



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

ACFA7004

Research Methods & Professional Development

Lecture 1 – Introduction

Trawsnewid Addysg; Trawsnewid Bywydau
Transforming Education; Transforming Lives



www.uwtsd.ac.uk

Module Learning Outcome

Upon the successful completion of this module, the student should be able to:

- Generate a project proposal that meets a given domain research requirements.
- Identify and visualise a complex research problem within a specific research domain, outline the investigative approach and comprehensively consider appropriate methods and solutions.
- Critically appraise the research process and its outcomes.



Refer Assessment Brief

Assessment Details

Week 1 *learning outcomes*

- Introduction to research.
- Characteristics
- Choosing your Topic
- Assignment for next week

**THIS
WEEK**

Research

In your opinion, what is research ?

Describe it in a word or two!



Research in everyday scenarios

Anita loses her phone and looks under her bed
and in her bag.

Is this **Search** or **Research**?

Research in everyday scenarios

Rhys tries baking cookies using a new recipe. They're too hard. He changes the sugar and flour ratios in three more batches and compares the taste.
Is this Search or Research?

Research in everyday scenarios

Leila opens Google Maps to check when the next bus is arriving.

Is this Search or Research?

Research in everyday scenarios

Sam thinks students are addicted to their phones. He designs a survey, gathers responses from 100 classmates, analyzes the results, and writes a report.

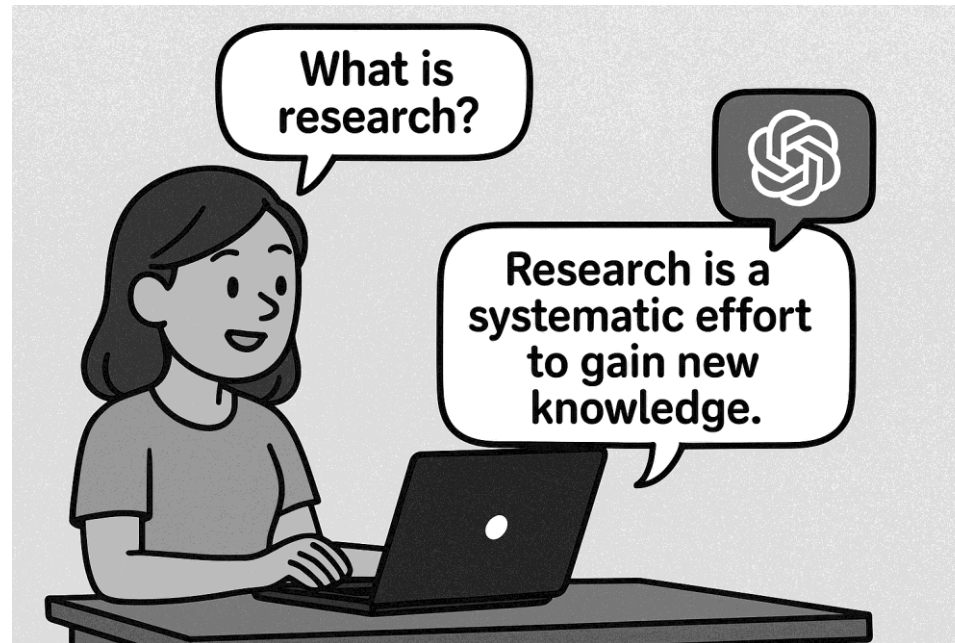
Is this Search or Research?

Research in everyday scenarios

Sarah checks travel blogs to find out the best place to visit in summer.
Is this Search or Research?

Research in everyday scenarios

If I ask ChatGPT “What is research?”,
is it search or research?



What is research ?

– **Research = Re+Search**

- Search/find again
- Systematic investigation or activity to gain new knowledge of the already existing facts
- intellectual activity
- Application of scientific method to solving problems



Research

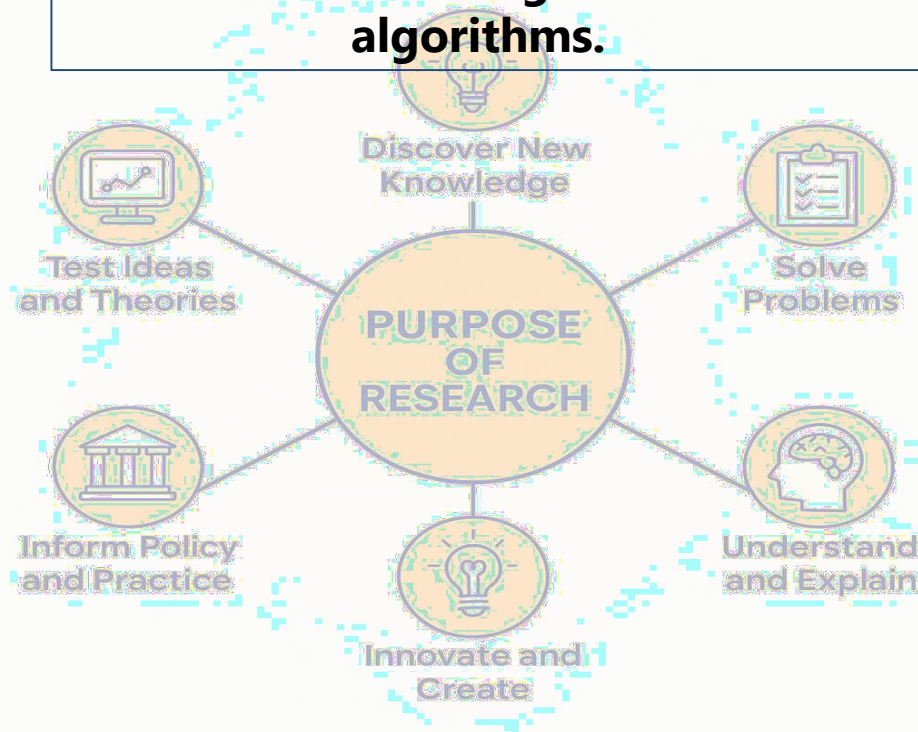
- What is research ?
 - Definition
 - *"Research is a systematic effort to gain new knowledge."*
Redman & Mori
 - *"Research may be defined as a method of studying problems whose solutions are to be derived partly or wholly from facts."*
W.S. Monroes
 - *"Research is an honest, exhaustive, intelligent searching for facts and their meanings or implications with reference to a given problem. The product or findings of a given piece of research should be an authentic, verifiable contribution to knowledge in the field studied."* **P.M. Cook**

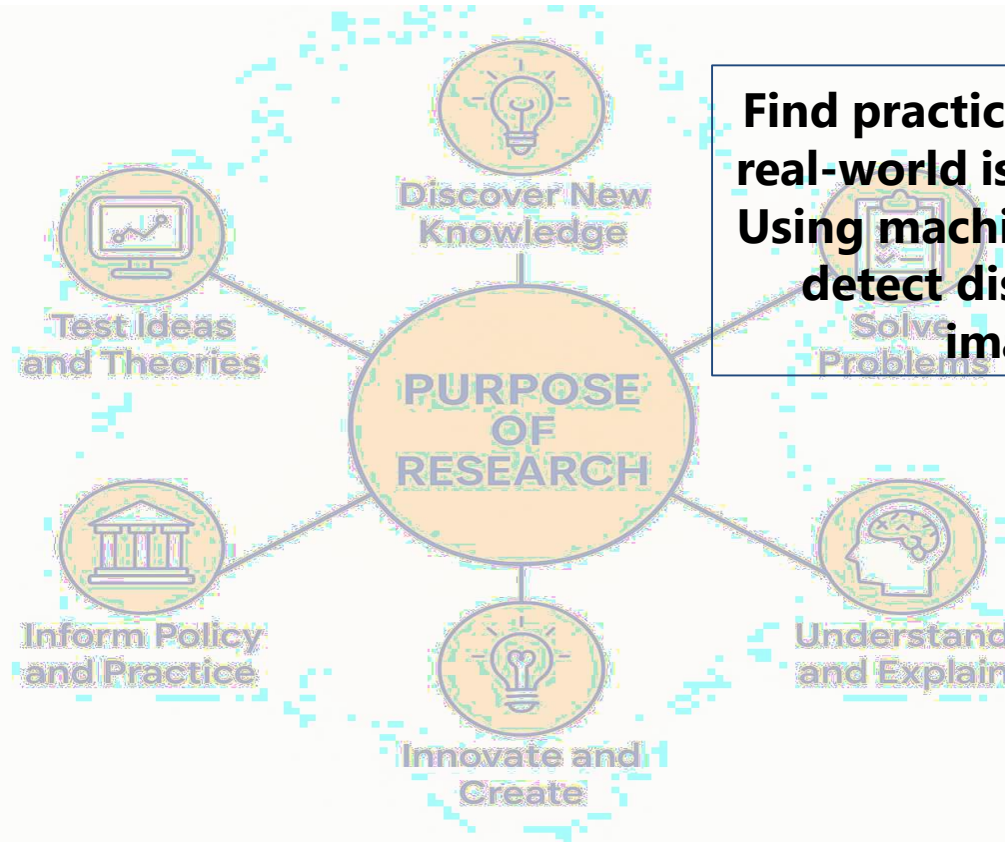
Purpose of research

- Systematically investigate to discover new knowledge or solve problem or create new understanding in various fields.
- Why Research ?
 - Publish or Perish ?

