



# UNDERGRADUATE PROJECT 1 SBEU 4942

*Abstract & Chapter 2 – Literature Review*

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# ABSTRACT ..(1)

- A **short summary** of the thesis/scientific paper or materials. The abstract should include the followings:
  - A **brief theme** sentence to orientate the reader on the overall issue
  - Aim or **purpose** of the research
  - The **importance of the study** should be explained
  - Briefly describe the **methodology** used in the study
  - Summarize the **main findings** of the study / **Expected outcomes**
  - **Conclusion** indicate the contribution made by the study
  - *\*\* No references, No abbreviation, No citation of tables or figures\*\**

## **Additional Rules (UTM Thesis Manual):**

- Abstract must be bilingual.
- The abstract should be written in one paragraph and not exceed one (1) page.
- The abstract can be written using single or 1.5 spacing.

# ABSTRACT – (Brief theme)

**Abstract.** Tidal datums are important for calculating spatial coordinates especially the elevation relative to mean sea level and also crucial for defining the state sovereignty boundaries over maritime areas. Normally, sea level was measured by tide gauges along the coastal for tidal datums computation. However, knowledge of tides is still restricted in coastal areas. Furthermore, tidal range at offshore was simply assumed to be similar as coastal due to the difficulties installing offshore tide gauges. The launching of satellite altimeter technologies with precise orbit determination since 1993 had provided significant accuracy of sea surface height (SSH) measurements. The observed SSH from satellite altimetry can be offered as tide gauge measurements at each location globally. This study aims to derive offshore tidal datums using satellite altimetry around Malaysian seas. SSH time series from TOPEX, Jason-1, Jason-2 and Geosat Follow On (GFO) were analysed using harmonic analysis approach to estimate harmonic constants. A minimum of 19 years tidal predictions were then performed using UTide software to determine Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT). These tidal datums were interpolated into regular  $0.125^\circ$  grids and were assessed with ten selected coastal tide gauges. The findings showed the Root Mean Square Error (RMSE) of spline interpolation yielded better accuracy, 25.5 cm ( $LAT_{MSL}$ ) and 17.4 cm ( $HAT_{MSL}$ ) as compared to the RMSE of Kriging interpolation, 31.8 cm ( $LAT_{MSL}$ ) and 33.8 cm ( $HAT_{MSL}$ ). In conclusion, deriving offshore tidal datums can serve as input data to unify marine database with coastal areas and also can support many marine applications.

# ABSTRACT – (Problem Statement)

**Abstract.** Tidal datums are important for calculating spatial coordinates especially the elevation relative to mean sea level and also crucial for defining the state sovereignty boundaries over maritime areas. Normally, sea level was measured by tide gauges along the coastal for tidal datums computation. However, knowledge of tides is still restricted in coastal areas. Furthermore, tidal range at offshore was simply assumed to be similar as coastal due to the difficulties installing offshore tide gauges. The launching of satellite altimeter technologies with precise orbit determination since 1993 had provided significant accuracy of sea surface height (SSH) measurements. The observed SSH from satellite altimetry can be offered as tide gauge measurements at each location globally. This study aims to derive offshore tidal datums using satellite altimetry around Malaysian seas. SSH time series from TOPEX, Jason-1, Jason-2 and Geosat Follow On (GFO) were analysed using harmonic analysis approach to estimate harmonic constants. A minimum of 19 years tidal predictions were then performed using UTide software to determine Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT). These tidal datums were interpolated into regular  $0.125^\circ$  grids and were assessed with ten selected coastal tide gauges. The findings showed the Root Mean Square Error (RMSE) of spline interpolation yielded better accuracy, 25.5 cm ( $LAT_{MSL}$ ) and 17.4 cm ( $HAT_{MSL}$ ) as compared to the RMSE of Kriging interpolation, 31.8 cm ( $LAT_{MSL}$ ) and 33.8 cm ( $HAT_{MSL}$ ). In conclusion, deriving offshore tidal datums can serve as input data to unify marine database with coastal areas and also can support many marine applications.

# ABSTRACT – (Importance of the study)

**Abstract.** Tidal datums are important for calculating spatial coordinates especially the elevation relative to mean sea level and also crucial for defining the state sovereignty boundaries over maritime areas. Normally, sea level was measured by tide gauges along the coastal for tidal datums computation. However, knowledge of tides is still restricted in coastal areas. Furthermore, tidal range at offshore was simply assumed to be similar as coastal due to the difficulties installing offshore tide gauges. The launching of satellite altimeter technologies with precise orbit determination since 1993 had provided significant accuracy of sea surface height (SSH) measurements. The observed SSH from satellite altimetry can be offered as tide gauge measurements at each location globally. This study aims to derive offshore tidal datums using satellite altimetry around Malaysian seas. SSH time series from TOPEX, Jason-1, Jason-2 and Geosat Follow On (GFO) were analysed using harmonic analysis approach to estimate harmonic constants. A minimum of 19 years tidal predictions were then performed using UTide software to determine Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT). These tidal datums were interpolated into regular  $0.125^\circ$  grids and were assessed with ten selected coastal tide gauges. The findings showed the Root Mean Square Error (RMSE) of spline interpolation yielded better accuracy, 25.5 cm ( $LAT_{MSL}$ ) and 17.4 cm ( $HAT_{MSL}$ ) as compared to the RMSE of Kriging interpolation, 31.8 cm ( $LAT_{MSL}$ ) and 33.8 cm ( $HAT_{MSL}$ ). In conclusion, deriving offshore tidal datums can serve as input data to unify marine database with coastal areas and also can support many marine applications.

