Implementation Plan by Module

Creating a **research education curriculum** involves designing a comprehensive program that equips students or participants with the knowledge and skills necessary to conduct research effectively. Below is a structured framework that can be adapted for your specific audience and goals.

Below is a detailed breakdown of lesson plans, project ideas, and teaching aids for each module in the **Research Education Curriculum**. Each example is practical and adaptable to different audiences.

This implementation plan can be tailored further based on the audience's expertise and time constraints.

Below is an expanded and detailed version of the **Research Education Curriculum**, with elaboration on all aspects. This provides a robust framework adaptable to different contexts.

1. Curriculum Goals

The program's objectives provide clarity on its purpose:

• Develop critical thinking and analytical skills

Participants learn how to assess information logically, identify gaps in existing knowledge, and approach problems with systematic reasoning.

• Teach ethical research practices

Emphasis is placed on the responsible conduct of research, including avoiding plagiarism, understanding consent and confidentiality in human subject research, and addressing conflicts of interest.

• Train participants in research design, methodologies, and analysis

This includes teaching participants how to design robust studies, select appropriate methodologies, and analyze data accurately using modern tools and techniques.

• Foster collaboration and communication of research findings

Collaboration is encouraged through group projects, emphasizing teamwork across disciplines and sectors. Participants also learn to present their findings effectively to diverse audiences (academic, industry, and public).

2. Target Audience

The curriculum is tailored to suit various groups:

• **Undergraduate students:** Focus on introductory research skills.

Introduce foundational concepts of research such as basic statistics, literature reviews, and hypothesis formation. The goal is to spark interest in research and equip them with essential skills for internships or entry-level research roles.

• **Graduate students:** Advanced methodologies and independent research.

Advanced topics like research methodology, experimental design, and proposal writing are included. The emphasis is on equipping students to conduct independent research and prepare for doctoral-level work or careers in academia and industry.

• **Industry professionals:** Application of research to solve real-world problems.

Focuses on applying research to solve business challenges or innovate within their organizations. Modules include case studies and real-world examples from their industries to maximize relevance.

3. Core Modules (Detailed)

Content is organized into modules that build progressively.

Module 1: Foundations of Research

This introductory module lays the groundwork for understanding research concepts:

• **What is research?**

Explain research as a systematic process for answering questions or solving problems. Discuss its role in academia, industry, and societal progress.

• **Types of research:**

Cover distinctions such as:

• *Basic research*: Expanding fundamental knowledge.

• *Applied research*: Solving practical problems.

• *Quantitative research*: Numerical data analysis.

• *Qualitative research*: Exploring patterns, behaviors, and experiences.

• **Identifying research questions and objectives:**

Teach how to identify meaningful gaps in knowledge and transform them into focused questions or hypotheses.

• **Importance of literature review:**

Explain how reviewing existing studies helps refine questions, avoid redundancy, and provide a theoretical framework.

• **Understanding research ethics:**

Address ethical dilemmas and introduce key guidelines like the Belmont Report, informed consent, and IRB (Institutional Review Board) processes.

Module 2: Research Design and Methodology

Focus on structuring research to produce valid, reliable results:

• **Formulating hypotheses and research proposals:**

Guide participants in crafting clear, testable hypotheses. Include templates for writing compelling research proposals.

• **Study designs:**

Teach different methodologies and when to use them:

• *Experimental*: Controlled manipulation of variables.

• *Observational*: Studying subjects in natural settings.

• *Surveys*: Collecting self-reported data.

• *Case studies*: In-depth investigation of a single subject or small group.

• **Sampling techniques:**

Discuss random sampling, stratified sampling, convenience sampling, and their implications on study validity.

• **Introduction to data collection tools.**

Module 3: Data Collection and Management

Emphasize tools and strategies for efficient data handling:

• **Qualitative methods: interviews, focus groups, content analysis.**

Techniques such as in-depth interviews, focus groups, ethnography, and thematic analysis.

• **Quantitative methods: surveys, experiments, and statistical sampling.**

Methods include designing surveys, experiments, and using standardized tests or scales.

• **Tools for data collection: SPSS, R, NVivo, etc.**

Introduce platforms like REDCap for surveys, NVivo for qualitative analysis, and Python/R for quantitative tasks.