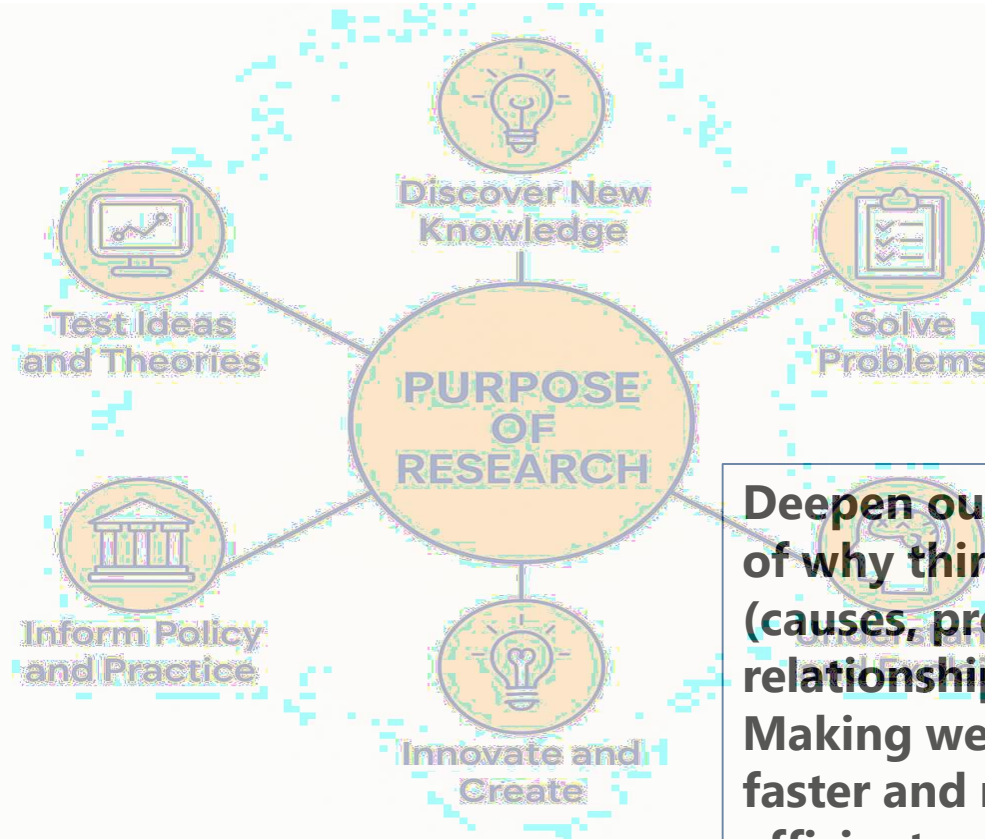


Uncover facts, principles, or phenomena that were previously unknown. Example: Designing more efficient sorting or search algorithms.





Find practical solutions to real-world issues. Example: Using machine learning to detect diseases from images.

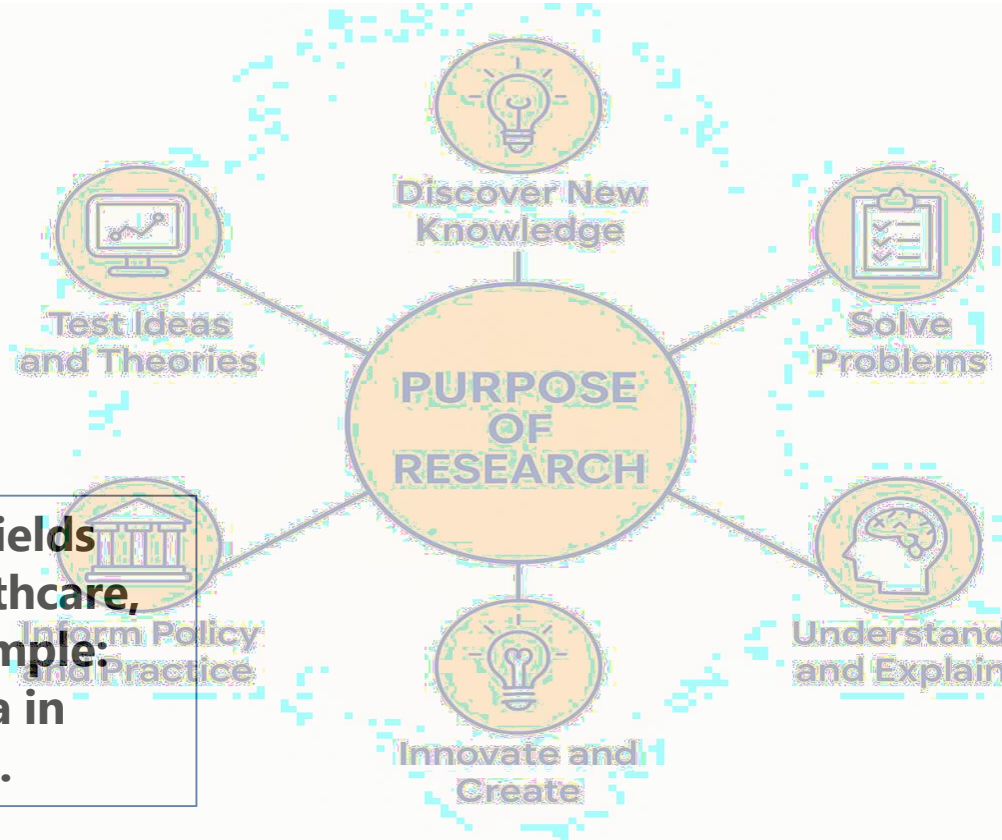


Deepen our understanding of why things happen (causes, processes, relationships). Example: Making web browsers faster and more energy efficient.

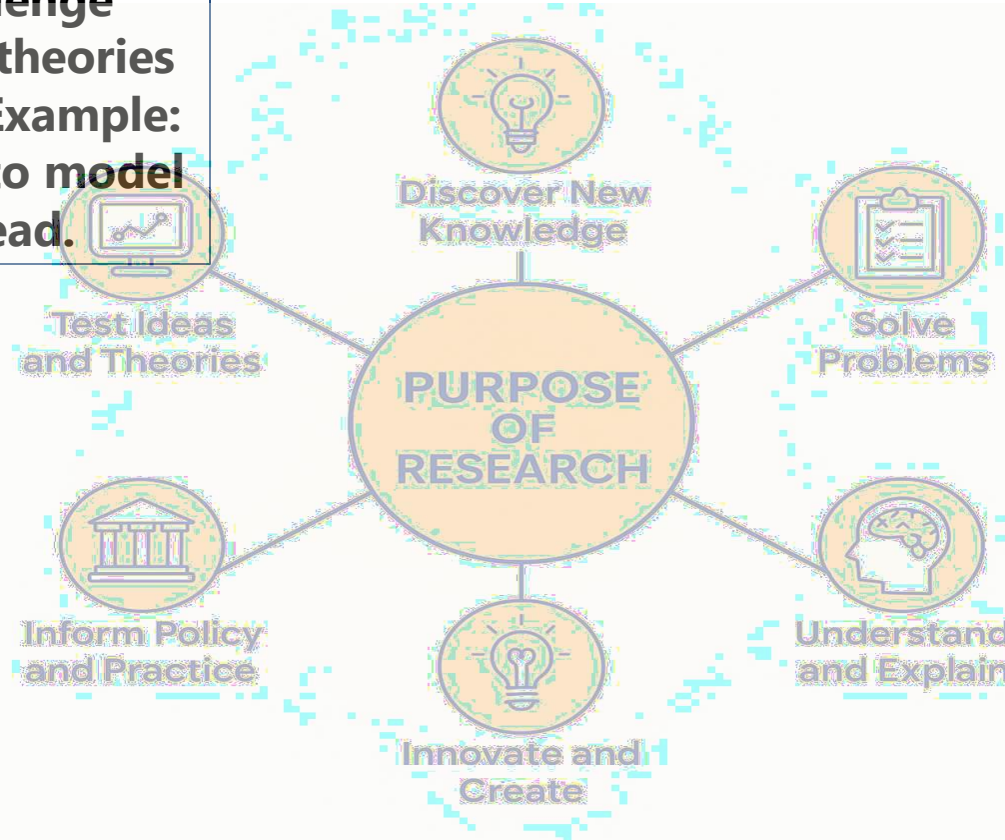


**Lead to new products, services, or technologies.
Example: Building apps for visually impaired users using voice navigation.**

Guide decisions in fields like education, healthcare, technology, etc. Example: Protecting user data in cloud environments.