# ABSTRACT – (Purpose / Objective)

**Abstract.** Tidal datums are important for calculating spatial coordinates especially the elevation relative to mean sea level and also crucial for defining the state sovereignty boundaries over maritime areas. Normally, sea level was measured by tide gauges along the coastal for tidal datums computation. However, knowledge of tides is still restricted in coastal areas. Furthermore, tidal range at offshore was simply assumed to be similar as coastal due to the difficulties installing offshore tide gauges. The launching of satellite altimeter technologies with precise orbit determination since 1993 had provided significant accuracy of sea surface height (SSH) measurements. The observed SSH from satellite altimetry can be offered as tide gauge measurements at each location globally. **This study aims to derive offshore tidal datums using satellite altimetry around Malaysian seas.** SSH time series from TOPEX, Jason-1, Jason-2 and Geosat Follow On (GFO) were analysed using harmonic analysis approach to estimate harmonic constants. A minimum of 19 years tidal predictions were then performed using UTide software to determine Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT). These tidal datums were interpolated into regular  $0.125^\circ$  grids and were assessed with ten selected coastal tide gauges. The findings showed the Root Mean Square Error (RMSE) of spline interpolation yielded better accuracy, 25.5 cm ( $LAT_{MSL}$ ) and 17.4 cm ( $HAT_{MSL}$ ) as compared to the RMSE of Kriging interpolation, 31.8 cm ( $LAT_{MSL}$ ) and 33.8 cm ( $HAT_{MSL}$ ). In conclusion, deriving offshore tidal datums can serve as input data to unify marine database with coastal areas and also can support many marine applications.

# ABSTRACT – (Method and Data)

**Abstract.** Tidal datums are important for calculating spatial coordinates especially the elevation relative to mean sea level and also crucial for defining the state sovereignty boundaries over maritime areas. Normally, sea level was measured by tide gauges along the coastal for tidal datums computation. However, knowledge of tides is still restricted in coastal areas. Furthermore, tidal range at offshore was simply assumed to be similar as coastal due to the difficulties installing offshore tide gauges. The launching of satellite altimeter technologies with precise orbit determination since 1993 had provided significant accuracy of sea surface height (SSH) measurements. The observed SSH from satellite altimetry can be offered as tide gauge measurements at each location globally. This study aims to derive offshore tidal datums using satellite altimetry around Malaysian seas. SSH time series from TOPEX, Jason-1, Jason-2 and Geosat Follow On (GFO) were analysed using harmonic analysis approach to estimate harmonic constants. A minimum of 19 years tidal predictions were then performed using UTide software to determine Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT). These tidal datums were interpolated into regular  $0.125^\circ$  grids and were assessed with ten selected coastal tide gauges. The findings showed the Root Mean Square Error (RMSE) of spline interpolation yielded better accuracy, 25.5 cm ( $LAT_{MSL}$ ) and 17.4 cm ( $HAT_{MSL}$ ) as compared to the RMSE of Kriging interpolation, 31.8 cm ( $LAT_{MSL}$ ) and 33.8 cm ( $HAT_{MSL}$ ). In conclusion, deriving offshore tidal datums can serve as input data to unify marine database with coastal areas and also can support many marine applications.



# ABSTRACT – (summary of main findings)

**Abstract.** Tidal datums are important for calculating spatial coordinates especially the elevation relative to mean sea level and also crucial for defining the state sovereignty boundaries over maritime areas. Normally, sea level was measured by tide gauges along the coastal for tidal datums computation. However, knowledge of tides is still restricted in coastal areas. Furthermore, tidal range at offshore was simply assumed to be similar as coastal due to the difficulties installing offshore tide gauges. The launching of satellite altimeter technologies with precise orbit determination since 1993 had provided significant accuracy of sea surface height (SSH) measurements. The observed SSH from satellite altimetry can be offered as tide gauge measurements at each location globally. This study aims to derive offshore tidal datums using satellite altimetry around Malaysian seas. SSH time series from TOPEX, Jason-1, Jason-2 and Geosat Follow On (GFO) were analysed using harmonic analysis approach to estimate harmonic constants. A minimum of 19 years tidal predictions were then performed using UTide software to determine Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT). These tidal datums were interpolated into regular  $0.125^\circ$  grids and were assessed with ten selected coastal tide gauges. The findings showed the Root Mean Square Error (RMSE) of spline interpolation yielded better accuracy, 25.5 cm ( $LAT_{MSL}$ ) and 17.4 cm ( $HAT_{MSL}$ ) as compared to the RMSE of Kriging interpolation, 31.8 cm ( $LAT_{MSL}$ ) and 33.8 cm ( $HAT_{MSL}$ ). In conclusion, deriving offshore tidal datums can serve as input data to unify marine database with coastal areas and also can support many marine applications.

# ABSTRACT – (Conclusion)

**Abstract.** Tidal datums are important for calculating spatial coordinates especially the elevation relative to mean sea level and also crucial for defining the state sovereignty boundaries over maritime areas. Normally, sea level was measured by tide gauges along the coastal for tidal datums computation. However, knowledge of tides is still restricted in coastal areas. Furthermore, tidal range at offshore was simply assumed to be similar as coastal due to the difficulties installing offshore tide gauges. The launching of satellite altimeter technologies with precise orbit determination since 1993 had provided significant accuracy of sea surface height (SSH) measurements. The observed SSH from satellite altimetry can be offered as tide gauge measurements at each location globally. This study aims to derive offshore tidal datums using satellite altimetry around Malaysian seas. SSH time series from TOPEX, Jason-1, Jason-2 and Geosat Follow On (GFO) were analysed using harmonic analysis approach to estimate harmonic constants. A minimum of 19 years tidal predictions were then performed using UTide software to determine Lowest Astronomical Tide (LAT) and Highest Astronomical Tide (HAT). These tidal datums were interpolated into regular  $0.125^\circ$  grids and were assessed with ten selected coastal tide gauges. The findings showed the Root Mean Square Error (RMSE) of spline interpolation yielded better accuracy, 25.5 cm ( $LAT_{MSL}$ ) and 17.4 cm ( $HAT_{MSL}$ ) as compared to the RMSE of Kriging interpolation, 31.8 cm ( $LAT_{MSL}$ ) and 33.8 cm ( $HAT_{MSL}$ ). **In conclusion, deriving offshore tidal datums can serve as input data to unify marine database with coastal areas and also can support many marine applications.**

# ABSTRACT ...(2)

- **Make a great first impression. Most applications require a brief abstract or summary of the project.**
- It is generally a good idea to **write the abstract or summary last**, when you can review the full proposal project description and pull out the most significant and winning arguments.
- **Think of it as the introduction to your project**, which offers reviewers their first impression of you and your proposed work. Your **goal** is to **gain their attention** and **guarantee that they will read the full proposal** with interest, and even enthusiasm

# LITERATURE REVIEW

Literature reviews are designed to **provide an overview of sources** that you have explored while researching a *particular topic*.