• **Data organization and security.**

Teach best practices for anonymizing sensitive data, adhering to GDPR (General Data Protection Regulation), and managing datasets securely using cloud solutions or version control systems like Git.

Module 4: Data Analysis

Equip participants with skills to make sense of collected data:

• **Descriptive and inferential statistics:**

• Descriptive statistics: Mean, median, standard deviation, etc.

• Inferential statistics: Hypothesis testing, confidence intervals, and regression analysis.

• **Software training (Excel, Python, R, or others):**

• Provide practical sessions on tools such as:

• *SPSS*: For statistical analysis.

• *R or Python*: For flexible, script-based data analysis.

• *Tableau or Power BI*: For creating interactive dashboards.

• Visualizing data with graphs and charts:

Teach participants to create effective charts and graphs to summarize findings.

• Interpreting results in the context of research questions.

Module 5: Writing and Communicating Research

Help participants effectively share their findings:

• Structuring research papers and reports:

Provide templates for IMRAD (Introduction, Methods, Results, and Discussion) structures.

• Citing sources and avoiding plagiarism:

Cover citation styles like APA, MLA, and Chicago, and introduce citation management tools like Zotero or EndNote.

• Preparing for peer reviews:

Teach how to incorporate feedback and handle rejection constructively.

• Communicating findings to diverse audiences (academic, industry, public):

Role-play sessions for presenting to different audiences, including scientific conferences, funding committees, and media.

Module 6: Advanced Topics

Explore specialized areas for more experienced participants:

• Systematic reviews and meta-analysis:

Teach methods to synthesize existing research using databases like PubMed.

• Grant writing and funding applications:

Guide participants in crafting compelling proposals tailored to funding bodies like NIH, NSF, or industry partners.

• Intellectual property and patents:

Explain the basics of copyright, trademarks, and the patent application process.

• **Collaborative research across disciplines:**

Discuss best practices for interdisciplinary and international collaborations.

4. Experiential Learning Components

Incorporate hands-on activities to enhance understanding.

• **Workshops: Practice designing studies and analyzing data:**

Include real-world exercises like designing experiments, interpreting datasets, and troubleshooting methodological challenges.

• **Case Studies: Real-world applications of research methods:**

Analyze landmark studies to understand how research principles were applied.

• **Projects: Conduct individual or group research projects:**

Encourage participants to design and execute their research projects, from question formulation to presenting findings.

• **Internships or Collaborations: Partner with academic labs, NGOs, or private companies:**

Facilitate placements in academic labs, NGOs, or R&D departments in private companies for hands-on experience.

5. Assessment and Feedback

• **Quizzes and assignments for theoretical understanding:**

Regular quizzes test theoretical knowledge, while assignments focus on practical application.

• **Evaluation of research proposals or papers:**

Evaluate participants' ability to create feasible, well-structured proposals or manuscripts.

• **Peer and instructor feedback on presentations or projects:**

Provide constructive feedback from peers, instructors, and external reviewers to refine skills.

6. Resources and Support

• Access to research software and databases:

Provide free or discounted access to platforms like SPSS, PubMed, and Microsoft Academic.

• Reading materials (books, journals, and articles):

Offer curated reading lists of textbooks, journal articles, and guidelines from reputable organizations like APA or WHO.

• Mentorship programs with researchers and industry professionals:

Pair participants with experienced researchers to provide guidance throughout their projects.

7. Program Duration

• Short courses: 1-3 months for foundational skills.

• Short courses (1-3 months):

Ideal for foundational topics, focused on introducing key concepts and basic skills.

• Certificate programs: 6 months for comprehensive training.

• Certificate programs (6 months):

Comprehensive training covering all modules, ideal for graduate students or professionals.

• Degree courses: 1-2 years for advanced mastery.

• Degree programs (1-2 years):

In-depth training with a strong emphasis on independent research and specialization in fields like life sciences, social sciences, or data science.

8. Implementation Plan

Implementing the **Research Education Curriculum** requires detailed planning for each module, including infrastructure, resources, timeline, and evaluation methods. Below is a comprehensive guide for implementing all modules in a program.

