



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

ACFA7004

Research Methods & Professional Development

Lecture 2 – Research Proposal

Trawsnewid Addysg; Trawsnewid Bywydau
Transforming Education; Transforming Lives



www.uwtsd.ac.uk

Recap

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

Week 2 *learning outcomes*

- Assignment brief
- SMART Objectives
- Pending presentations
- Introduction to research Proposal.
- Elements of Research proposal

**THIS
WEEK**

Assessment Brief

- **Module:** Research Methods and Professional Development
- **Module Code:** ACFA7004
- **Level:** MSc (Level 7)
- **Assessment Breakdown:**
 - Coursework 1: Research Proposal (70%)
 - Coursework 2: Presentation (30%)

Assessment Brief

Coursework 1 – Research Proposal

Deadline: 1 May 2026 2 pm

Word Count: 4000 words (+appendices)

Submission: Via Turnitin (Do not upload the brief itself)

Ethics Form: Mandatory (submitted via Moodle separately)

AI Use: Research, structure, proofreading allowed; no content generation

Assessment Brief

Structure of Research Proposal

Introduction (35%)

- Context, background, current developments
- Problem definition & challenges
- Research Aim and SMART Objectives
- Significance & potential applications

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Specific
Measurable
Achievable
Relevant
Time-bound

Assessment Brief

Structure of Research Proposal

Literature Review (25%)

- Thematic/Chronological structure
- Identify gaps, relate to your study
- Use relevant and recent academic sources

Assessment Brief

Structure of Research Proposal

Research Design and Methodology (25%)

- Research design approach (e.g., simulation, design science, analysis)
- Research method: Qualitative, quantitative, mixed
- Strategy: Case study, survey, experiment, etc.
- Tools, data sources, analysis & ethical considerations
- Technical tools and hardware/software (if applicable)

Assessment Brief

Structure of Research Proposal

Outcomes, Timeline, and Referencing

- **Expected Outcomes** (5%)
 - Predicted results, potential contributions, limitations
- **Timeline** (5%)
 - Include milestones and key activities (e.g., simple Gantt format)
- **References** (5%)
 - Proper citations, recent and credible sources
- Overall presentation of the proposal - 5%

Assessment Brief

Assessment Component 2

ALL students need to include an ethics form for their research.

The ethics committee representatives will review the form and approve it as necessary.

The ethics form will not be allocated a mark, but if not included the report will be deemed a failure

Assessment Brief

Structure of Research Proposal

Common Mistakes to Avoid

- Weak problem definition or vague objectives
- Outdated or few references
- No clear link between literature and research aim
- Missing ethics form = automatic fail
- Misuse of AI tools = academic misconduct

Assessment Brief

Use of Generative AI in Assessment

RESEARCH	For this assessment, you can use Generative AI to support you in research and data analysis.	Yes No
STRUCTURE	For this assessment, you can use Generative AI to support you in structuring your submission, including creating a draft argument structure, identifying parts and headings, etc.	Yes No
PROOFREADING	For this assessment, you can use Generative AI to check your own text/creation for grammatical and syntactical mistakes, including getting suggestions to rephrase your work.	Yes No
WRITING	For this assessment, you can use Generative AI to create text for submission.	Yes No
CREATIVE	For this assessment, you can use Generative AI to create creative materials, such as images.	Yes No
PROGRAMING	For this assessment, you can use Generative AI to create and check code.	Yes No
NONE	For this assessment, you are not allowed to use any type of Generative AI support. This includes research support, structure support, writing/proofreading support and creative support.	☐

Assessment Brief

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STRUCTURE	For this assessment, you can use Generative AI to support you in structuring your submission, including creating a draft argument structure, identifying parts and headings, etc.	Yes ☒ No ☐
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WRITING	For this assessment, you can use Generative AI to create text for submission.	Yes ☐ No ☒
CREATIVE	For this assessment, you can use Generative AI to create creative materials, such as images.	Yes ☐ No ☒
PROGRAMING	For this assessment, you can use Generative AI to create and check code.	Yes ☐ No ☒
NONE	For this assessment, you are not allowed to use any type of Generative AI support. This includes research support, structure support, writing/proofreading support and creative support.	☐



Assessment Brief – Coursework 2

Presentation Overview

- Deadline: Week 10
- In-person Presentation: Week 11 20-April-2026
- Duration: 10 minutes
- Focus: Project management & professionalism based on your research topic

Assessment Brief – Coursework 2

Presentation Content Expectations

The presentation should include:

- Research context/background
- Research Problem [based on the identified research/Literature Gap]
- Research Aim and Objectives
- A brief literature review and summary that leads to the research/literature gap
- Research methodology
- Project planning and resources
- Project impact and limitations
- Reference

Assessment Brief – Coursework 2

Tips for an Effective Presentation

- Be concise and focused – 10 mins max
- Visual design: clean slides, limit text
- Speak clearly, maintain eye contact
- Rehearse to stay within time
- Reference your key sources briefly

Assessment Brief – Coursework 2

How Will You Be Assessed?

