

The 32nd Annual Association for Practical and Professional Ethics (APPE) International Conference

Oral Presentation Virtual 2B (March 31, 2023, 12:30pm-14:00pm EDT)

Teaching Research Integrity: An Educational Digital Storytelling (EDS) Approach Facilitated by Multimedia

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Taiwan Association for Academic Ethics Education (TAAEE)

Research Interests

- Instructional design for research integrity curriculum
- Scholarly publication ethics in the digital era
- The challenges of supporting research integrity in the face of publication pressures (e.g., ethics of authorship)

Selected Publication

Chou, C., **Pan, S. J.-A.**, & Hsueh, M.-L. (2022). Assessment criteria for research misconduct: Taiwanese researchers' perceptions. *Accountability in Research—Policies and Quality Assurance*. <https://doi.org/10.1080/08989621.2022.2071155>

Pan, S. J.-A. (2021). Taiwanese and American graduate students' misconceptions regarding responsible conduct of research: A cross-national comparison using a two-tier test approach. *Science and Engineering Ethics*, 27, article 20. <https://doi.org/10.1007/s11948-021-00297-7>

Pan, S. J.-A., & Chou, C. (2020). Taiwanese researchers' perceptions of questionable authorship practices: An exploratory study. *Science and Engineering Ethics*, 26, 1499–1530. <https://doi.org/10.1007/s11948-020-00180-x>



Share the pedagogy of utilizing EDS approach and multimedia materials to teach research integrity (RI)

- Research integrity training and education in Taiwan
- Common challenges across academic institutions and proposed solutions in the NYCU
- The semester-length (16-week) research integrity course
- Teaching materials and activities: 7 examples
- Students' feedback and future work

Keywords

instructional design

instructional multimedia

learning sciences

pedagogical approach

educational digital storytelling (EDS)

research integrity



◆ I. Background / Introduction



- The local research and scientific communities have strongly recognized the **significance of research integrity (RI)**.
- Concerns have been raised:
 - Adequacy of RI policies and regulations?
 - Mechanisms for promoting good research practices (GRP)?
 - **RI training provided for researchers and students?**
- One of the proposed solutions:
 - Conduct a national-level educational project since 2014: ***Education and Implementation Mechanism of Research Ethics in Taiwan's Higher Education***
 - Being funded and supervised by the Ministry of Education (MOE) of Taiwan
 - Being led by National Yang Ming Chiao Tung University (NYCU)