Program Timeline: 6 Months

Month	Module	Focus	Output
1	Foundations	Introduction, ethics, literature review	Case study summaries, IRB role-play
2	Study Design	Research questions and methodologies	Research protocols, hypothesis development
3	Data Collection	Survey and clinical data collection	Surveys, pilot data collection
4	Data Analysis	Statistical methods and visualization	Analyzed datasets, visualizations
5	Writing and Communication	Writing and presenting research	Abstracts, oral presentations
6	Advanced Topics	Systematic reviews, grant writing	Systematic reviews, mock grant proposals

Module 1: Foundations of Research

Module 1: Foundations of Cardio-Oncology Research

Focus: Understanding heart risks in cancer survivors, the interplay between oncology and cardiology, and research ethics.

Timeline: Month 1

• Week 1: Orientation to cardio-oncology.

• Week 2: Introduction to research.

• Week 3: Literature review workshop.

• Week 4: Ethics seminar with case-based learning.

Steps for Implementation

Implementation Plan for Module 1: Foundations of Research

Objective

To introduce participants to the fundamental principles of research, its types, ethics, and processes.

Infrastructure

• Set up classrooms with audiovisual tools for lectures.

• Use learning management systems (e.g., Moodle) to share readings and assignments.

Curriculum Delivery

1. **Overview of Cardio-Oncology**

• **Content**: Explain heart risks associated with cancer treatments (e.g., cardiotoxicity of chemotherapy).

• **Deliverables**:

• **High School Students**: Create an infographic on heart health in cancer survivors.

• **Undergraduates**: Write a one-page summary of a case study.

• **Medical Students/Residents**: Present a real-world case of cardiotoxicity.

2. **Introduction to Research (1 hour)**

• **Week 1: Understanding Research and Its Importance**

• *Objective*: Define research and its significance.

• *Activities*:

• Interactive lecture on the history of research.

• Conduct an interactive lecture on the role of research in society.

• Discussion on how research impacts society, using real-world examples.

• Group activity: Compare basic vs. applied research in current news articles.

• Include a brainstorming session where participants discuss problems in their fields that could benefit from research.

3. **Literature Review Basics**

• **Week 2: Literature Review Workshop**

• **Content**: Guide participants on finding relevant cardio-oncology papers.

• *Activities*:

• Guide participants on how to find, read, and synthesize journal articles using databases like PubMed or JSTOR.

• Conduct a live demonstration of reference management tools (e.g., Zotero or EndNote).

4. **Understanding Research Ethics (2 hours)**

4. **Research Ethics in Cardio-Oncology**

• **Week 3: Research Ethics**

• *Objective*: Introduce ethical guidelines in research.

• **Content**: Focus on consent.

• *Activities*:

• Role-play IRB approval scenarios using case studies (e.g., Tuskegee study).

• Ensure participants complete an online ethics certification, such as CITI Training.

Project Idea

• Develop a mock research question based on a societal issue (e.g., climate change, public health). Write a one-page ethical justification and identify potential ethical challenges.

Teaching Aids

• Videos: *Introduction to Research* by Coursera or Khan Academy.

• Handouts: Summaries of ethical guidelines (Belmont Report, APA guidelines).

• Tools: Interactive slides with examples of research misconduct.

3. **Assessment**

• Weekly quizzes on research types and ethics.

• A group activity to write an ethical justification for a mock research question.

4. **Resources**

• Preloaded research databases (e.g., JSTOR).

• Handouts summarizing ethical guidelines like the Belmont Report.

• **Deliverables**:

• **High School Students**: Summarize a short article.

- **Undergraduates**: Compile 3-5 relevant articles on heart risk.
- **Advanced Participants**: Conduct a mini literature review on a specific question.

Module 2: Study Design in Cardio-Oncology

Module 2: Research Design and Methodology

Focus: Designing studies to assess heart risk in cancer patients.

Objective

To teach participants how to design and structure research effectively.

Infrastructure

• Provide access to whiteboards or brainstorming tools like Miro for mapping out study designs.

• Use data collection tools like Google Forms or REDCap.

Implementation Plan for Module 2: Research Design and Methodology

Steps for Implementation

Curriculum Delivery

1. **Creating Research Questions**

1. **Formulating Research Questions (1 hour)**

Week 1: Hypotheses and Research Questions

• *Objective*: Teach participants to create clear and testable research questions.

• **Content**: Focus on relevant questions like "What is the incidence of cardiotoxicity in breast cancer patients treated with doxorubicin?"

Activities

• Conduct a workshop where participants refine vague research questions into testable hypotheses.