Grading Criteria:

- Literature Engagement
- Knowledge & Understanding
- Cognitive & Critical Skills
- Practical Application
- Transferable Skills (communication, planning, independence)

Assessment Brief – Coursework 2

Use of Generative AI Tools

Allowed for:

- Research exploration

- Draft structure and outlines

- Proofreading and paraphrasing your writing

NOT allowed:

- Full AI-generated text

- Image creation or coding for this task

Assessment Brief – Coursework 2

Final Reminders & Support

- Attend all proposal presentations during sessions
- Use feedback from presentation to improve proposal
- Access library databases for research
- Finalise topic approval

SMART Objectives

Specific:

- Define what exactly you want to achieve.
Focus on a narrow aspect of the research.

To develop a machine learning-based intrusion detection system (IDS) for detecting zero-day attacks in IoT networks.

To develop a lightweight cryptographic protocol tailored for low-power IoT sensors used in smart agriculture.

To design a blockchain-based framework for secure and transparent sharing of electronic health records (EHR) among healthcare providers.

SMART Objectives

Measurable:

- You should be able to assess progress using clear metrics.

To improve detection accuracy by at least 10% compared to existing IDS models (KNN or SVM) on a benchmark dataset such as NSL-KDD.

SMART Objectives

Achievable

Ensure the objective is realistic considering your time, resources, and skills.

To implement and evaluate the model using Python libraries (e.g., Scikit-learn, TensorFlow) within the available project timeline.

popular machine learning libraries in Python

SMART Objectives

Relevant

- The goal must align with the broader research problem and current challenges in the field.

To address the growing threat of IoT vulnerabilities by proposing a lightweight and accurate detection system that can be deployed on edge devices.

SMART Objectives

Time-bound

- Set a deadline or time frame for completion.

To complete the design and initial testing of the IDS prototype by the end of the third month and conduct full evaluation, documentation & presentation by stipulated timeframe

Assessment Brief – SMART Objectives

Combined:

To develop a machine learning-based intrusion detection system (IDS) for detecting zero-day attacks in IoT networks, aiming to improve detection accuracy by at least 10% compared to existing models such as KNN and SVM using the NSL-KDD dataset.

The model will be implemented and evaluated using Python libraries like Scikit-learn and TensorFlow within the available **6-month project timeline**.

This research addresses the increasing threat of IoT vulnerabilities by proposing a lightweight, deployable IDS suitable for edge devices. The system's prototype will be designed and initially tested by the end of the third month, with full evaluation and documentation completed by **month six**.

Activity-Identifying Research Gaps and Writing an Introduction

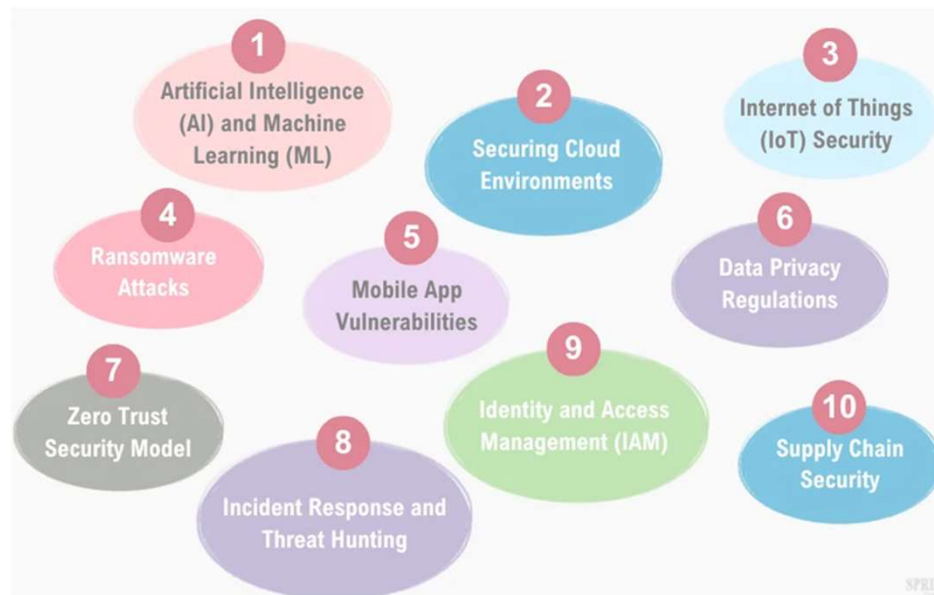
Objective:

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 concept** 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

Cyber Security Concepts

Ransomware Detection and Prevention

Phishing and Social Engineering Attacks

Network Intrusion Detection Systems (NIDS)

IoT Security

Cloud Security

Zero Trust Architecture

Cyber Threat Intelligence (CTI)

Cryptography and Data Privacy

Digital Forensics Concepts

Cloud Forensics

Mobile Device Forensics

Network Forensics

Malware Forensics

Memory Forensics

IoT Forensics

Blockchain Forensics

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

Instructions:

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

A broad overview of the research area. A discussion of current developments, trends, or challenges in that area. Enough context so the reader understands why your research topic is relevant today.