It also help to demonstrate the readers how your research fits within a larger field of study.

A literature review is a survey of **scholarly sources** on a **specific topic**. It provides an **overview of current knowledge**, allowing you to **identify relevant theories, methods, and gaps** in the existing research.

## **Important Key Steps**

- 1. Search** relevant literature
- 2. Evaluate** sources
- 3. Identify** themes, debates & gaps
- 4. Outline** the structure
- 5. Write** literature review

# LITERATURE REVIEW

- It is a **review of what has been published on that topic** so that you do not duplicate someone else's work.
- **Conduct a thorough literature search** before designing your methodology and collecting your data.
- **Conclude the review of the literature with a short section** that describes your topic, highlighting why it is important to address the problem you have investigated.

# IMPORTANCE OF LITERATURE REVIEW

- To limit the problem area
- To define the problem
- To avoid unnecessary repetition
- To search for new approaches
- To recommend suitable methods
- To sample current opinions

# IMPORTANCE OF LITERATURE REVIEW

- **To limit the problem area**

- The problem should be small enough and sufficiently specific for adequate treatment and competent analysis. Research articles often suggest recommendations for the course that further research should take.

- **To define the problem**

- *Definition* means that the researcher knows exactly what he is looking for, so that data when collected and analysed actually relates back to the problem

# IMPORTANCE OF LITERATURE REVIEW

- **To avoid unnecessary repetition**

- Do not assume that because most of the existing research adopts one method that it is the only method or the correct method available in the circumstance. Do not use the approach if you have reservations about its application to the problem.

- **To search for new approaches**

- Be alert to research approaches which may have been overlooked. Be prepared to adopt a different viewpoint, particularly in areas where research is sparse



# IMPORTANCE OF LITERATURE REVIEW

- **To recommend suitable methods**
  - Methodology should be appropriate to the research problem. Compile a checklist in which you reference ideas on research design, instrumentation, sampling and data collecting and analysis from various studies
- **To sample current opinions**
  - Newspapers, magazines and non-technical articles may contain unique ideas that have not yet been researched

# GENERAL GUIDELINES TO WRITE LITERATURE REVIEW ... (1)

- Introduce the literature review by **pointing out the major research topic** that will be discussed.
- **Identify the broad problem area** but don't be too global (for example, discussing the history of education when the topic is on specific instructional strategy).
- Discuss the **general importance of your topic** for those in your field

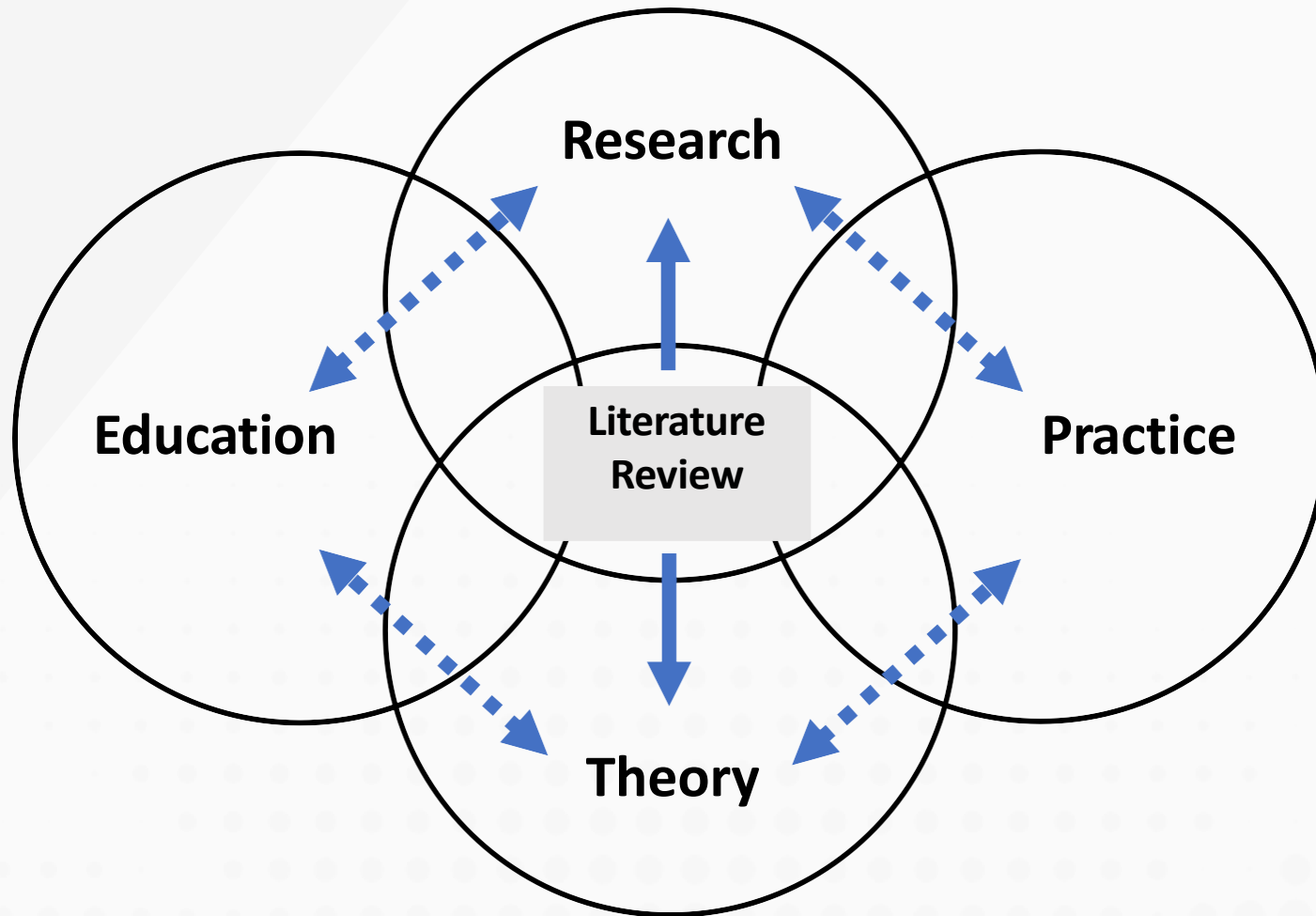
# GENERAL GUIDELINES TO WRITE LITERATURE REVIEW ... (2)