**Confirm or challenge
existing beliefs or theories
through evidence. Example:
Using simulations to model
pandemic spread.**



Research

Sarah wants to find out the symptoms of flu, so she types “flu symptoms” into Google and reads an article from a health website. What is she doing?

- A. Conducting research
- B. Doing a literature review
- C. Searching for information online
- D. Collecting primary data

Research

Sarah wants to find out the symptoms of flu, so she types “flu symptoms” into Google and reads an article from a health website. What is she doing?

- A. Conducting research
- B. Doing a literature review
- C. Searching for information online**
- D. Collecting primary data

Research

Raj is exploring whether social media use affects students' concentration. He designs a survey, collects responses, and uses statistics to analyze the results. What is this an example of?

- A. Searching online
- B. Copying data
- C. Personal opinion gathering
- D. Research

Research

Raj is exploring whether social media use affects students' concentration. He designs a survey, collects responses, and uses statistics to analyze the results. What is this an example of?

- A. Searching online
- B. Copying data
- C. Personal opinion gathering
- D. Research

Research

Maria watches YouTube videos to understand how to do referencing in her report. Which activity is she engaged in?

- A. Conducting a systematic review
- B. Searching for online resources
- C. Publishing research
- D. Data collection

Research

Maria watches YouTube videos to understand how to do referencing in her report. Which activity is she engaged in?

A. Conducting a systematic review

B. Searching for online resources

C. Publishing research

D. Data collection

Research

Aisha notices an increase in plastic waste in her community. She conducts interviews, analyzes local data, and writes a report suggesting policy changes. This is an example of:

- A. A social media campaign
- B. Search engine optimization
- C. Research
- D. Information retrieval

Research

Aisha notices an increase in plastic waste in her community. She conducts interviews, analyzes local data, and writes a report suggesting policy changes. This is an example of:

- A. A social media campaign
- B. Search engine optimization
- C. Research
- D. Information retrieval

Research

Daniel writes a blog post summarizing facts about climate change from various websites. Is he doing research?

- A. Yes, because he is collecting data
- B. No, because he is only reporting known facts
- C. Yes, because he is publishing his findings
- D. No, because he didn't use Google Scholar

Research

Daniel writes a blog post summarizing facts about climate change from various websites. Is he doing research?

A. Yes, because he is collecting data

B. No, because he is only reporting known facts

C. Yes, because he is publishing his findings

D. No, because he didn't use Google Scholar

Steps(*Randomized*) of the research process

1. Getting permission from the department and approval from the Ethical Review Committee.
2. Narrowing down and focusing your research question or hypothesis
3. Identifying your area of research
4. Formulating a Research Question or hypothesis
5. Identifying a subset of further questions
6. Initial Literature Review
7. Selecting the appropriate research method
8. Detailed Literature Review
9. Writing a Research Proposal or Protocol
10. Work and plan on the practical aspects: Resources, timeline, and budget
11. Identifying and narrowing down your goals and objectives
12. Identifying the gaps in knowledge or the important questions you want to address

correctly arrange the 12 shuffled steps of the research process through group discussion
(3-4 per group)

Steps of the research process

1. Identifying your area of research
2. Identifying the gaps in knowledge or the important questions that you want to address
3. Formulating a Research Question or hypothesis
4. Initial Literature Review
5. Narrowing down and focusing your research question or hypothesis
6. Identifying a subset of further questions
7. Selecting the appropriate research method
8. Detailed Literature Review
9. Identifying and narrowing down your goals and objectives (There may be primary and secondary objectives and gains from your study)
- 10. Writing a Research Proposal or Protocol**
11. Getting permission from the department and approval from Ethical Review Committee.
12. Work and plan on the practical aspects: Resources, timeline and budget

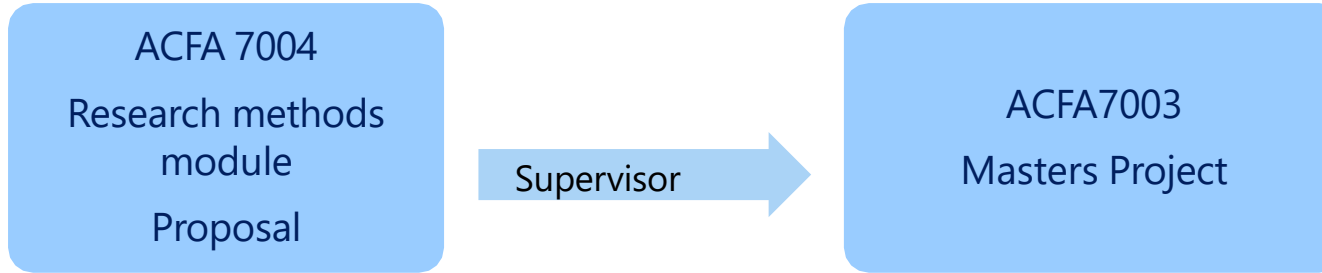
Research

- Possibly apply for a Grant
- Practical Aspects: Doing experiments or 'fieldwork'; Collecting the Data
- Analyzing the Data (Statistical Analysis)
- Present your findings in simple and easy to understand ways. Tables, graphs and charts may be employed.
- Answering your research questions based on your findings
- Producing Conclusions
- **Writing down your results as a paper, dissertation or thesis**
- Choosing the right journal or forum for sharing your findings
- Publishing your Findings
- Promoting or Sharing your findings.
- Getting feedback
- Implementing your findings. The research should translate into practice and bring about a change
- The Road Ahead: Identifying and starting work on unanswered questions or questions/queries that emerged from your study

Source : Kasi et. al., [1]

Research

Why research ?



Research Proposal as the Blueprint

- The proposal developed in the Research Methods module lays out the research problem, aims, objectives, methodology, and evaluation plan. This serves as a structured plan for your research project.
- The objectives formulated in your proposal should directly align with the outcomes expected in the Research Project module. This ensures coherence and a clear direction for your research.
- The Research Methods module will allow you to receive feedback on the proposal. This feedback is critical as it shapes the next phase of your project, helping you refine your approach for the actual research and ensuring your project is feasible and scientifically robust.

Research Characteristics



Research Characteristics

- **Significant**
 - Relevant and of interest to those working and studying in the field
- **Systematic**
 - a process that is sustained and methodical/systematic
- **Informed**
 - entailing researching the topic by reading extensively on it to find out what is already established
 - Knowing the experts in the fields and find out their views
 - Building on what is already known

Research Characteristics

- Contributory
 - The findings of the research should be communicated to add to knowledge and understanding within the field in some way
- Evidence based
 - include gathering data, documents, interviews, and other types of material to support your stance, arguments, and conclusions
- Positioned
 - taking a stance on the topics discussed and supporting it with evidence-based reasoning

Research Characteristics

- Objective
 - Instead of favoring information that fits the researcher's purpose or point of view, collect, assess, use, and present the information in a fair and balanced manner
- Communicated
 - it is written and/or presented in an appropriate style and format for others to read
 - it communicates messages about research in the field
- Academic integrity
 - conduct the research and present findings in a manner that is honest, truthful, trustworthy and reliable

Choosing your Topic and Title

- The most important task
 - Not just what you like to study but what is practicable, achievable based on the requirements
 - It is a winding path
 - False starts
 - Too complex, time consuming, too big, too expensive , etc... or fall before some other barrier
 - Plan ahead, investigate on potential topic

Choosing your Topic and Title

- What makes a good topic?
 - Motivating
 - Really interesting
 - See its relevance to your carrier or passion
 - To know more about the topic
 - Interest in studying in depth for become a researcher
 - Challenging
 - The complexity should match the level of study
 - Over-ambitious ?
 - Not able to complete it in expected time consider to scale it down
 - Grounded
 - Choose an area of study where you are already knowledgeable.
 - Expands on a topic you recently covered for your course

Choosing your Topic and Title

- Feasible
 - Possible to do it conveniently
 - Scale : The subject matter is not so vast or intricate that it would be impossible for you to complete the required background reading, information collection, and analysis of your research findings in the allotted time and word count [2].
 - Ethics
 - Meet ethical requirements [protect the dignity, rights and welfare of the participants]
 - Originality
 - Make a contribution to the knowledge
 - Expand on previous findings
 - Find your own angle
 - Selecting new variables
 - Replicate – see whether you can replicate the results of the previously published research

Choosing your Topic and Title

- A good title
 - clear - make sense to the reader
 - Specific – clearly identified; certain
 - Incorporate a question
 - Precise
 - Fits convention
 - A usual accepted way of behaving : typical title of dissertation used previously