• Use peer feedback to improve clarity and focus.

• **Deliverables**:

• **High School Students**: Develop one research question.

• **Undergraduates**: Propose a hypothesis.

• **Advanced Participants**: Create a complete research question and hypothesis.

2. **Study Designs (2 hours)**

2. **Selecting Study Designs**

• **Week 2: Study Designs**

• *Objective*: Differentiate between study designs and select the right one.

• **Content**: Compare observational vs. experimental designs for heart risk studies.

• *Activities*:

• Lecture on experimental, observational, and case study methods with real-world examples.

• Divide participants into teams and assign each a scenario (e.g., studying vaccine efficacy). Teams design a mock study and present it.

• Lecture on experimental vs. observational designs.

• Case study: Compare methods in two published studies.

• Workshop: Create a study design for a given research problem.

• **Deliverables**:

• **High School Students**: Match study types to scenarios.

• **Undergraduates**: Outline a cohort study design.

• **Advanced Participants**: Propose a research protocol for a clinical study.

3.

• **Week 3: Sampling Techniques**

• *Activities*:

• Teach probability and non-probability sampling with hands-on activities, such as drawing random samples from a dataset.

Timeline: Month 2

• Week 1: Introduction to research design.

• Week 2: Hypothesis and variables workshop.

• Week 3: Study design lecture and group work.

Project Idea

• Design a mock study on a relevant topic (e.g., the effects of screen time on academic performance). Include hypothesis, variables, and sampling strategy.

Teaching Aids

• Handouts: Study design decision tree.

• Templates: Research proposal structure.

• Tools: Collaborative tools like Miro for brainstorming designs.

3. **Assessment**

• Create a study proposal with a clear design, methodology, and sampling strategy.

• Peer reviews of study designs for critique and improvement.

4. **Resources**

• Templates for research proposals.

• Access to collaborative tools (e.g., Google Docs, Miro).

• Example studies to analyze different designs.

Module 3: Data Collection in Cardio-Oncology

Module 3: Data Collection and Management

Focus: Gathering data to predict and assess heart risk.

Objective

To train participants in effective data collection methods and ethical data handling.

Infrastructure

• Provide computers with software for survey creation (e.g., Google Forms) and qualitative analysis (e.g., NVivo).

• Ensure secure cloud storage for data handling.

Implementation Plan for Module 3: Data Collection and Management

Steps for Implementation

Curriculum Delivery

1. **Survey and Interview Design**

1. **Survey Design Basics (1 hour)**

• Week 1: Designing Data Collection Tools

• *Objective*: Introduce principles of survey creation.

• **Content**: Focus on collecting patient data (e.g., heart monitoring during chemotherapy).

• *Activities*:

• Analyze examples of good and bad surveys.

• Workshop: Draft a survey with 5-10 questions for peer feedback.

• Workshop: Participants design a survey on a given topic. Peer review is used to refine clarity and relevance.

• **Deliverables**:

• **High School Students**: Draft 3 survey questions.

• **Undergraduates**: Design a 5-question survey on risk factors.

• **Advanced Participants**: Develop a comprehensive survey for cardio-oncology patients.

2. **Clinical Data Handling**

2. **Data Security and Privacy (2 hours)**

• **Week 2: Managing Data Securely**

• *Objective*: Teach data protection and ethical storage practices.

• **Content**: Introduce tools for managing sensitive data.

• *Activities*:

• Lecture on GDPR and HIPAA.

• Group exercise: Identify potential privacy risks in research scenarios.

• Lecture on GDPR and HIPAA standards, followed by an activity where participants identify potential risks in fictional research scenarios.

• **Deliverables**:

• Perform a data-entry exercise using sample datasets.

3.

• **Week 3: Pilot Testing**

• *Activities*:

• Participants pilot their surveys or interviews, collect sample responses, and analyze initial data for quality.

Timeline: Month 3

• Week 1: Basics of survey design.

• Week 2: Data management workshop.

• Week 3: Peer feedback on survey tools.

Project Idea

• Create a survey or interview guide to study a specific topic (e.g., mental health in college students). Pilot the survey and report feedback.

Teaching Aids

• Tools: Google Forms or REDCap for designing surveys.

• Handouts: Best practices for anonymizing data.

• Videos: Tutorials on using NVivo for qualitative data management.