- **Do not attempt to cover everything** written on your topic.
- **Pick out the research most relevant** to the topic you are studying.
- You will use the studies in your literature review as **“evidence” that your research question** is an important one

# GENERAL GUIDELINES TO WRITE LITERATURE REVIEW ... (3)

- It is important to cover research relevant to all the variables being studied.
- Research that explains the relationship between these variables is a top priority.
- **Plan on how you will structure your literature review** and write from this plan

# RELATIONSHIP OF LITERATURE REVIEW TO THEORY, RESEARCH, EDUCATION & PRACTICE



# THE USE OF LITERATURE REVIEW IN QUANTITATIVE RESEARCH ...(1)

- **Theoretical framework**

- The literature defines *concepts and terms* in relation to the study

- **Problem statement and hypotheses**

- The literature review helps to *determine what is known and not known*; to *uncover gaps*, consistencies, or inconsistencies, and/or to reveal unanswered questions about a subject, concept or problem

- ***The literature review allows for refinement of research problems and questions and/or hypotheses***

# THE USE OF LITERATURE REVIEW IN QUANTITATIVE RESEARCH ...(2)

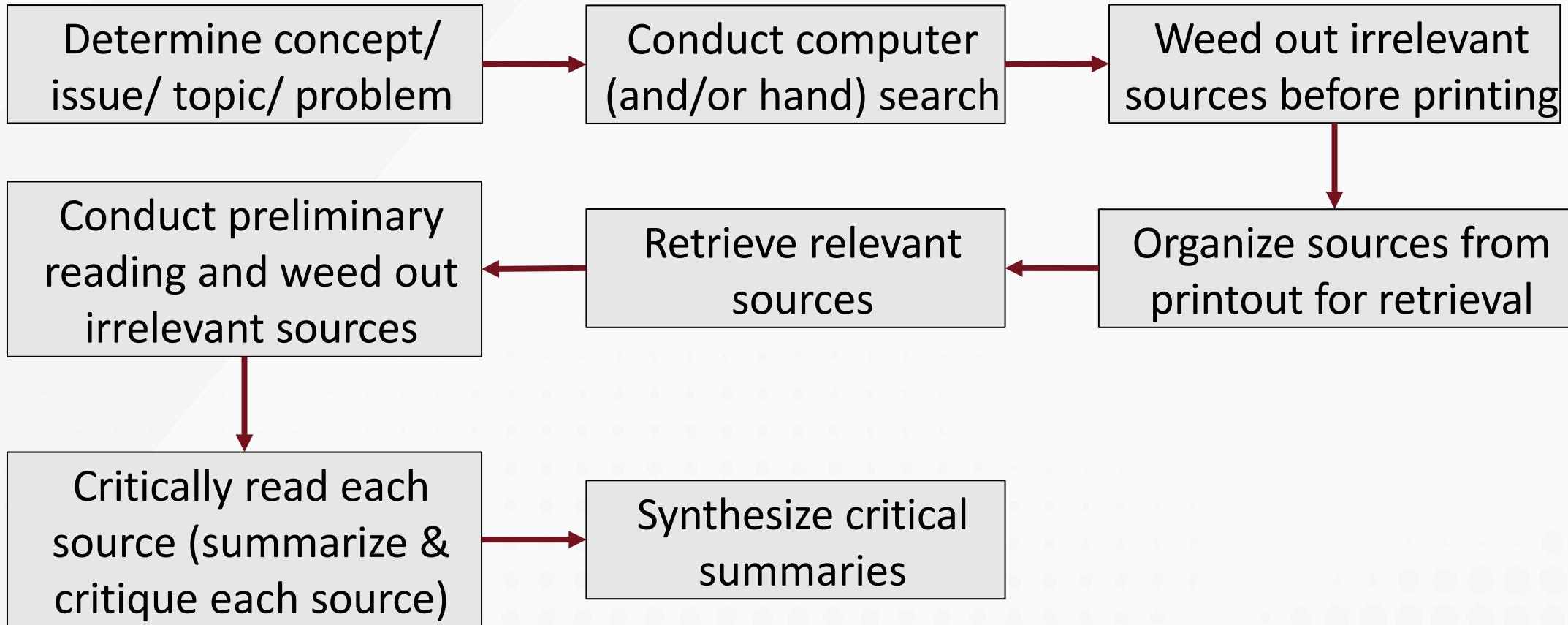
- **Design and method**

- The literature review reveals strengths and weaknesses of designs and methods of previous research studies