References

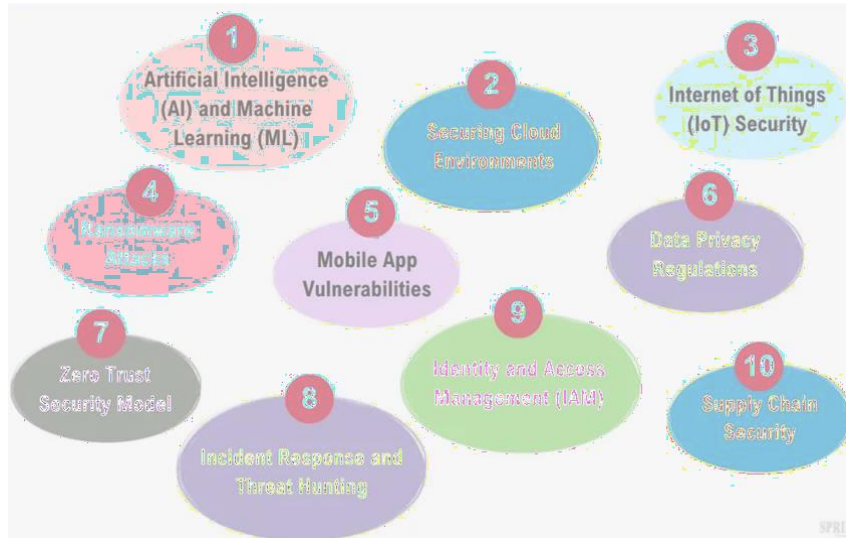
- 1 K. Kasi et al., Research: What, Why and How? A Treatise from Researchers to Researchers. 2009. [Online]. Available:
<https://doi.org/10.13140/2.1.3274.1442>[2]
- 2 S. Cottrell, Dissertations and Project Reports: A Step by Step Guide. Basingstoke, U.K.: Palgrave Macmillan, 2014.

Activity-Identifying Research Gaps and Writing an Introduction

Objective:

This activity aims to develop your ability to identify **research gaps** in existing academic literature and write a concise **introduction section** for a potential research project in **digital forensics or cyber security**.

Activity-Identifying Research Gaps and Writing an Introduction



Instructions:

- Select a **specific topic** within digital forensics or cyber security (ransomware investigation techniques, IoT forensics, AI in threat detection, cloud evidence preservation, etc.).

Activity-Identifying Research Gaps and Writing an Introduction

Instructions:

- Conduct a brief **literature review** using recent academic sources (journal articles, conference papers, standards, or reports).



Activity-Identifying Research Gaps and Writing an Introduction

Log in to RefWorks

(<https://refworks.proquest.com> or your institution link).

Create a folder/project for your assignment ("MSc RMPD Intro").

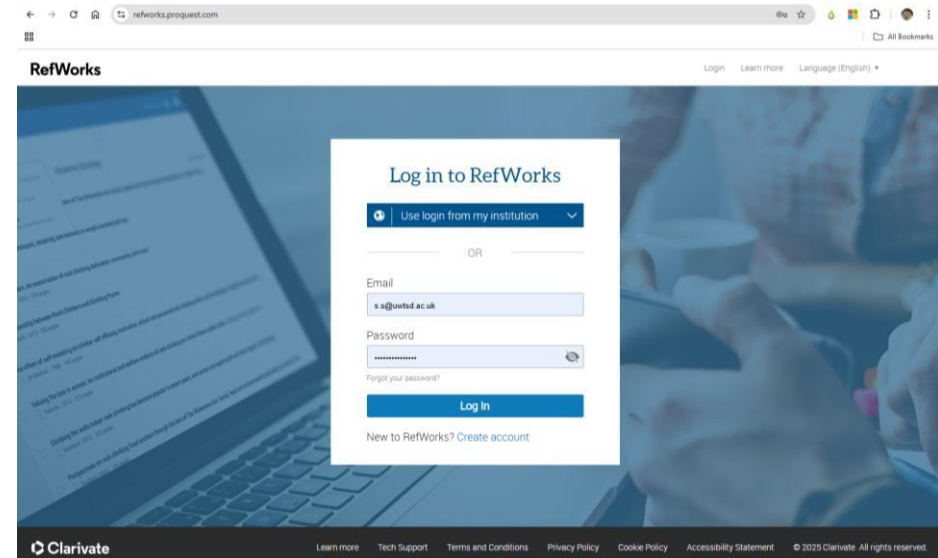
Import references:

Use "Save to RefWorks" browser button (if installed) while viewing an article; or

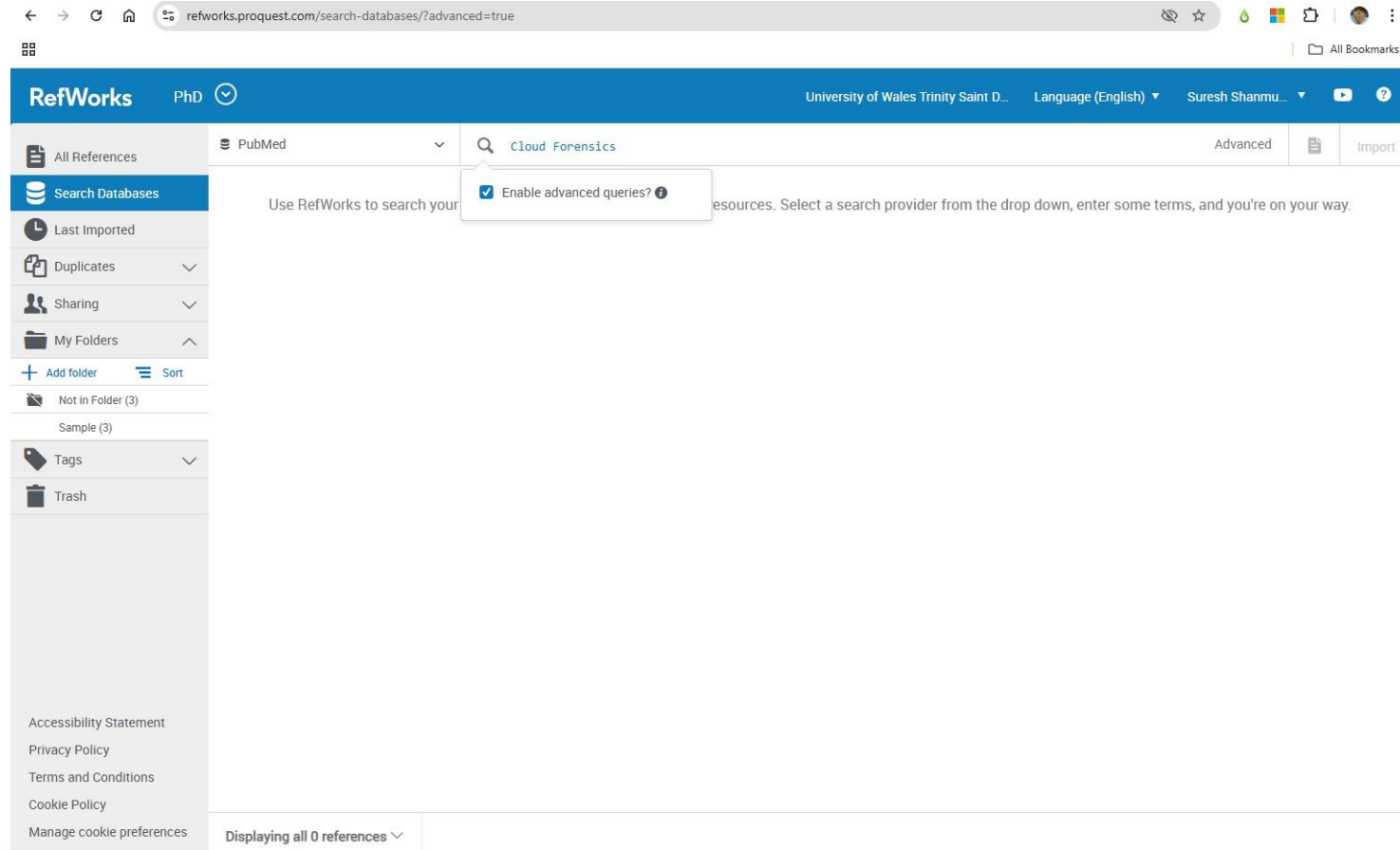
From RefWorks click Add > Import references and upload an RIS/EndNote file exported from a database; or

Click Add > Create new reference and enter details manually.

Check each imported record — ensure author names, journal title, volume, pages, year, DOI are correct. Edit metadata if needed.