3. **Assessment**

• Evaluate the design and implementation of surveys and interview protocols.

• Ensure participants submit a short report on pilot test results and suggest improvements.

4. **Resources**

• Handouts on survey question design and data privacy laws.

• Preloaded interview guides for practice.

• Online tutorials for REDCap and NVivo.

Module 4: Data Analysis in Cardio-Oncology

Module 4: Data Analysis

Focus: Analyzing data to identify trends in heart risks.

Objective

To develop participants' skills in statistical analysis and data visualization.

Infrastructure

• Set up computer labs with statistical software (e.g., SPSS, RStudio) and visualization tools (e.g., Tableau).

• Provide preloaded datasets for practice.

Implementation Plan for Module 4: Data Analysis

Steps for Implementation

Curriculum Delivery

1. **Descriptive and Inferential Statistics**

1. **Introduction to Statistical Analysis (2 hours)**

• Week 1: Descriptive Statistics

• *Objective*: Teach participants to calculate basic descriptive statistics.

• **Content**: Use sample datasets (e.g., echocardiography readings).

• *Activities*:

• Hands-on activity using Excel or R to compute means, medians, and standard deviations.

• Group exercise: Summarize and interpret patterns in a dataset.

• Workshop: Use Excel to compute mean, median, and standard deviation.

• Group activity: Interpret statistics from sample datasets.

• **Deliverables**:

• **High School Students**: Calculate averages and percentages.

• **Undergraduates**: Compute and interpret correlations.

• **Advanced Participants**: Perform regression analysis.

• **Week 2: Inferential Statistics**

• *Activities*:

• Lecture on hypothesis testing and p-values, followed by guided practice using SPSS or RStudio.

• **Deliverables**:

• **High School Students**: Calculate averages and percentages.

• **Undergraduates**: Compute and interpret correlations.

• **Advanced Participants**: Perform regression analysis.

3. **Visualizing Cardio-Oncology Data**

3. **Visualizing Data (1 hour)**

• **Week 3: Data Visualization**

• *Objective*: Show participants how to create effective graphs.

• **Content**: Teach graphs for presenting patient data.

• *Activities*:

• Lecture on types of visualizations (e.g., histograms, scatterplots).

• Hands-on: Create charts using Python (matplotlib) or Tableau.

• Workshop: Participants use Tableau to create charts and dashboards. Present findings visually to the class.

• **Deliverables**:

• **High School Students**: Create pie charts.

• **Undergraduates**: Build histograms.

• **Advanced Participants**: Generate complex visualizations in Tableau.

Timeline: Month 4

• Week 1: Data analysis basics.

• Week 2: Practical session using Excel/SPSS.

• Week 3: Data visualization workshop.

Project Idea

• Analyze a dataset (e.g., demographic data) using Excel or R. Generate a report with graphs and written interpretations.

Teaching Aids

• Datasets: Pre-prepared datasets from Kaggle or open-source repositories.

• Software: Access to RStudio or Tableau Public.

• Templates: Excel files with pre-loaded data for analysis.

3. **Assessment**

• Analyze a given dataset and submit a report with both statistical analysis and visualizations.

• Peer and instructor feedback on the clarity of analysis and presentation.

4. **Resources**

- Preloaded datasets (e.g., from Kaggle).
- Online tutorials for R and Tableau.

Module 5: Writing and Communicating Cardio-Oncology Research

Module 5: Writing and Communicating Research

Focus: Presenting research findings effectively.

Objective

To train participants in effectively writing and presenting research findings.

Infrastructure

• Provide access to citation management tools (e.g., Zotero) and grammar software (e.g., Grammarly).

Implementation Plan for Module 5: Writing and Communicating Research

Steps for Implementation

Curriculum Delivery

1. **Writing Research Papers**

1. **Structuring a Research Paper (2 hours)**

• Week 1: Structuring Research Papers

• *Objective*: Teach IMRAD structure for academic writing.

Activities:

• Analyze the structure of published papers.

• Workshop: Draft an abstract and introduction for a mock study.

• Workshop: Break down an academic article into IMRAD sections. Participants outline their own papers based on a given dataset.

• **Deliverables**:

• **High School Students**: Write an abstract.

• **Undergraduates**: Draft an introduction.

• **Advanced Participants**: Write a full research paper.