Activity-Identifying Research Gaps and Writing an Introduction- Context and Background

Instructions:

1. Start with a Broad Definition

Begin by introducing the *general area* of your study — Cyber Security, Digital Forensics, Network Security, or Cloud Forensics

"Cyber security involves protecting computer systems and networks from digital attacks aimed at accessing, changing, or destroying sensitive information."

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").

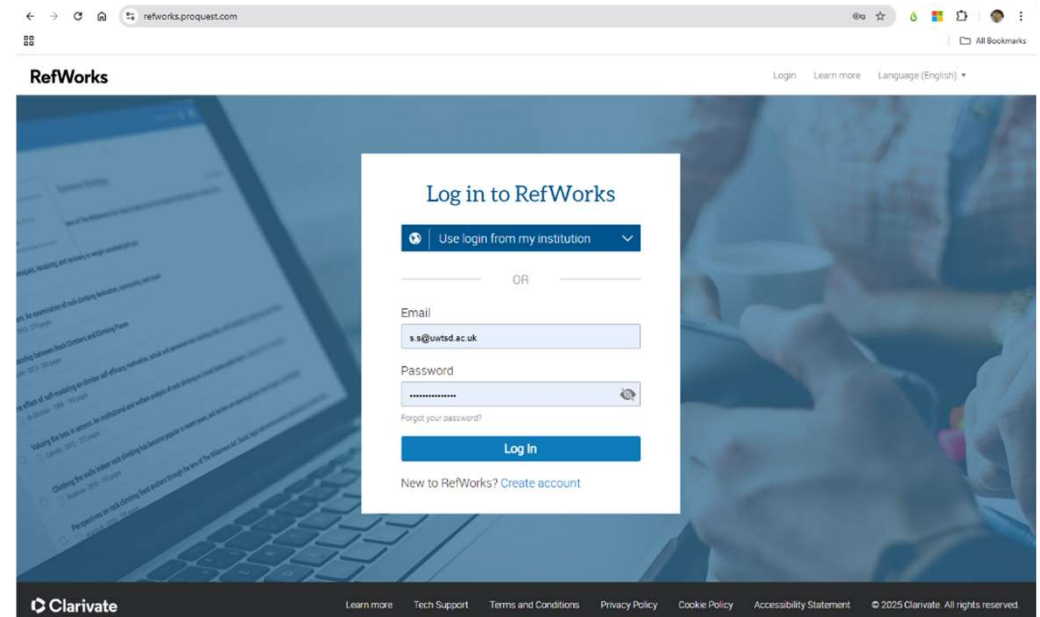
Import references:

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

The screenshot shows the RefWorks web interface. The browser address bar displays `refworks.proquest.com/search-databases/?advanced=true`. The RefWorks header includes the logo, a user profile dropdown for 'PhD', and navigation links for 'University of Wales Trinity Saint D...', 'Language (English)', and 'Suresh Shanmu...'. A left sidebar contains navigation options: 'All References', 'Search Databases' (highlighted), 'Last Imported', 'Duplicates', 'Sharing', 'My Folders', 'Add folder', 'Sort', 'Not in Folder (3)', 'Sample (3)', 'Tags', and 'Trash'. At the bottom of the sidebar are links for 'Accessibility Statement', 'Privacy Policy', 'Terms and Conditions', 'Cookie Policy', and 'Manage cookie preferences'. The main search area shows a search bar with 'Cloud Forensics' entered. A dropdown menu below the search bar offers 'Enable advanced queries?'. The search results area is currently empty, displaying 'Use RefWorks to search your resources. Select a search provider from the drop down, enter some terms, and you're on your way.' The bottom status bar indicates 'Displaying all 0 references'.

Activity-Identifying Research Gaps and Writing an Introduction

The screenshot displays the RefWorks Proquest search interface. The browser address bar shows the URL: refworks.proquest.com/search-databases/?advanced=true. The interface includes a top navigation bar with the RefWorks logo, user information (PhD, University of Wales Trinity Saint David, Language (English), Suresh Shanmu...), and a search bar containing the text "Cloud Forensics".

On the left side, there is a sidebar menu with the following options: All References, Search Databases (selected), Last Imported, Duplicates, Sharing, My Folders, Add folder, Sort, Not in Folder (3), Sample (3), Tags, and Trash. Below the sidebar, there are links for Accessibility Statement, Privacy Policy, Terms and Conditions, Cookie Policy, and Manage cookie preferences.