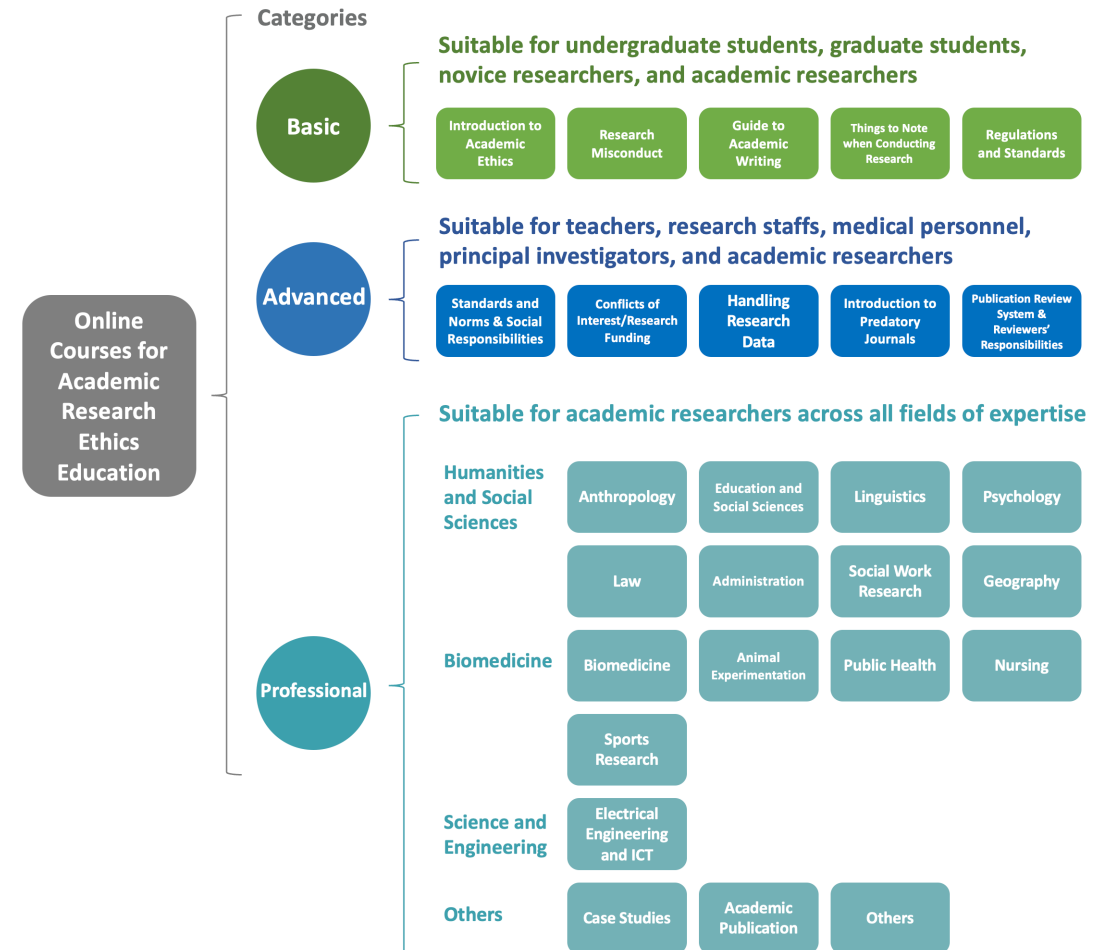


National
Yang Ming
Chiao Tung
University



- To develop and promote a RI education mechanism for the higher education systems in Taiwan.
- To develop the first systematic, comprehensive, and free Chinese RI training content for Taiwanese researchers and students.
- To establish the **Center for Taiwan Academic Research Ethics Education (AREE)** - an online learning management system (LMS) designed for academic institutions and individual learners.

In January 2023, the AREE platform has attracted a total of **1.12 million users** and has garnered approximately **123 million views**.



https://ethics.moe.edu.tw/intro_en/

Learners

- They do not have the opportunities to interact with RI instructors and peers.
- The eLearning setup may not be conducive to in-depth discussion and reflection on RI issues.

Instructors

- There is a shortage of qualified RI instructors in Taiwan.
- Current instructors' motivation to teach is unclear (might be weak).
- Instructors are unable to give timely responses and feedback to learners' questions/ideas.
- Assessing teaching and learning effectiveness in an eLearning environment is challenging.
- It is unclear whether learners read the eLearning modules in person regularly.



The eLearning setup may increasingly be seen as a way of meeting institutional RI training requirements rather than promoting good research practices.

- Establish the **Office of Academic Ethics and Research Integrity (OAERI)** in 2017 to...
 - manage all institutional RI-related affairs
 - enhance an institutional culture of research integrity
 - promote good research practices
 - develop institutional RI-related policies
 - investigate research misconduct allegations
- Host RI-related seminars and workshops regularly (e.g., *ChatGPT and Research Integrity*)
- Design customized educational activities for different campus communities



A semester-length face-to-face course in research integrity and ethics is designed for undergraduate students to provide an additional option to study RI.

◆ II. The Semester-Length (16-Week) Research Integrity Course: *Academic Research Ethics: Principles and Case Studies*



- **Synthesis and Evaluation**

Able to apply academic writing principles and professional decision-making skills to **analyze moral dilemmas and develop solutions** objectively.

- **Analysis and Evaluation**

Competent in identifying historical disputes that contravene research integrity (RI) principles and **proposing realistic and practical solutions** that can help rectify historical outcomes by referencing current research norms and regulations.

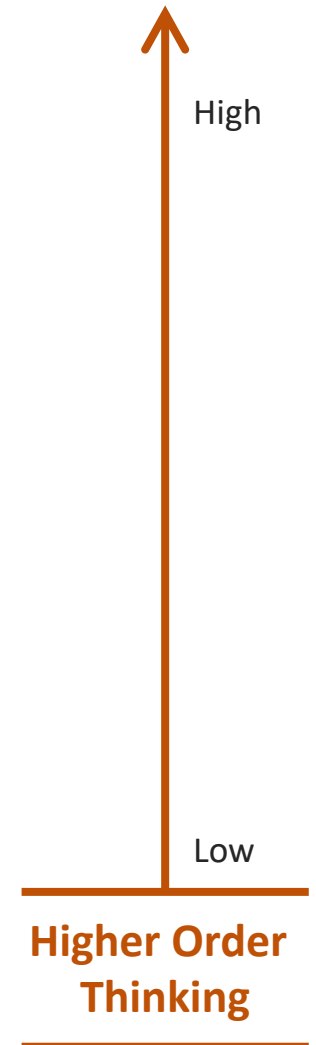
- **Understanding and Application**

Proficient in **applying knowledge and skills** to uphold RI in daily research activities, including adhering to ethical principles in academic writing and employing professional decision-making techniques.