- **Outcome of the analysis (findings, implications, and recommendations)**

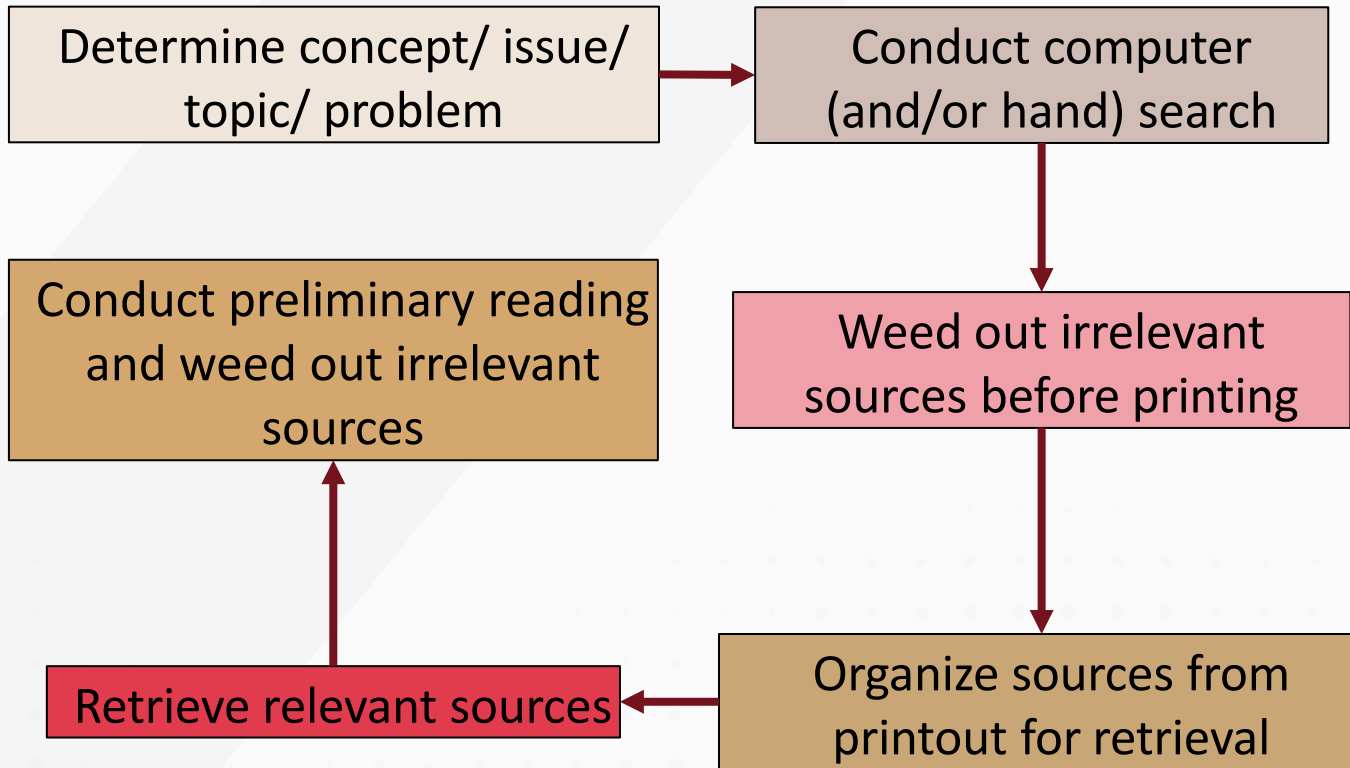
- The literature review is used to discuss the results or findings of a study. The discussion relates the study's findings to what was or was not found in the review of literature

# PROCESS OF SEARCHING THE LITERATURE





# PROCESS OF SEARCHING THE LITERATURE



## Is This Article Relevant To My Research?

A Guide to Skimming

**Step 1**  
**Read the Abstract**

The abstract is a summary of the article. By reading this, you can get a sense of the content, the scope of the research, the author's methodology, and the academic level of the article.

**Step 2**  
**Read the Conclusion**

Authors usually repeat their main ideas and their final findings in the conclusion. This will give you an overview of the article and help determine if it is relevant to your research.

**Step 3**  
**Read the First Paragraph or the Introduction**

This is usually where an author lays out their plan for the rest of the article. This can help you determine which sections of the article you should read in full.

**Step 4**  
**Read the First Sentence of Every Paragraph**

The first sentence (or topic sentence) will convey the main idea for that paragraph. See something interesting? Read the rest.

**Step 5**  
**The Rest of the Article**

Now that you've determined what's most important, remember to at least browse the rest of the article!

**To Review:**

- Abstract
- Conclusion
- Introduction
- Topic Sentences
- Whole Article

# ORGANIZING LITERATURE REVIEW

- **Topical order** — organize by main topics or issues; emphasize the relationship of the issues to the main “problem”
- **Chronological order** — organize the literature by the dates the research was published
- **Problem-Cause-Solution order** — Organize the review so that it moves from the problem to the solution
- **General-to-Specific order** — (Also called the funnel approach) Examine broad-based research first and then focus on specific studies that relate to the topic
- **Specific-to-General order** — Try to make discuss specific research studies so conclusions can be drawn

# COMMON MISTAKES TO AVOID

- Review is not logically organized
- Review is not focused on most important facets (sides) of the study
- Review doesn't relate literature to the study
- Too few references or outdated references cited (***Cross-ref with references***)
- Review is not written in author's own words (**Plagiarism! Avoid this!**)
- Review reads like a series of disjointed summaries
- Review doesn't argue a point