The main content area shows a list of search results. The first three results are visible:

- ☐ 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 results list, it says "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 the URL: 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 a checkbox for selection and a "Sort by" dropdown set to "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 t... Tags: Browser forensi..., Cloud forensics, Digital forensics, +3.
- ☐ Teing, Yee-Yang; Dehghantanha, Ali... Conti, Mauro. (2017, May). Forensic Investigation of Cooperative Stora... Tags: Symform analys..., cloud forensics, cooperative clo..., +5.

Reference Details (Right Panel):

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

The screenshot shows a PDF viewer interface. The top bar indicates the file path: C:/Users/s.s/Downloads/sensors-25-00106-v2.pdf. The left sidebar shows a table of contents with four pages. The main content area displays the article 'Retrieving and Identifying Remnants of Artefacts on Local Devices Using Sync.com Cloud' from the journal 'sensors'. The authors are Abdulghani Ali Ahmed, Khalid Farhan, Mohd Izuan Hafez Ninggal, and Ghadir Alsawi. The abstract discusses challenges in cloud forensics and proposes a technique for identifying and recovering artifacts from cloud devices. The keywords are cloud forensics, cloud company services, web browser, Sync.com cloud, digital forensics, cyber investigation, and cloud computing. The introduction section is also visible, starting with 'Cloud computing has gained significant recognition and popularity as technology has advanced...'.

Retrieving and Identifying Remnants of Artefacts on Local Devices Using S...

1 / 27 100%

sensors MDPI

Article

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

Abdulghani Ali Ahmed ^{1,*}, Khalid Farhan ², Mohd Izuan Hafez Ninggal ³ and Ghadir Alsawi ²

¹ School of Computer Science and Informatics, Faculty of Computing, Engineering and Media, De Montfort University, Leicester LE1 9BH, UK
² School of Computer Science and Engineering, University of New South Wales, Sydney, NSW 2052, Australia; k.farhan@unsw.edu.au (K.F.)
³ Faculty of Computer Science & Information Technology, Universiti Putra Malaysia, Serdang, Selangor 43400, Malaysia; mohdizuan@upm.edu.my
* Correspondence: aa.ahmed@dmu.ac.uk

Abstract: Most current research in cloud forensics is focused on tackling the challenges encountered by forensic investigators in identifying and recovering artifacts from cloud devices. These challenges arise from the diverse array of cloud service providers as each has its distinct rules, guidelines, and requirements. This research proposes an investigation technique for identifying and locating data remnants in two main stages: artefact collection and evidence identification. In the artefacts collection stage, the proposed technique determines the location of the artefacts in cloud storage and collects them for further investigation in the next stage. In the evidence identification stage, the collected artefacts are investigated to identify the evidence relevant to the cybercrime currently being investigated. These two stages perform an integrated process for mitigating the difficulty of locating the artefacts and reducing the time of identifying the relevant evidence. The proposed technique is implemented and tested by applying a forensics investigation algorithm on Sync.com cloud storage using the Microsoft Windows 10 operating system.

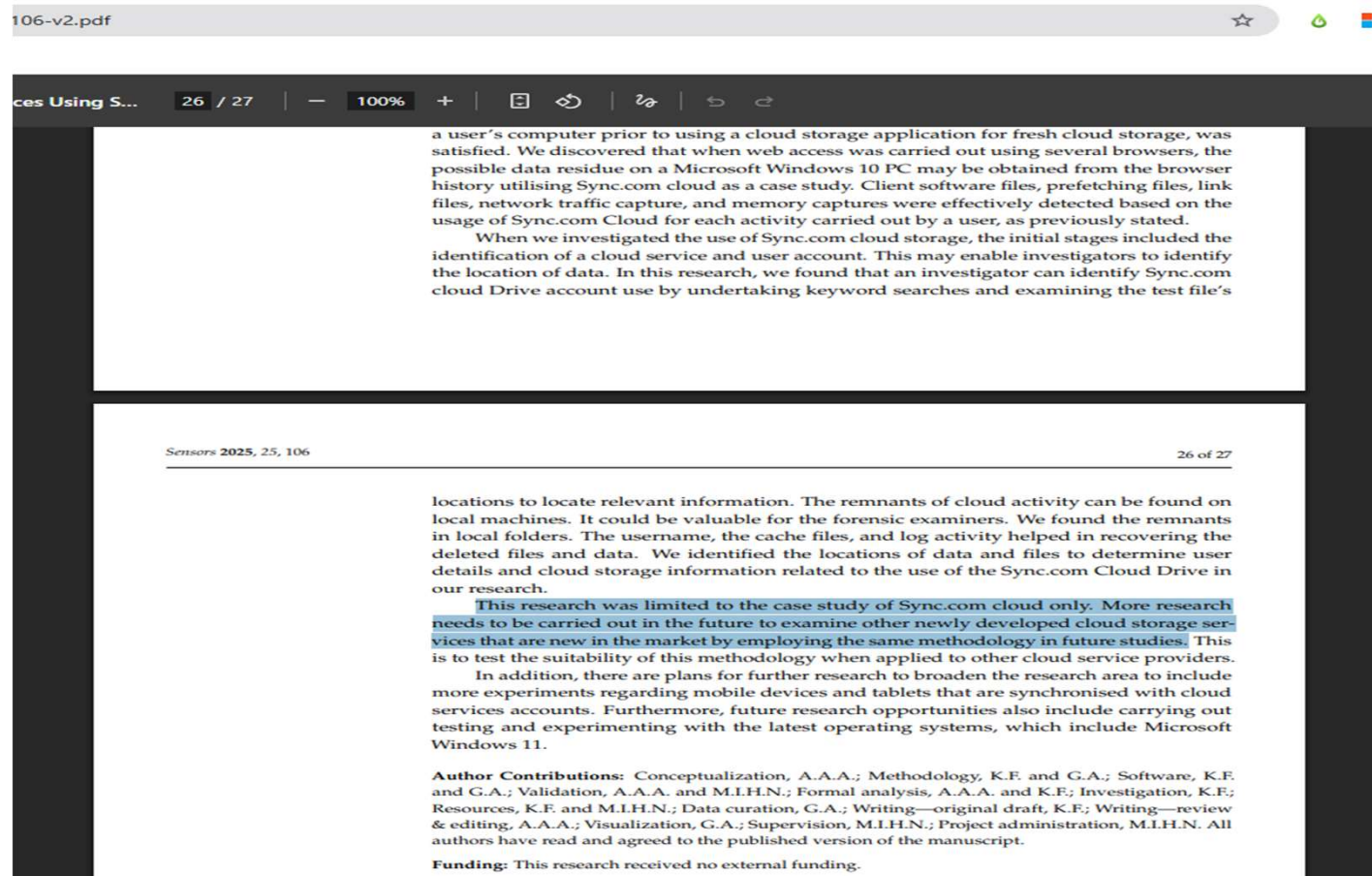
Keywords: cloud forensics; cloud company services; web browser; Sync.com cloud; digital forensics; cyber investigation; cloud computing