Activity-Identifying Research Gaps and Writing an Introduction



Activity-Identifying Research Gaps and Writing an Introduction

The screenshot shows a web browser window with the URL `refworks.proquest.com/search-databases/7/advanced=true`. The page is the RefWorks search interface. The top navigation bar includes the RefWorks logo, a user profile dropdown (PhD), and the University of Wales Trinity Saint David logo. The search bar shows 'Cloud Forensics' and 'Advanced' search mode. The left sidebar contains a list of folders: 'All References', 'Search Databases', 'Last Imported', 'Duplicates', 'Sharing', 'My Folders', 'Add folder', 'Sort', 'Not in Folder (3)', 'Sample (3)', 'Tags', and 'Trash'. The main content area displays three search results, each with a checkbox, author information, title, and tags. The results are sorted by 'Date added'.

Search Results
☐ Ahmed, Abdulghani Ali; Farhan, Khalid... Alselwi, Ghadir. (2024, December). Retrieving and Identifying Remnants of Artefacts on Local Devices Using Sync.com Cloud Tags: Sync.com cloud, cloud company..., cloud computing, +4
☐ Horsman, Graeme. (2021, January). A case study on anonymised sharing platforms and digital traces left by their usage Tags: Browser forensi..., Cloud forensics, Digital forensics, +3
☐ Teing, Yee-Yang; Dehghantanha, Ali... Conti, Mauro. (2017, May). Forensic Investigation of Cooperative Storage Cloud Service: Symform as a Case Study Tags: Symform analys..., cloud forensics, cooperative clo..., +5

At the bottom of the page, there is a footer with links: Accessibility Statement, Privacy Policy, Terms and Conditions, Cookie Policy, and Manage cookie preferences. A status bar at the bottom indicates 'Displaying all 3 references'.

Activity-Identifying Research Gaps and Writing an Introduction

The screenshot displays the RefWorks Proquest search interface. The browser address bar shows `refworks.proquest.com/search-databases/?advanced=true`. The RefWorks header includes the user's name, Suresh Shanmu, and the institution, University of Wales Trinity Saint David. The search results are for the query "Cloud Forensics" in the PubMed database. The results list three references, each with associated tags and a "Full Text" button. A sidebar on the left contains navigation options like "All References", "Search Databases", and "My Folders". A right-hand panel provides detailed information for the selected reference, including the title, authors, abstract, and tags.

RefWorks PhD University of Wales Trinity Saint D... Language (English) Suresh Shanmu... Advanced Import

All References PubMed Search Databases Last Imported Duplicates Sharing My Folders Add folder Sort Not in Folder (3) Sample (3) Tags Trash

Select all on this page Sort by: Date added

Ahmed, Abdulghani Ali; Farhan, Khalid... Alselwi, Ghadir. (2024, December). Retrieving and Identifying Remnan... Sync.com cloud cloud company ... cloud computing +4

Horsman, Graeme. (2021, January). A case study on anonymised sharing platforms and digital traces left by t... Browser forensi... Cloud forensics Digital forensics +3

Teing, Yee-Yang; Dehghantanha, Ali... Conti, Mauro. (2017, May). Forensic Investigation of Cooperative Stora... Symform analys... cloud forensics cooperative clo... +5

Displaying all 3 references

Ref ID: Journal Article | Electronic

Retrieving and Identifying Remnants of Artefacts on Local Devices Using Sync.com Cloud

Check for full text at UWTSD Full Text

Reference details Related articles

Authors Ahmed, Abdulghani Ali; Farhan, Khalid; Ninggal, Mohd Izuan Hafez; Alselwi, Ghadir

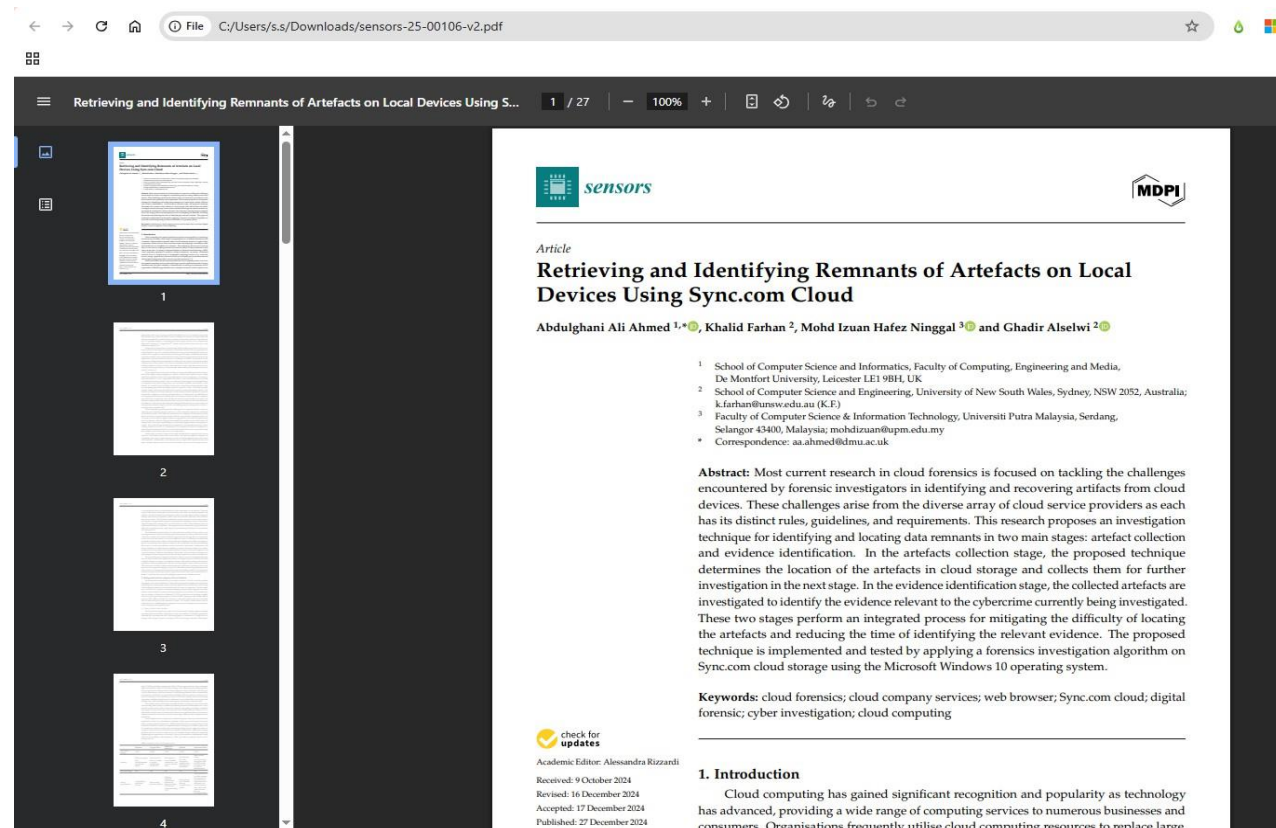
Abstract Most current research in cloud forensics is focused on tackling the challenges encountered by forensic investigators in identifying and recovering artifacts View full abstract

Tags cloud company services cloud computing cloud forensics cyber investigation View all tags

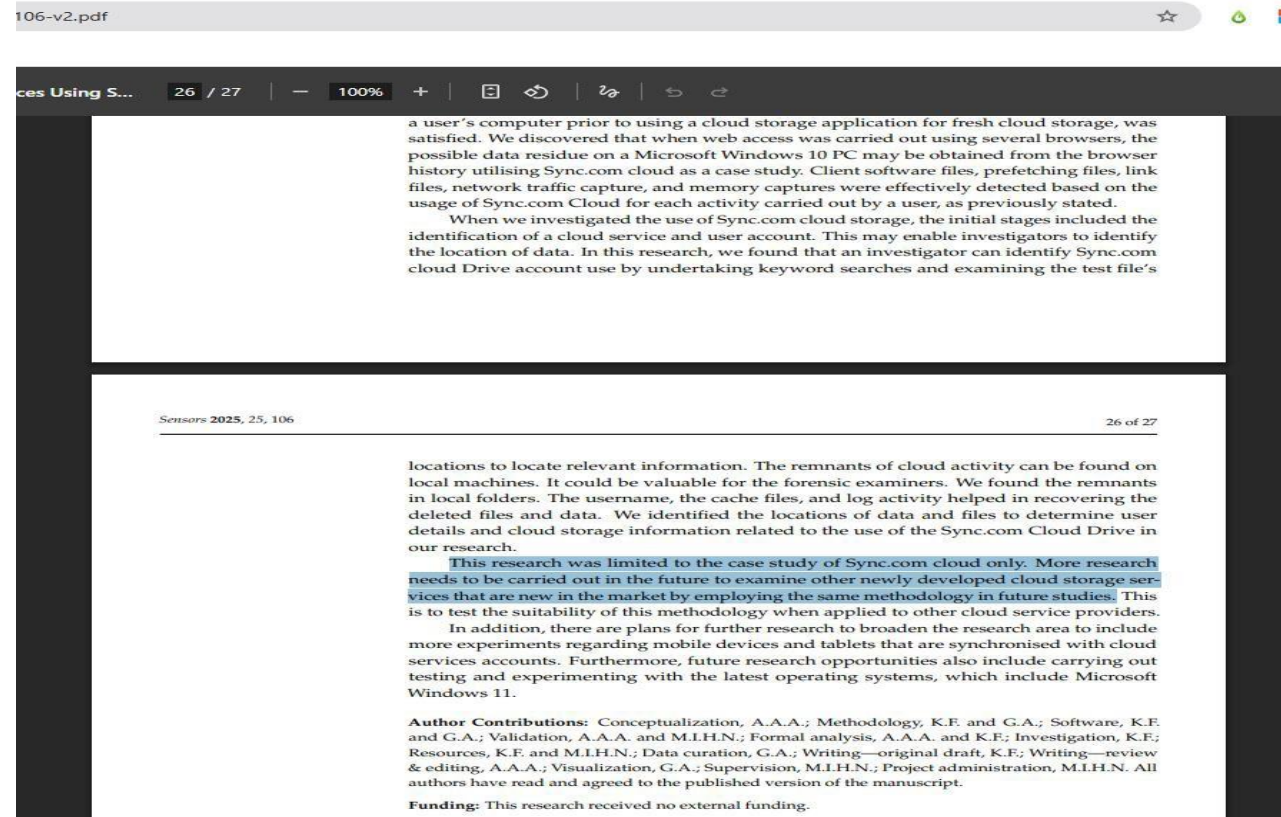
Periodical, Abbreviated Sensors (Basel)