# SOURCE OF DATABASES / REFERENCES

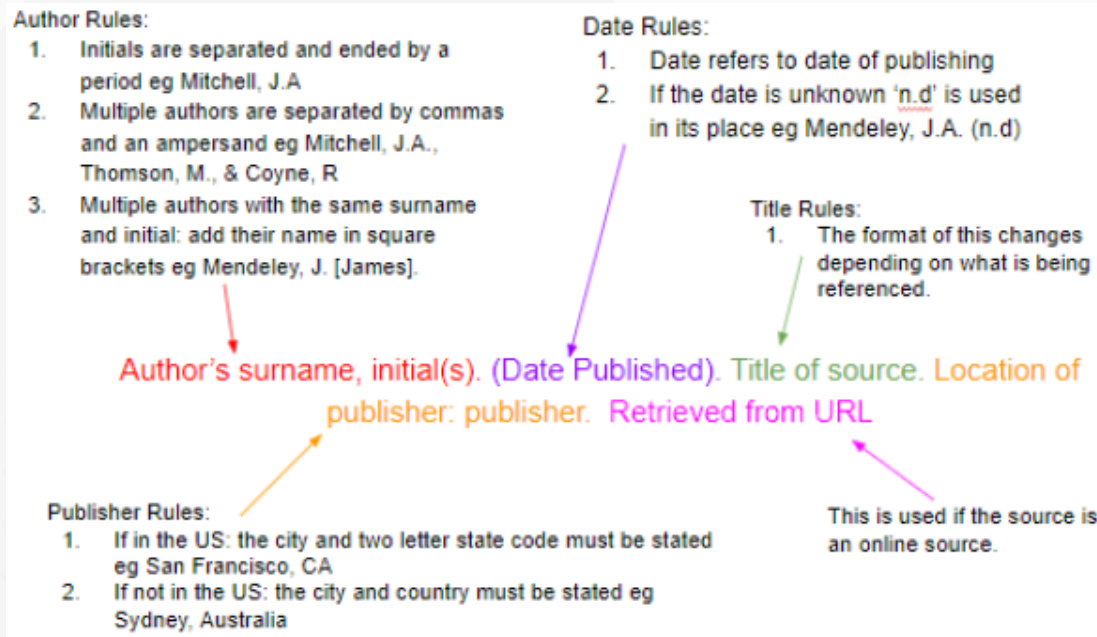
1. PSZ Online Database: <https://login.ezproxy.utm.my/login>
2. Google Scholar: <https://scholar.google.com/>
3. Ebook: <https://www.pdfdrive.com/>
4. Sci-Hub: <https://sci.hubg.org/>
5. Any related website
6. Discussion/ interview with lecturers or postgraduate students
7. PSZ & Zarith Sofea Library
8. Online thesis (worldwide) - <http://oatd.org/>
9. UTM Thesis Manual & Template

# SUMMARY TABLE AND RESEARCH GAP

Researcher	Aim	Study Area	Data Gathering	Data Input	Data Processing	Analyzing Approach
NAHRIM, 2010	Sea level rise projection	Malaysian Seas	Altimeter ( Tx, J1) & Tide Gauge	Sea level anomaly & Tidal	Altimeter: Global Model	<ul style="list-style-type: none"> <li>- Normal Linear Trend (Sea level projection)</li> <li>- Altimeter only</li> </ul>
Din et al., 2009	Sea Level rise (93 - 08)	Malaysian Seas	Altimeter( Tx, J1, e1, e2, n1) & Tide Gauge	Sea Level Anomaly & Tidal	Altimeter: Analyze on ocean tide model only	<ul style="list-style-type: none"> <li>- Normal Linear Trend (Sea level rate)</li> <li>- Altimeter only</li> </ul>
AVISO, 2012	Global sea level rise	Global	Altimeter (Tx, J1, J2)	Sea level anomaly	Altimeter: Global Model	<ul style="list-style-type: none"> <li>- Normal linear trend (Sea level rate)</li> <li>- Altimeter only</li> </ul>
Hooper, 2006	Volcano and land subsidence	Galapagos and Netherlands	ERS and EnviSat (PS InSAR)	Vertical land motion	Localized to the study area	Normal linear trend (VLM)
Willis, 2008	Crustal motion	West and East Antartica	GPS	Horizontal and vertical land motion	Localized to the study area	Normal linear trend (Horizontal and vertical)
<i>This Study</i>	<i>Sea level rise (93- 11)</i>	<i>Malaysian Seas</i>	<i>Altimeter (Tx, J1, J2, e1, e2, n1), Tide Gauge, GPS and PS InSAR</i>	<i>Sea level anomaly, tidal data, vertical land motion from GPS, PS InSAR &amp; "SALT minus TG"</i>	<ul style="list-style-type: none"> <li>- <i>Altimeter: Apply the best model for each correction</i></li> <li>- <i>Altimeter: Data filtering and gridding (using Gaussian Weighting Function)</i></li> <li>- <i>PS InSAR &amp; GPS: Localized</i></li> </ul>	<ul style="list-style-type: none"> <li>- <i>Robust fit technique (Sea level &amp; VLM rate)</i></li> <li>- <i>Altimeter + tide gauge (absolute)</i></li> </ul>

# REFERENCES STYLE

- Please refer UTM Thesis manual for reference style
- Preferable to use APA Reference Style



**Mendeley**

<https://www.mendeley.com/>

**Citation Text**

Hamden et al. (2021)