check for updates
Academic Editor: Alessandra Rizzardi
Received: 9 October 2024
Revised: 16 December 2024
Accepted: 17 December 2024
Published: 27 December 2024

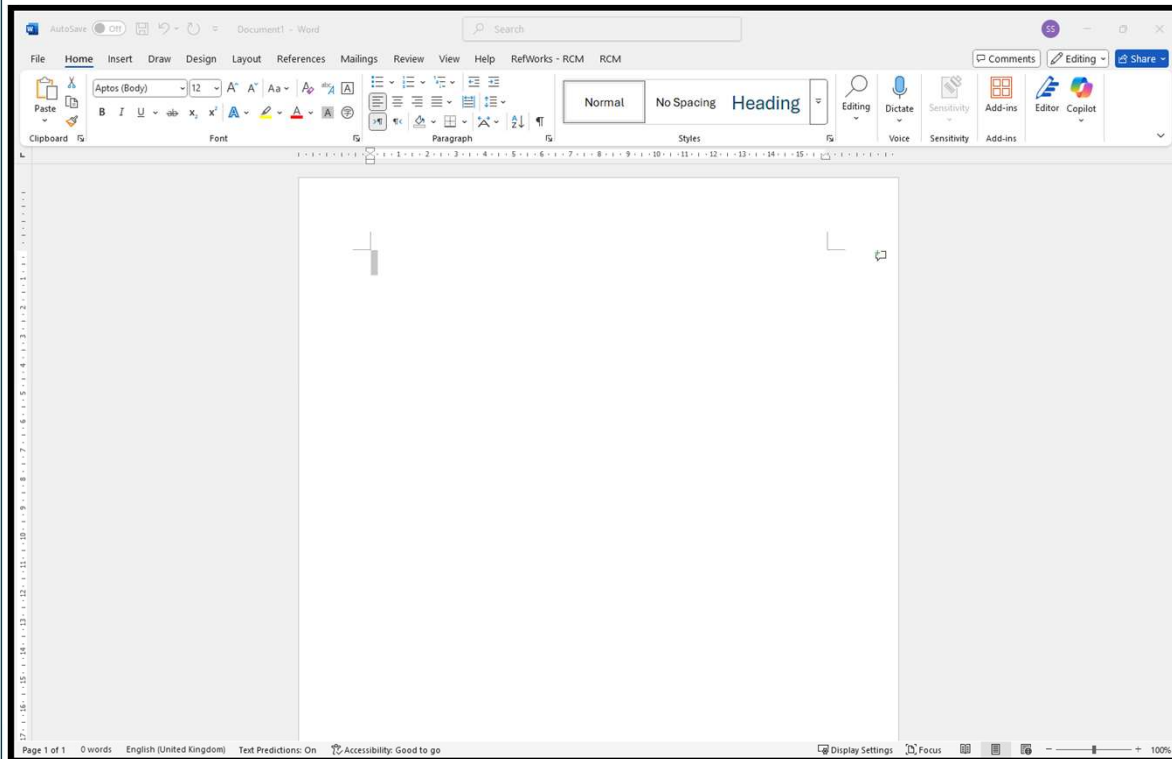
1. Introduction

Cloud computing has gained significant recognition and popularity as technology has advanced, providing a wide range of computing services to numerous businesses and consumers. Organisations frequently utilise cloud computing resources to replace large,