- **Knowledge and Understanding**

Capable of **describing** RI concepts, **recognizing** the significance of RI, and **identifying** the significant issues encompassed by RI.

Note. The objectives were developed with reference to [Bloom's Taxonomy](#).



1

Tracing the Origins: The History of Research Integrity and Ethics and the Social Responsibility of Scientists

- The concept and importance of research Integrity and ethics
- The history and evolution of research Integrity and ethics
- The social responsibilities of contemporary scientists

2

Contemporary Issues: Rights and Protection of Human Subjects and Participants in Research

- The rights and protection of general research subjects and participants
- The rights and protection of vulnerable populations

3

Learning from the Past: Discussing Research Integrity and Ethics Through Historical Events

- Professional decision-making skills
- Ethical academic writing and citation styles
- Discussion of classic research ethics cases; topics include responsible research conduct, rights and protection of research participants, laboratory culture, faculty-student collaboration and mentorship, etc.
- Drawing inspiration from classic research ethics cases and applying professional decision-making skills to propose strategies for resolving ethical dilemmas

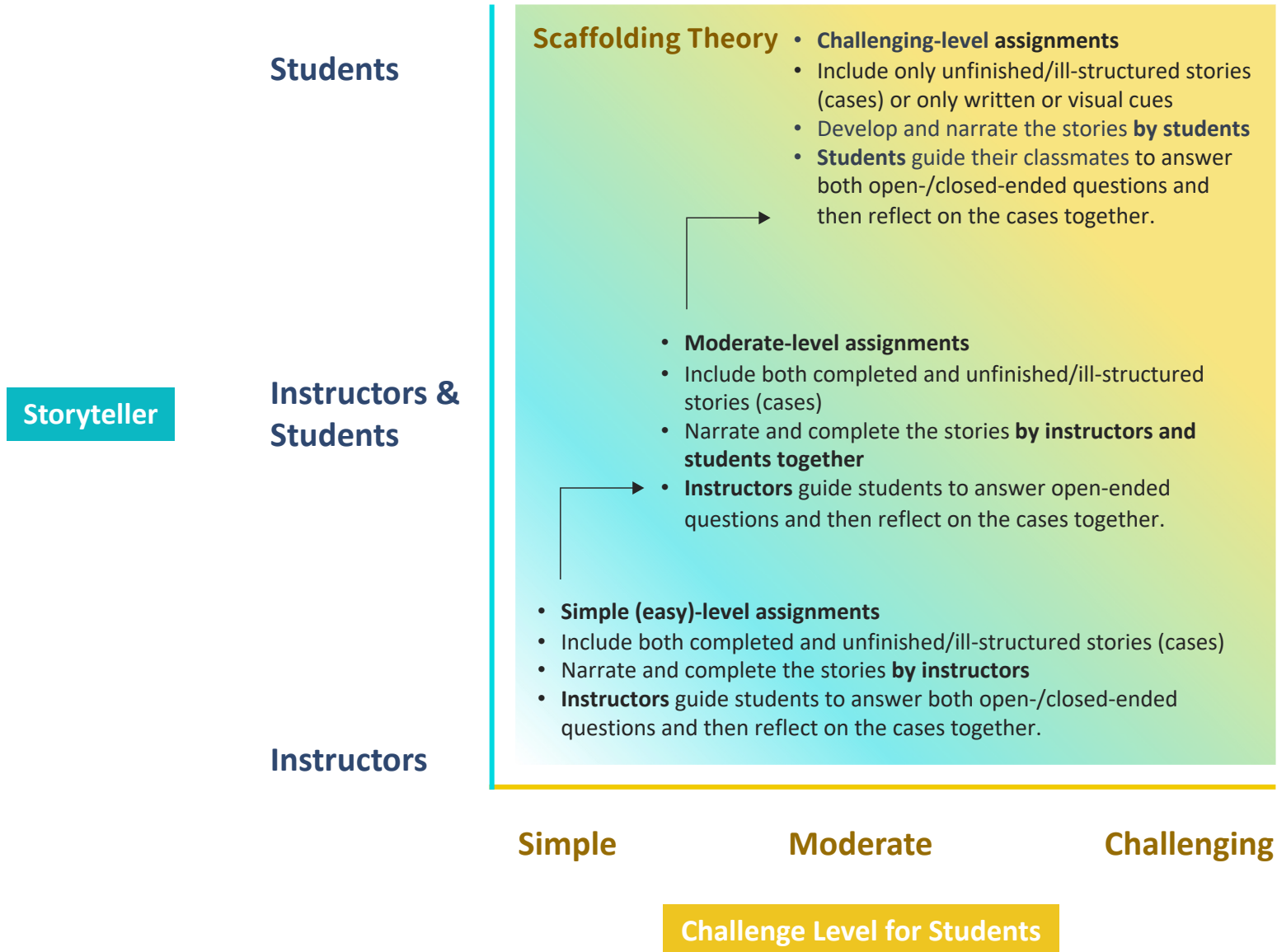
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Evaluation: Students' Assignments