**EndNote**

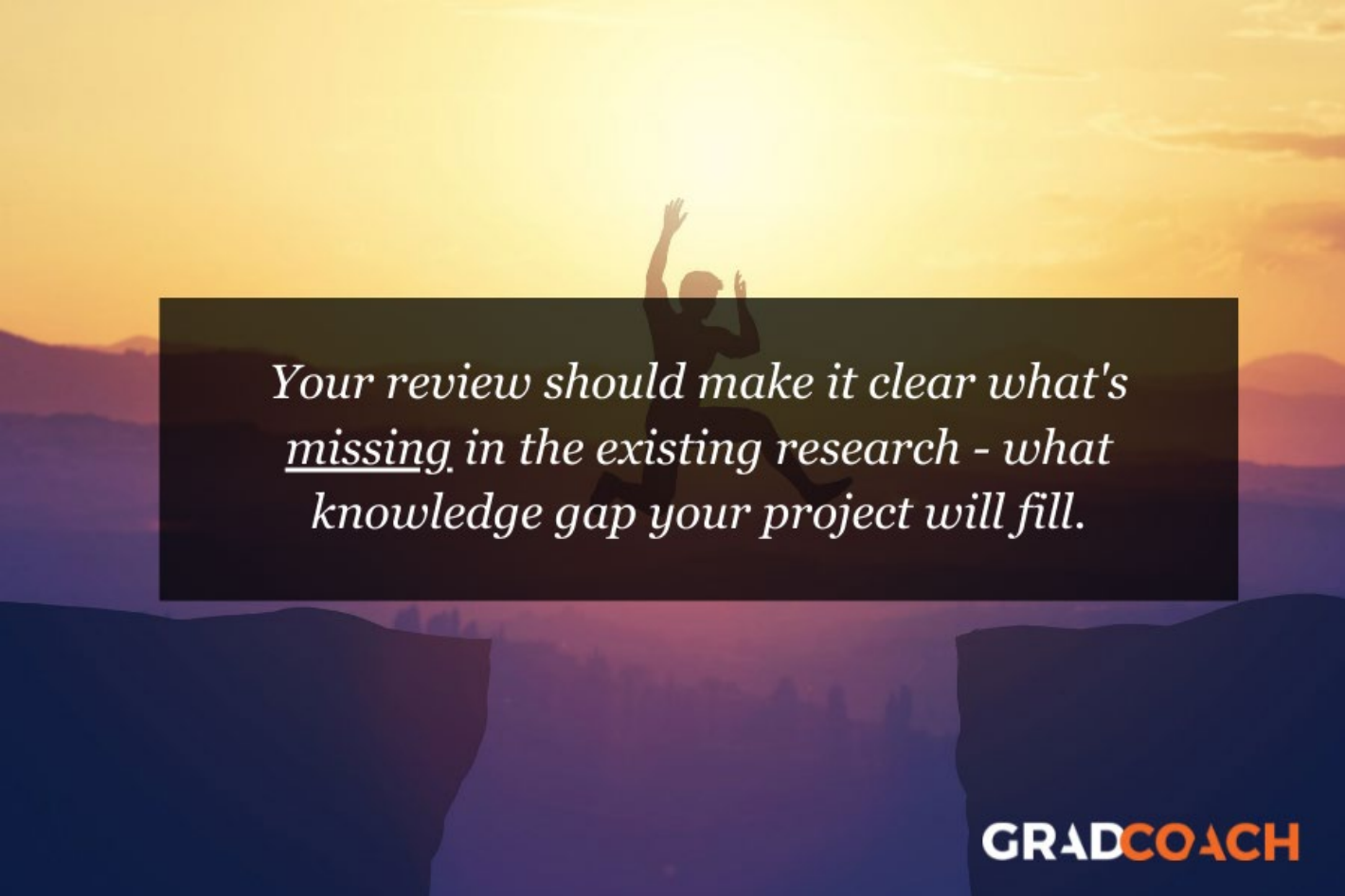
<https://software.utm.my/soft/4VB>

**References**

Hamden, M. H., Din, A. H. M., Wijaya, D. D., Yusoff, M. Y. M., & Pa'suya, M. F. (2021). Regional mean sea surface and mean dynamic topography models around malaysian seas developed from 27 years of along-track multi-mission satellite altimetry data. *Frontiers in Earth Science*, 9, 665876.

Now you can  
start writing the  
literature review  
according to  
your study

–All the Best–

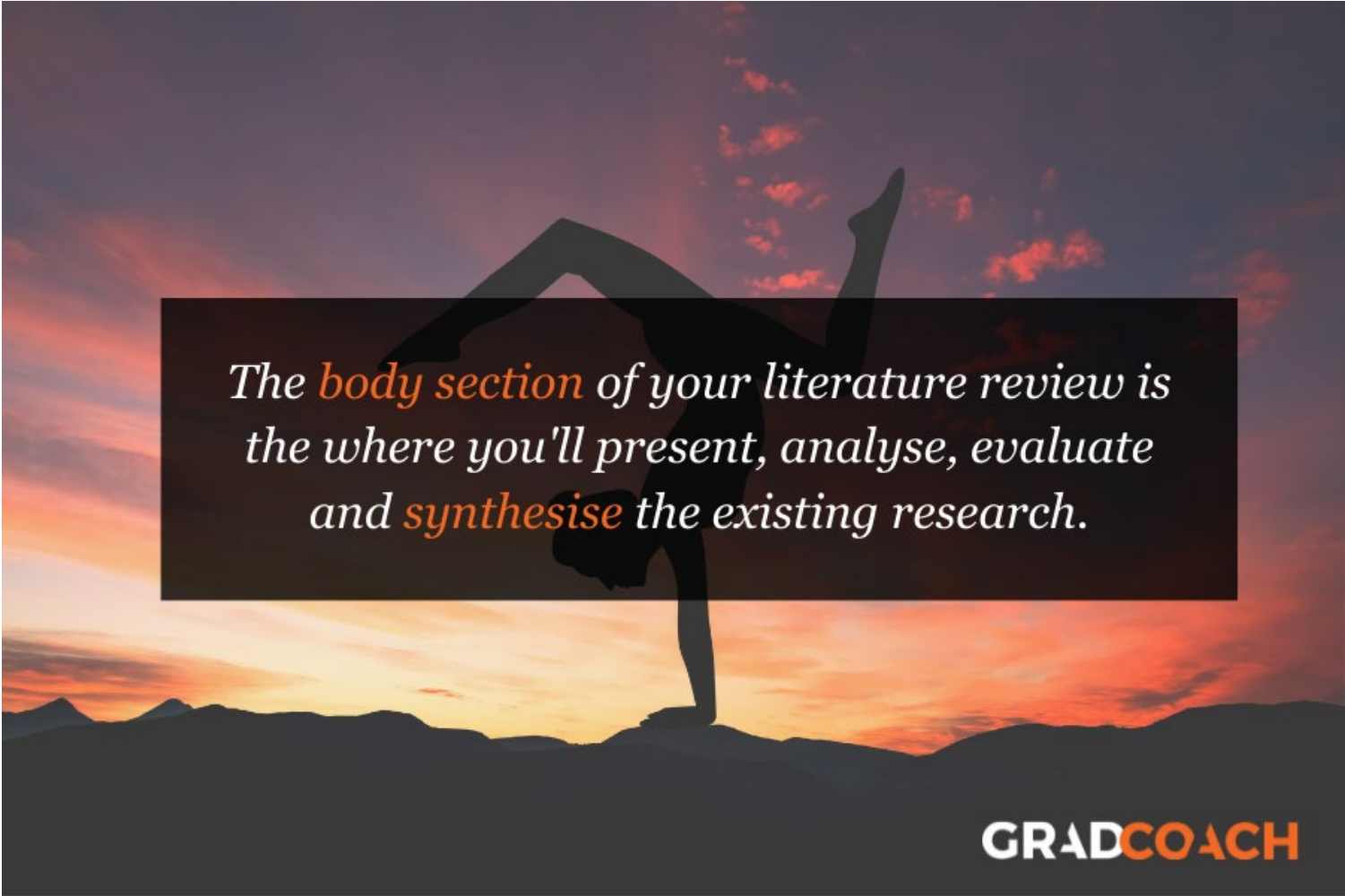
A person is silhouetted against a bright sunset sky, jumping over a deep canyon. The scene is filled with warm colors of orange, yellow, and purple. The person's arms are raised in a gesture of triumph or achievement.