Activity-Identifying Research Gaps and Writing an Introduction

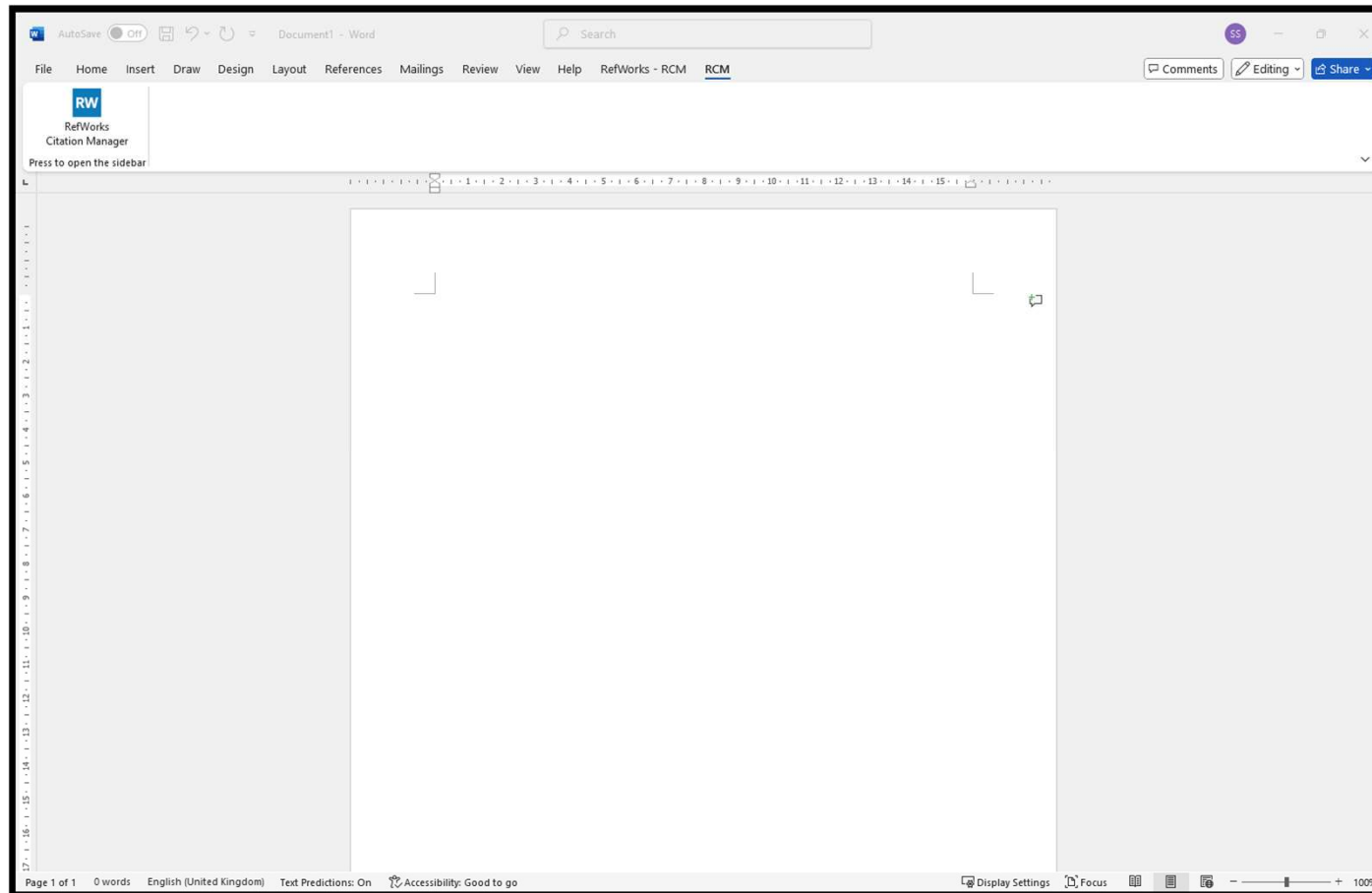


WRITE THE BRIEF REVIEW (in MS Word) and cite using RefWorks Citation Manager

