be supported by evidence?

Desirable source attribute	Questions to consider in order to determine this
	<ul style="list-style-type: none"> • Can the information be verified through other sources? • Is there a non-web equivalent of this material that could be used to verify the information? • Does the URL (web address) give you any indication of the source of the information?
Accuracy	<ul style="list-style-type: none"> • Is there an indication as to who has responsibility for the accuracy of the information provided? • Do you know if the information has been reviewed? • Are there grammatical, spelling or typographical errors? If there are, what does this suggest about the source? • Is there a bibliography?
Objectivity	<ul style="list-style-type: none"> • Is the information fact or opinion? • Is the language used free of bias? • Is the author's point of view objective or do they make it clear when they are expressing a personal opinion? • Is it a personal website? • Is the author affiliated with any institution or organization which might create a bias in the information?
Currency	<ul style="list-style-type: none"> • Is the information kept up-to-date? • Is there any indication of when the information was last updated? • Are any links up to date and working?

Using online encyclopedias and other similar information websites

As a tool for research, free online encyclopedias can be valuable resources, but there are several reasons why students should be cautious in using them:

- they tend to be general encyclopedias
- very often the author is unknown
- there is no guarantee that the content meets standards of academic rigour—it may not, for example, have been through a process of peer review
- the content can be unstable, in that it can change at any time.

Teachers, supervisors and coordinators may choose to caution against the use of free online encyclopedias and other similar information websites. Certainly a bibliography that only cites these for reference or an argument that is overly reliant on them will not demonstrate the necessary “range of sources” required by the assessment criteria for the extended essay. They may also not be relevant or appropriate for the research question being explored.

Many online encyclopedias are not scholarly sources; however, if used appropriately and critically they can offer a useful starting point for many students undertaking research. Rather than absolutely discouraging the use of these sites, it may be more supportive to explore their potential as a platform for training students in research and thinking skills, especially in terms of assessing and evaluating the information they provide.

The internet is part of the education information ecosystem and a “real-world” source that many students engage with. The rise in popularity of free online encyclopedias has led to a shift in how knowledge and expertise is viewed, with new definitions of notions such as authority and expertise. For this reason, ensuring that students use it in an informed way is essential if they are to develop the necessary research, critical thinking and reflection skills in which the extended essay places value.

If using free online encyclopedias, students should do the following.

- Follow the references provided by the encyclopedia; this will help to verify the information given.
- Consider whether the article is part of a larger project, where a number of people are contributing to the discussion. If it is, then it implies that the writers have more than a casual interest in the topic being written about.
- Look to see if there is a rating for the information provided. If there is then this means that the information has undergone some sort of peer review and been given a rating. While not the same as an academic peer review, it can aid the judgment of the “quality” of the information.

The key point to remember, if students do use information that is found on the internet, is that they are responsible for ensuring that it is both reliable and accurate. One way a supervisor could facilitate this as a learning opportunity is in terms of a discussion with students about the quality of their sources. This could take the form of asking students to produce an annotated bibliography as part of their Researcher’s reflection space. An annotated bibliography provides a concise summary of each source and some assessment of its value and relevance. A good annotated bibliography will:

- encourage students to think critically about the sources they are using and how these relate to their chosen research area in terms of their relevance for example
- provide a way to help students determine whether a source is of use to them in their research
- allow students to keep track of their reading and enable them to make informed decisions about which sources to use in writing their essay.

Use of computer programs

The use of computers is encouraged where they are appropriate as tools for analysing data relevant to the subject of the extended essay. Material such as a hard copy of computer output may be included in the extended essay, but any associated program should be referred to or reproduced, if original, only as an appendix.

Computer programs may only be included (in particular circumstances) in computer science and physics essays. (See the "Computer science" and "Physics" sections for further details.)

Proofreading

The whole essay needs to be proofread carefully by the student (computer spelling and grammar checkers are useful but will not do everything). They must not ask someone else to proofread their work as this is an important part of the learning experience.