*Your review should make it clear what's  
missing in the existing research - what  
knowledge gap your project will fill.*

GRADCOACH

Now you can  
start writing the  
literature review  
according to  
your study

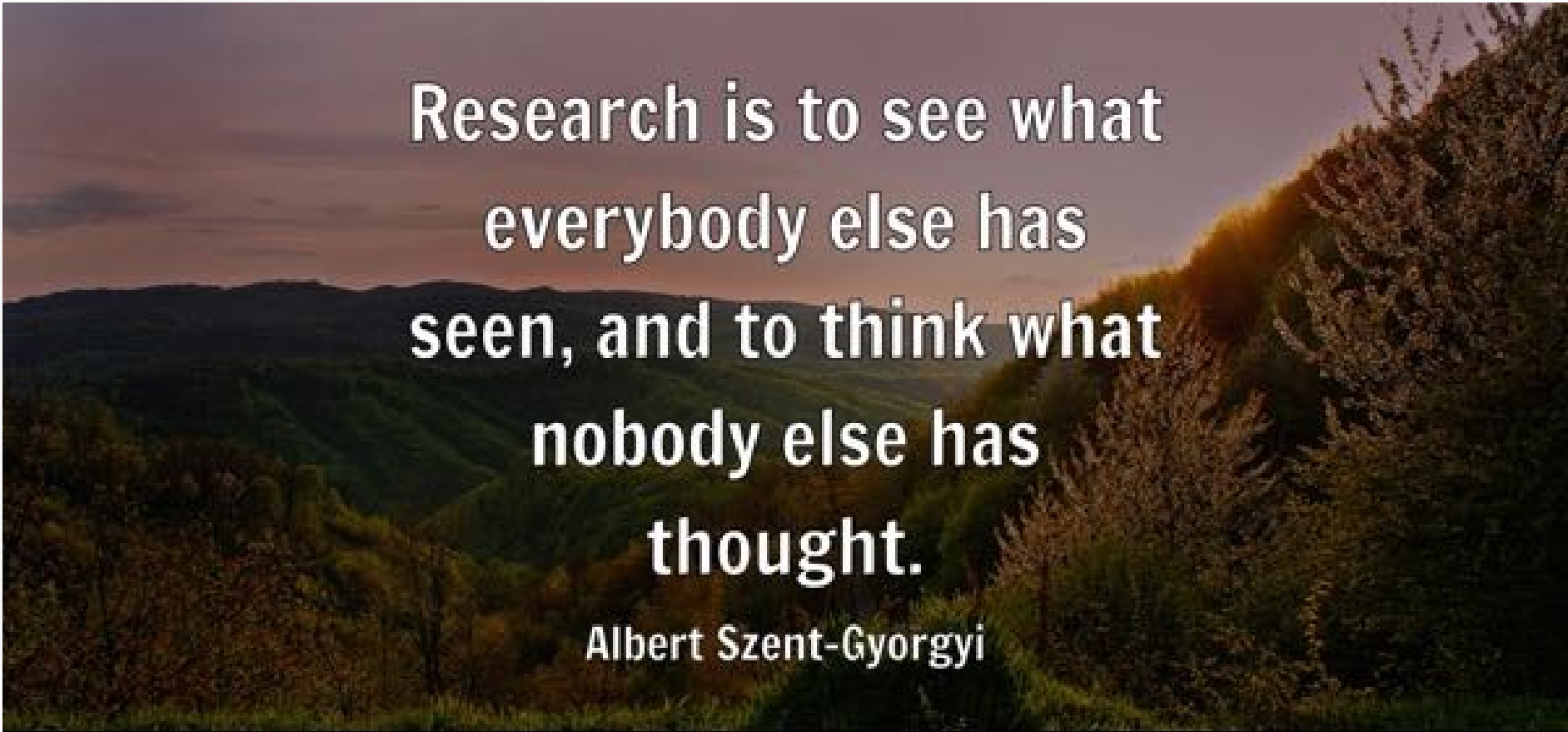
–All the Best–



*The **body section** of your literature review is  
the where you'll present, analyse, evaluate  
and **synthesise** the existing research.*

GRADCOACH





Research is to see what  
everybody else has  
seen, and to think what  
nobody else has  
thought.

Albert Szent-Gyorgyi

BrainyQuote®

"The expert in  
anything was once  
a beginner." –  
Helen Hayes

# THANK YOU



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Kerana Tuhan untuk Manusia