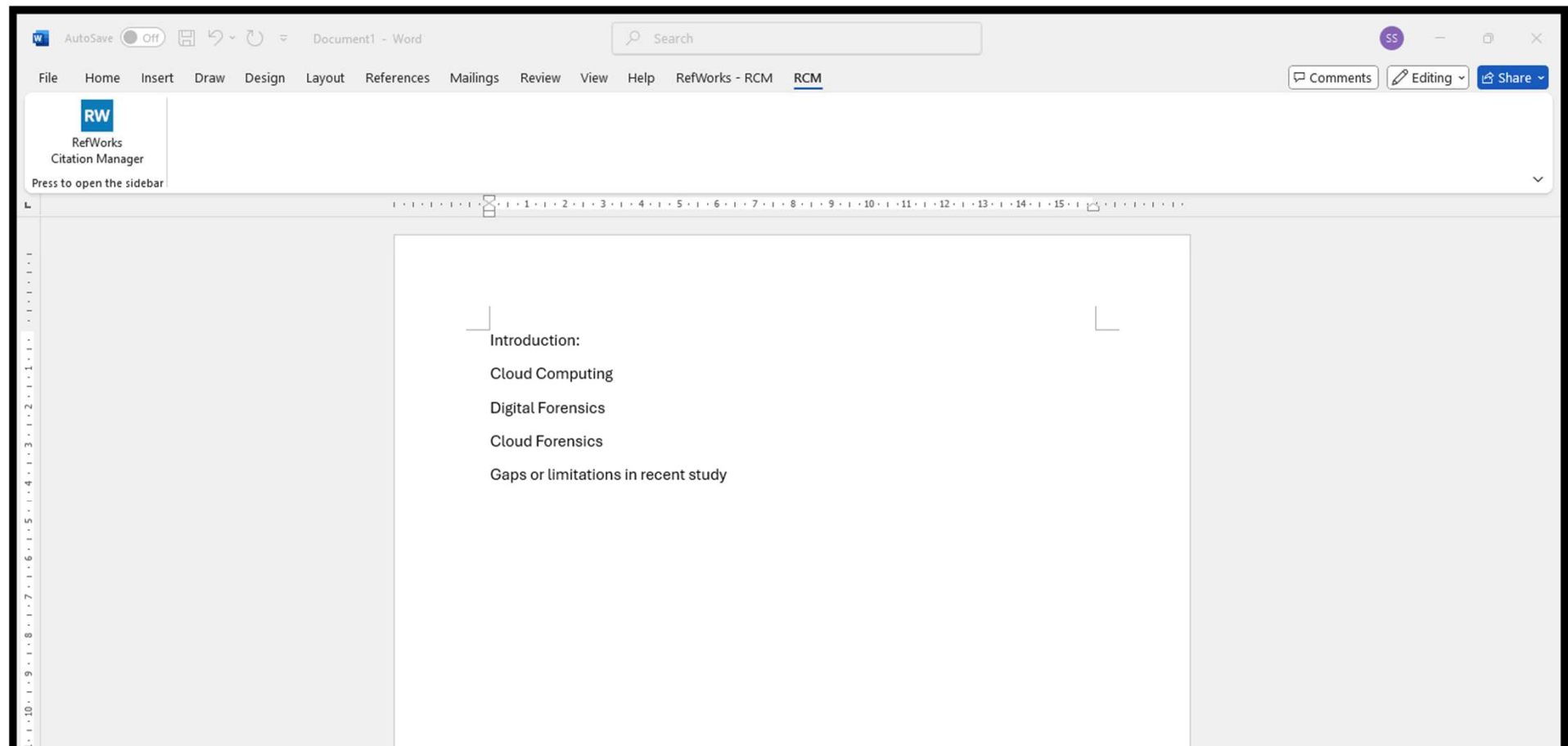


Start a new Word doc and install/open RefWorks Citation Manager (RCM) in Word: Insert → Get Add-ins → search RefWorks → Get. (Microsoft add-ins guidance).