Date Published December 27, 2024

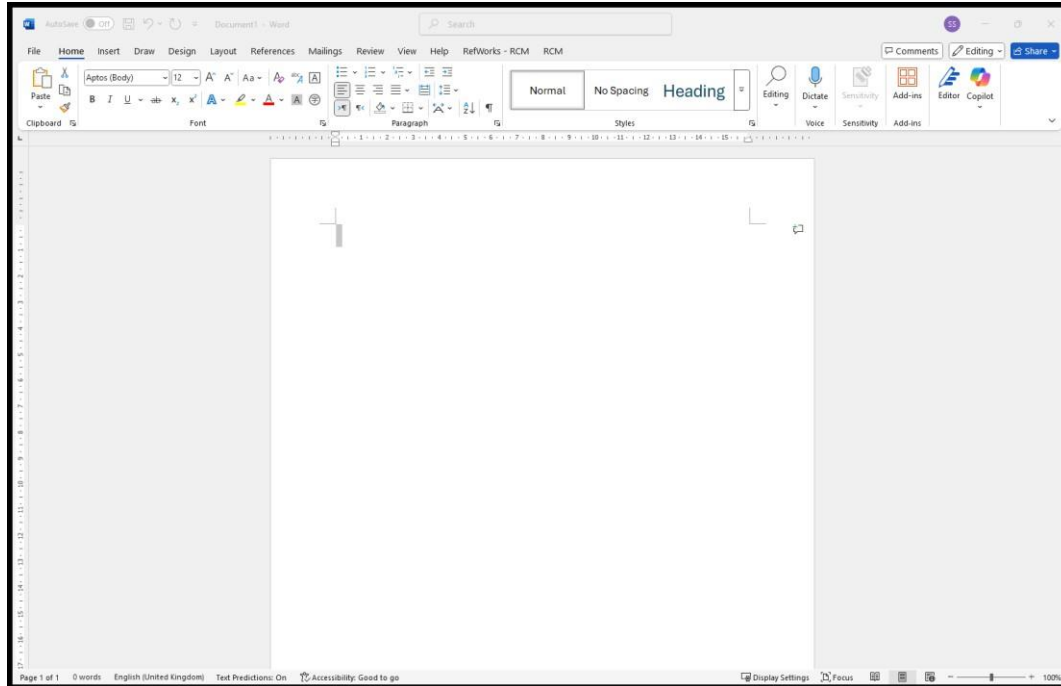
Activity-Identifying Research Gaps and Writing an Introduction