- **Mid-term writing exercises:** Designed to practice ethical academic writing and citation formatting
- **Group EDS project presentation:** Focused on studying and presenting real cases of research integrity and ethics through the use of educational digital storytelling (EDS) approach
- **Peer assessment:** Designed to objectively judge the work of others and provide constructive feedback

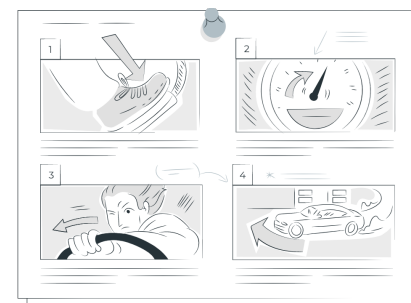
Note. The course is designed to be 2 sessions (100 minutes) per week, for a total of 32 sessions in one semester.





Type of EDS Orientation and Distinguishing Feature

EDS Orientation	Distinguishing Feature	Applied in the Class
Appropriative	Appropriation of given concepts	✓
Agentive	Embodiment of agency	
Reflective	Reflection on experiences	✓
Reconstructive	Critical reconstruction of given concepts	✓
Reflexive	Identity formation in action	



Types of EDS Outcomes and Description

Types of Outcomes	Description	Applied in the Class
Affective	Learning attitudes and emotional engagement (e.g., engaging in RI learning)	✓
Cognitive	Thinking outcomes such as critical and creative thinking (of RI-related real cases)	✓
Conceptual	Understanding of concepts or reconceptualization (e.g., important RI concepts)	✓
Academic	Study skills and research skills, academic performance	
Technological	Technical skills, media skills (students' EDS project)	✓
Linguistic	Language skills (e.g., writing, reading, expression, genre)	
Ontological (identity-related)	Self-awareness (who I am) and awareness of other social groups (who they are)	
Social	Collaborative skills, teamwork skills, and communication skills (students' EDS project)	✓

◆ III. Teaching Materials and Activities (7 Examples)



Students' Learning Styles

- Technology-skillful and heavy use
- Different information process competencies
- Require motivation to learn
- Prefer multi-tasking
- Need a high degree of interaction and participation
- Need better control and fun
- Need student-centered learning activities
 - cooperative learning
 - discussion and share
 - discovery
 - gamification
 - simulation
 - problem-solving

General Teaching Flow (2 sessions/100 minutes)

- ① Introduce the agenda for the week
- ② Deliver a lecture on the topic of the week
- ③ Present multimedia materials to supplement the lecture
- ④ Facilitate **classroom discussions** to encourage participation and engagement
- ⑤ Introduce **today's classroom assignment(s)**
- ⑥ Give students time to **complete the assignment(s)**
- ⑦ Allow students to **demonstrate their hard work on the assignment(s)**
- ⑧ Offer constructive feedback to students
- ⑨ Give take-home assignment(s) instructions (if any)
- ⑩ Conclude and end the sessions



40 mins

45 mins

15 mins

Adapted from: Chou, C., & Pan, S. J.-A. (2013, May 5–8). *How can we teach the next generation research integrity? The design and development of research integrity online curriculum for Taiwanese college students* [Paper presentation]. The 3rd World Conference on Research Integrity (WCRI), Montreal, Canada.


Storyteller: Instructors
Challenge Level: ●○○○

Example: We together explored the **potential violation of research ethics principles** by the Tuskegee syphilis study from the different perspectives of stakeholders.