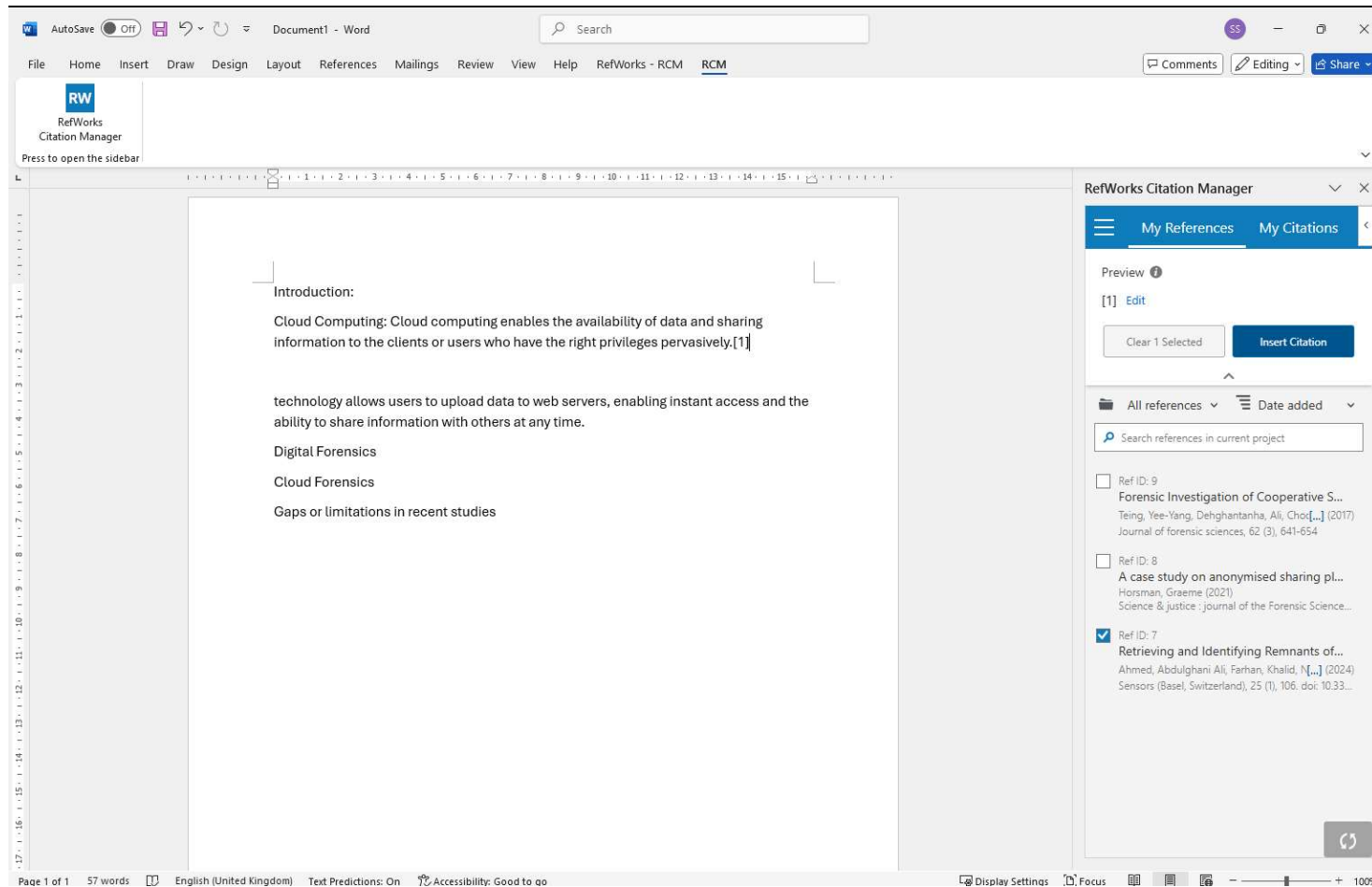
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WRITE THE BRIEF REVIEW (in MS Word) and cite using RefWorks Citation Manager

The screenshot shows the Microsoft Word interface with the RefWorks Citation Manager (RCM) sidebar open on the right. The document content includes:

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

The RefWorks Citation Manager sidebar on the right shows the 'My References' tab. It includes a 'Preview' section with a list of references. The first reference is selected:

- ☒ Ref ID: 7
Retrieving and Identifying Remnants of...

Other references listed include:

- ☐ Ref ID: 9
Forensic Investigation of Cooperative S...
Teing, Yee-Yang, Dehghantanha, Ali, Choc[...] (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...

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 contains the following text:

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.

The RefWorks Citation Manager interface on the right shows a preview of a citation for Ref ID 7: "Retrieving and Identifying Remnants of ... Ahmed, Abdulghani Ali, Farhan, Khalid, ... Sensors (Basel, Switzerland), 25 (1), 106. ...". It includes options to add prefix/suffix, display as author (year), include author, and include date. There are buttons for "Delete Citation" and "Update Citation". The bottom status bar of the Word document shows "Page 1 of 2", "320 words", "English (United Kingdom)", "Text Predictions: On", and "Accessibility: Good to go".

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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RefWorks Citation Manager

- References homepage
Find references and insert citations
- Citation style
IEEE UWTSD (Institutional)
- Project
PhD
- Refresh and update
Refresh references from RefWorks and update document
- Citation formatting: On
To reduce processing times, turn citation formatting OFF. Citations will not be formatted until formatting is turned back ON.
- Bibliography: Off
To update the bibliography each time you add or remove citations from your document, turn bibliography ON.

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References

[1] A. A. Ahmed, et al., "Retrieving and Identifying Remnants of Artefacts on Local Devices Using Sync.com Cloud," *Sensors (Basel)*, vol. 25, no. 1, pp.106. doi: 10.3390/s25010106, December 27 2024. doi: 10.3390/s25010106.

RefWorks Citation Manager

- References homepage
Find references and insert citations
- Citation style
IEEE UWTSD (Institutional)
- Project
PhD
- Refresh and update
Refresh references from RefWorks and update document
- Citation formatting: On
To reduce processing times, turn citation formatting OFF. Citations will not be formatted until formatting is turned back ON.
- Bibliography: On
To reduce processing times, turn bibliography OFF. When citation formatting is OFF, bibliography will not be automatically updated.

Activity- Submission point

<https://forms.office.com/e/b9ihy8s4fZ>