Activity-Identifying Research Gaps and Writing an Introduction

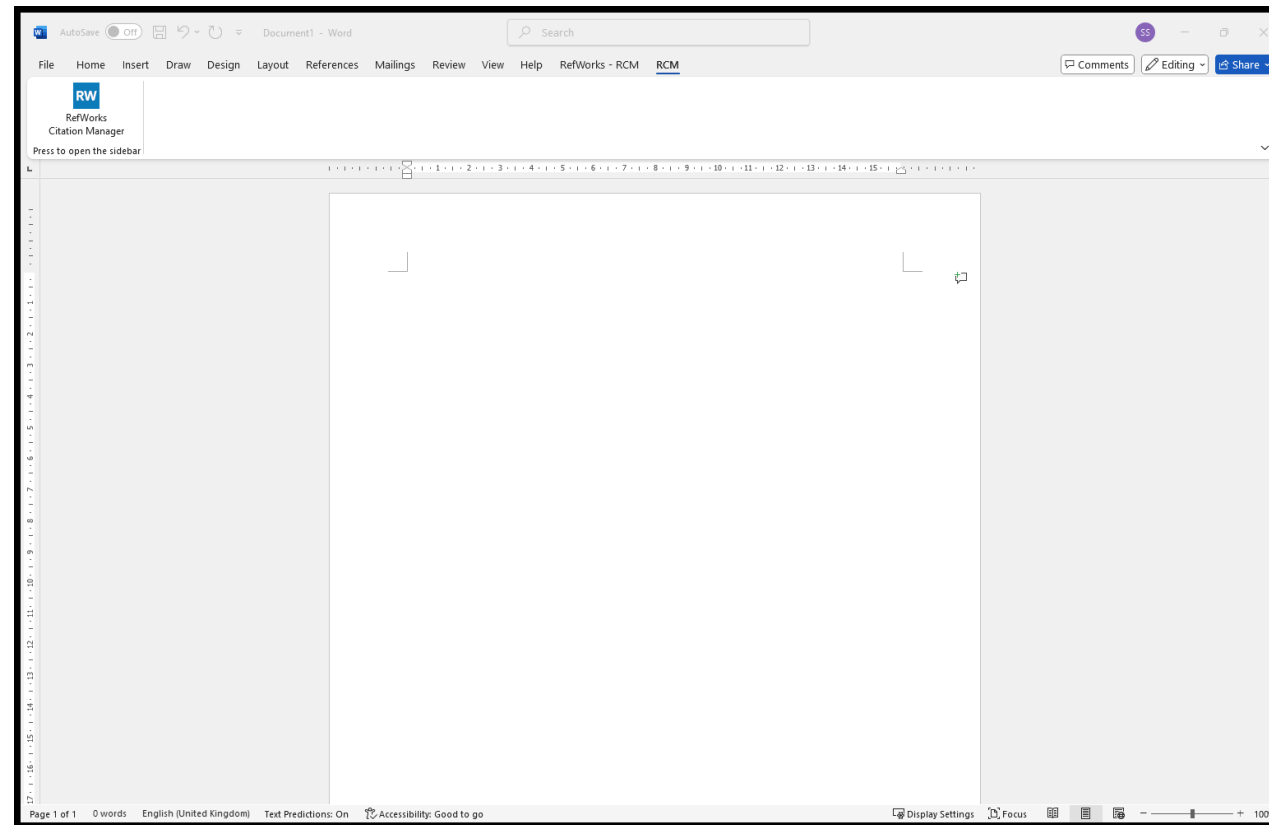


WRITE THE BRIEF REVIEW (in MS Word) and cite using RefWorks Citation Manager

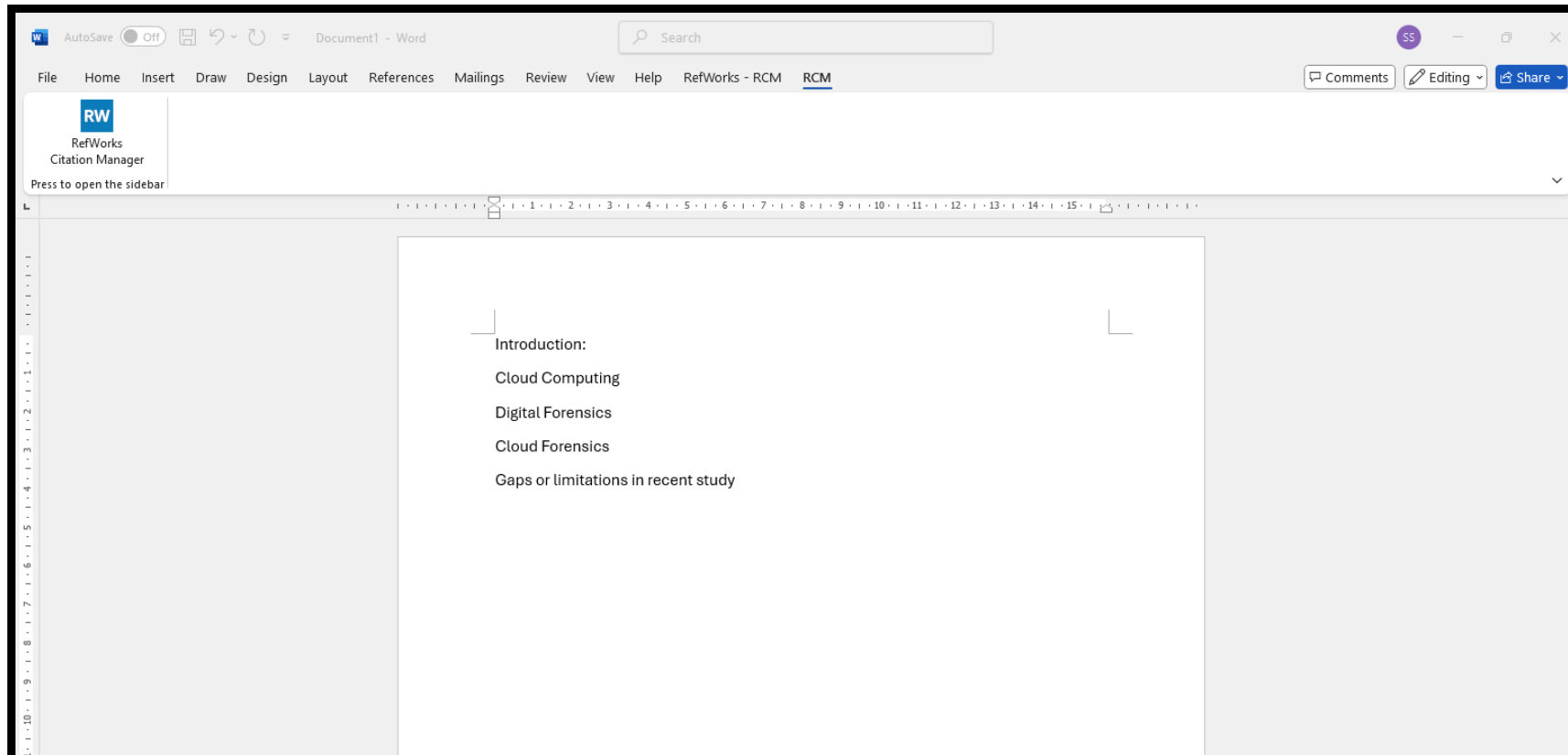


Start a new Word doc and install/open RefWorks Citation Manager (RCM) in Word: Insert → Get Add-ins → search RefWorks → Get. (Microsoft add-ins guidance).

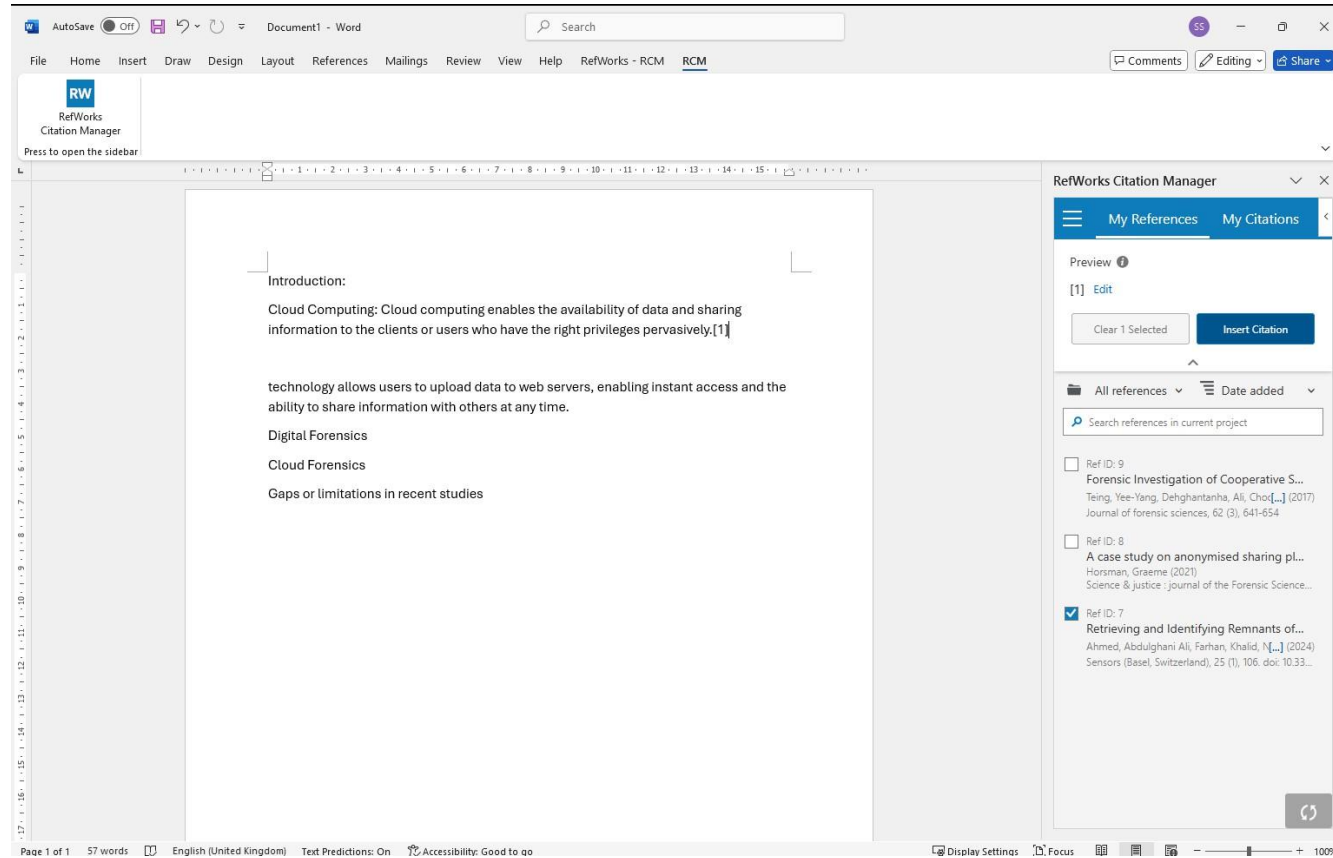
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WRITE THE BRIEF REVIEW (in MS Word) and cite using RefWorks Citation Manager

The screenshot shows a Microsoft Word document titled "Document1 - Word" with the RefWorks Citation Manager (RCM) sidebar open on the right. The document content includes an introduction and three paragraphs, each followed by a citation [1]. The sidebar shows a list of references with checkboxes for selection.

Document Content:

Introduction:

Cloud Computing: Cloud computing enables the availability of data and sharing information to the clients or users who have the right privileges pervasively.[1]

Digital Forensics: digital forensics technology helps the investigators to determine the cause of data breaches and other crimes in the cyber space by substantiating the evidences from the incidents. [1]

Cloud Forensics: Cloud forensics aid the investigators to observe the findings from the cloud devices through the investigative procedure.[1]

Gaps or limitations in recent studies

RefWorks Citation Manager Sidebar:

- My References | My Citations
- Preview ⓘ
- [1] Edit
- Clear 1 Selected | Insert Citation
- All references | Date added
- Search references in current project
- Ref ID: 9: Forensic Investigation of Cooperative S... Teing, Yee-Yang, Dehghantaha, Ali, Cho[...] (2017) Journal of forensic sciences, 62 (3), 641-654
- Ref ID: 8: A case study on anonymised sharing pl... Horsman, Graeme (2021) Science & justice : journal of the Forensic Science...
- ☒ Ref ID: 7: Retrieving and Identifying Remnants of...

WRITE THE BRIEF REVIEW (in MS Word) and cite using RefWorks Citation Manager

The image shows a Microsoft Word document on the left and the RefWorks Citation Manager interface on the right. The Word document is on page 1 of 2, containing a brief review of cloud forensics. The RefWorks interface shows a citation for 'Retrieving and Identifying Remnants of ...' by Ahmed, Abdulghani Ali, Farhan, Khalid, et al. The citation is displayed in a preview window with options to include author and date, and buttons to delete or update the citation.