2. **Preparing for Peer Review (1 hour)**

• **Week 2: Peer Review Process**

• *Objective*: Train participants to handle peer reviews.

Activities:

• Role-play peer review: Participants exchange and critique drafts of abstracts or introductions.

• Role-play: Review each other's abstracts and provide constructive feedback.

3. **Presenting Research**

• **Week 3: Presenting Research**

Activities:

• Teach presentation techniques. Participants prepare 3-minute presentations using visual aids like PowerPoint or posters.

• **Deliverables**:

• Create and deliver a 3-minute research presentation.

Timeline: Month 5

• Week 1: Structuring research papers.

• Week 2: Writing abstracts.

• Week 3: Presentation skills workshop.

Project Idea

• Write and present a mini-research report on a chosen topic. Incorporate peer and instructor feedback for improvement.

Teaching Aids

• Handouts: Writing templates for research articles.

• Tools: Grammarly or Turnitin for checking plagiarism and grammar.

• Videos: “How to Write a Research Paper” tutorials on YouTube.

3. **Assessment**

• Submit a draft of a research paper for instructor feedback.

• Deliver an oral presentation and receive peer evaluations.

4. **Resources**

• Templates for research articles and PowerPoint presentations.

• Examples of successful posters and presentations.

Module 6: Advanced Cardio-Oncology Topics

Module 6: Advanced Topics

Focus: Advanced research techniques like systematic reviews and grant writing.

Objective

To introduce participants to specialized areas like systematic reviews and grant writing.

Infrastructure

• Provide access to systematic review tools (e.g., Covidence) and grant-writing resources (e.g., NIH templates).

Implementation Plan for Module 6: Advanced Topics

Steps for Implementation

Curriculum Delivery

1. **Conducting Systematic Reviews**

1. **Systematic Reviews (2 hours)**

• Week 1: Conducting Systematic Reviews

• *Objective*: Teach steps for conducting a systematic review.

• *Activities*:

• Workshop: Practice screening abstracts for relevance.

• Workshop: Screen abstracts and extract data from selected studies.

• Group activity: Extract data from selected articles and summarize.

• **Deliverables**:

• Participants conduct a mini-systematic review on cardio-oncology interventions.

2. **Grant Writing**

2. **Grant Writing Basics**

• **Week 2: Grant Writing**

• *Objective*: Show how to prepare funding proposals.

Activities:

• Analyze successful grants and draft specific aims for a mock funding proposal.

• Analyze successful grant applications.

• Workshop: Draft a budget and specific aims for a mock proposal.

• **Deliverables**:

• Write a mock proposal for a study on heart risk prediction.

3.

• **Week 3: Collaborative Research**

• Group activity: Simulate collaboration across fields to design an interdisciplinary project.

Timeline: Month 6

• Week 1: Systematic review methods.

• Week 2: Grant writing seminar.

• Week 3: Final project presentations.

Project Idea

• Write a grant proposal for a research project and present it to a simulated funding panel.

Teaching Aids

• Examples: Sample systematic reviews or grant proposals.

• Templates: Budget and timeline templates for proposals.

• Tools: Covidence for systematic reviews and NIH templates for grants.

3. **Assessment**

• Submit a systematic review protocol or grant proposal.

• Role-play presenting a grant proposal to a mock funding panel.

4. **Resources**

• Examples of systematic reviews and grants.

• Templates for data extraction and budget planning.

4. Experiential Learning Components

• Workshops:

Examples include mock IRB review sessions, analyzing real-world datasets, and creating dashboards for data visualization.

• Case Studies:

Use examples like John Snow's cholera study or Watson and Crick's discovery of DNA structure to illustrate research principles.

• Internships:

Partner with organizations to give participants hands-on exposure to academic or industry research processes.

5. Assessment and Feedback

• Quizzes:

Weekly quizzes on key concepts, such as ethical practices or study design.

• Proposals and Projects:

Rubrics to evaluate structure, originality, and feasibility of research proposals.

Final Deliverables by Level

• **High School Students**: Infographic, short paper, simple chart, and presentation.

• **Undergraduates**: Research proposal, survey, dataset analysis, and presentation.

• **Advanced Participants**: Research paper, statistical analysis, systematic review, and grant proposal.

This timeline ensures comprehensive coverage of research skills while allowing tailored outputs for different expertise levels.