Cloud Forensics: Cloud forensics aid the investigators to observe the findings from the cloud devices through the investigative procedure.[1]

Gaps or limitations in recent studies

Earlier research focused only on a case study using the Sync.com cloud storage service. This means the results cannot be easily applied to other cloud platforms. To build on this work, the current study will include different cloud storage providers and use the same forensic approach to test how well it works in various environments.[1]

Previous studies also did not look at mobile devices and tablets that connect or synchronize with cloud accounts. Since these devices are now widely used, this research will examine how synchronization affects digital evidence and what new artefacts can be found.[1]

Finally, this study will also explore the use of the latest operating systems, such as Microsoft Windows 11, to discover any new forensic artefacts and check whether existing methods still work effectively with newer technologies.[1]

This research was limited to the case study of Sync.com cloud only. More research needs to be carried out in the future to examine other newly developed cloud storage services that are new in the market by employing the same methodology in future studies. This is to test the suitability of this methodology when applied to other cloud service providers. In addition, there are plans for further research to broaden the research area to include more experiments regarding mobile devices and tablets that are synchronised with cloud services accounts. Furthermore, future research opportunities also include carrying out testing and experimenting with the latest operating systems, which include Microsoft Windows 11.

Page 1 of 2 320 words English (United Kingdom) Text Predictions: On Accessibility: Good to go

Preview [1]

Ref ID 7
Retrieving and Identifying Remnants of ...
Ahmed, Abdulghani Ali, Farhan, Khalid, ...
Sensors (Basel, Switzerland), 25 (1), 106. ...

☐ Page Value

☐ Display as Author (Year)

☒ Include author

☒ Include date

Add prefix/suffix
prefix [reference] suffix

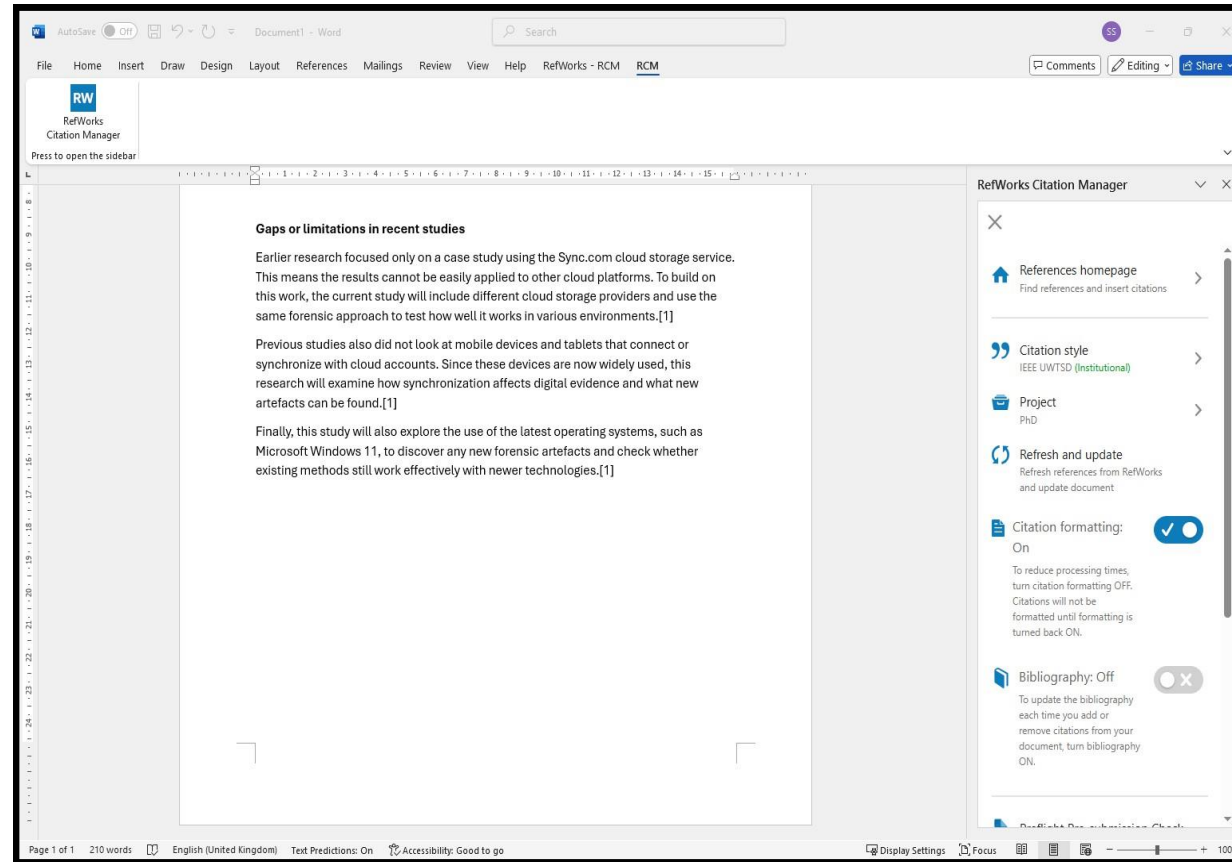
Add reference(s) to this citation

Delete Citation Update Citation

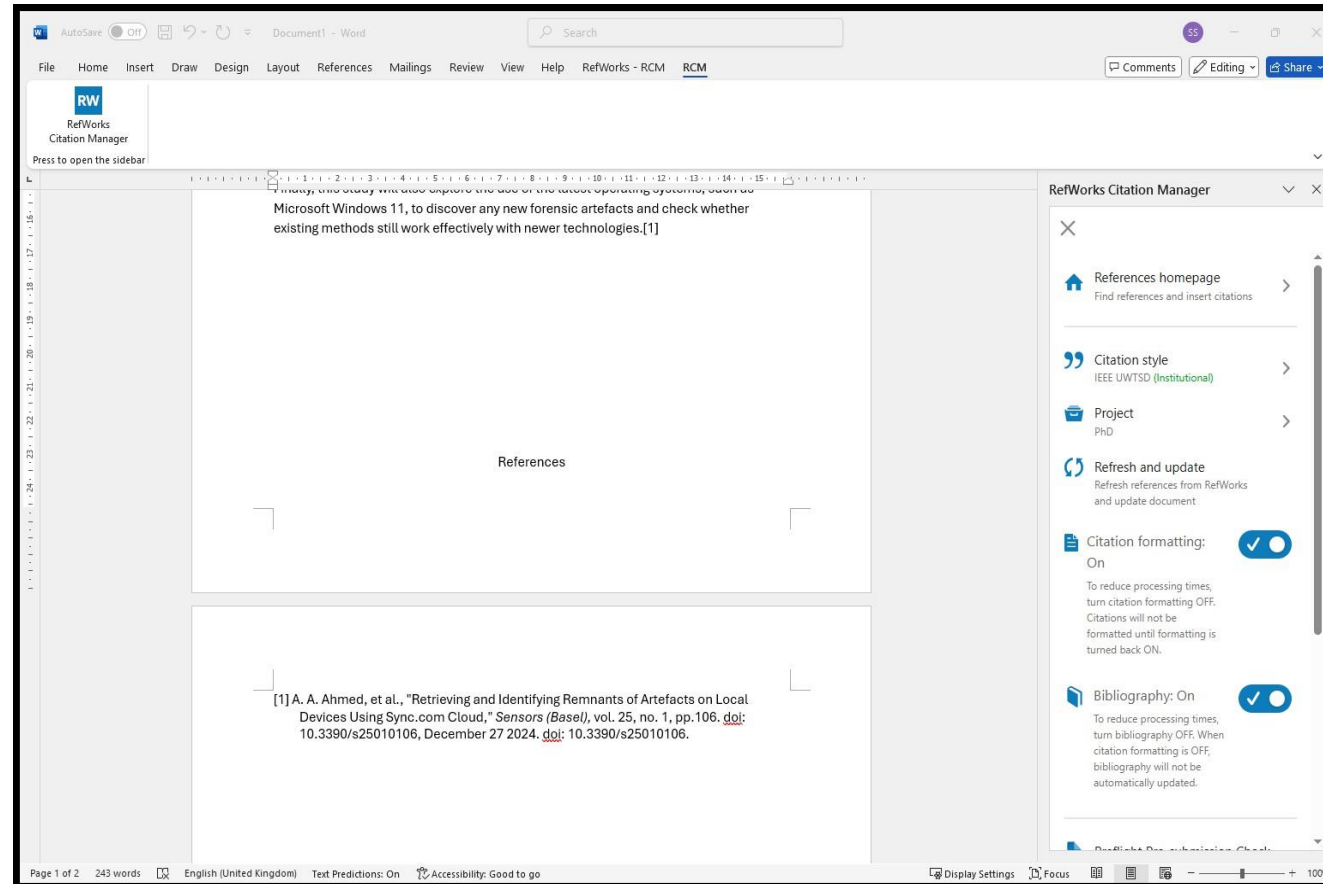
References

[1] A. A. Ahmed, et al., "Retrieving and Identifying Remnants of Artefacts on Local Devices Using ..."

WRITE THE BRIEF REVIEW (in MS Word) and cite using RefWorks Citation Manager



WRITE THE BRIEF REVIEW (in MS Word) and cite using RefWorks Citation Manager



Research Proposal and its elements

Coming up



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Any Questions?

Trawsnewid Addysg; Trawsnewid Bywydau
Transforming Education; Transforming Lives



www.uwtsd.ac.uk