關於塔斯基吉梅毒實驗 (Participants' position)

學期：110 下
課號：DWA1080

黑人受試者 (文盲佃農)



“1932年那天，某人來到我身旁。
他跟我說，我某天出現在附近的學校教室，
我就能接受免費的健康檢查。”

“檢查那天，他們告訴我「你有髒血」(bad blood)！”

“他們從未提到「梅毒」，連一次都沒有提到，
只一直強調我有髒血！”


髒血是當代對於感染疾病的一種稱呼，
因此多數受試者一生都不知道自己感染梅毒。

資料來源：James H. Jones《髒血：塔斯基吉梅毒實驗》；圖片來源：US CDC (2021). The U.S. Public Health Service Syphilis Study at Tuskegee 22

關於塔斯基吉梅毒實驗 (The project nurse's position)

學期：110 下
課號：DWA1080

黑人護理師莉芙絲小姐



Eunice Rivers
Nurse
(計畫護理師)

為該計畫與黑人社區，奉獻一生心力

原本是醫院的夜班護理師，後來被延攬成為計畫的護理師；她積極彰顯自己是專業的醫療人員。

她被延攬時還是單身，有充足時間與心力，去照顧社區居民。(註：她後來與一位梅毒死者的兒子結婚。)

她成為實驗現場的計畫代表，最大的責任是確保梅毒患者的家屬，能於患者死亡後同意驗屍。

資料來源：James H. Jones《髒血：塔斯基吉梅毒實驗》；圖片來源：維基百科詞條《Tuskegee Syphilis Study》24

關於塔斯基吉梅毒實驗 (Healthcare system at the time)

學期：110 下
課號：DWA1080

人文、制度與地理因素



Raymond A. Vonderlehr
Medical Doctor
(政府醫師之一)

Oliver Wenger
Medical Doctor
(政府醫師之一)

成為讓研究計畫得以成功的「助力」

客觀性不足的同儕審查制度

- 當代醫師覺得，只有醫師有能力評估醫學研究計畫。
- 所謂的「好醫學」(good medicine) 仰賴少數白人醫師的自由興證。

沒有約束力的知情同意原則

- 落實知情同意只是個理想原則，但它尚不存在於具約束力的任何規範中。
- 無形的相對主義凌駕於知情同意原則之上。
- 主張醫學研究的倫理，只要與其他行為的倫理相當即可。

註：最早投入這個梅毒研究的是 USPHS 的官員 Taliaferro Clark 博士，他原本只預計進行至多一年的研究。但當原本資助該研究的基金會 Rosenwald Fund 撤回資金後，他決定繼續進行研究。研究目的是想與在挪威奧斯陸的白人梅毒研究進行比較。

資料來源：James H. Jones《髒血：塔斯基吉梅毒實驗》；圖片來源：維基百科詞條《Tuskegee Syphilis Study》19

一群努力釐清真相的勇者 (Whistleblowers' position)

學期：110 下
課號：DWA1080

Austin V. Deibert
Albert P. Iskrent
PHS 的僱員

曾向 PHS 表達梅毒研究並不道德，但沒有人理會他們。

Count Gibson
助理教授
Medical College of Virginia in Richmond

1955 年時也質疑 PHS 梅毒研究的道德性，但還是無疾而終。

Irwin Schatz
芝加哥的醫師

1965 年時讀到梅毒研究的期刊論文，寫信給作者，指責他們極為不道德；作者們選擇不理會他。

Peter Buxtun
PHS 舊金山疾病管制人員

1966 年時向 PHS 性病組的主任，提出對於梅毒研究在倫理與道德上的質疑。PHS 評估後，決定繼續研究。

William Carter Jenkins
PHS 的非裔科學家

創辦並編輯致力於推動醫療種族平權的雜誌 The Drum，並於 1968 年在雜誌上譴責梅毒研究，並呼籲 PHS 終止研究。梅毒研究首次躍上媒體版面，但不確定有沒有讀他的文章。

(事件的吹哨者，終止事件的推手)

資料來源：James H. Jones《髒血：塔斯基吉梅毒實驗》；圖片來源：維基百科詞條《Tuskegee Syphilis Study》28

Source: Pan, S. J.-A. Pan. (2022). Academic research ethics: Principles and case studies [Class PowerPoint slides / in Chinese only].

Example #2: Animations of Real Research Integrity Cases

Storyteller: Instructors

Challenge Level: ● ○ ○

Example: The video features a voice-over narration that tells the **Diederik Stapel case** and the lessons learned by the global academic community from the scandal.



Source: Center for Taiwan Academic Research Ethics Education. (2022). *The fall of an academic superstar* [Animation / in English]. <https://youtu.be/dwigt1KgSYM>

Storyteller: Instructors

Challenge Level: ● ○ ○

Example: The video features a voice-over narration that tells the **Diederik Stapel case** and the lessons learned by the global academic community from the scandal.



Source: Center for Taiwan Academic Research Ethics Education. (2022). *The fall of an academic superstar* [Animation / in English]. <https://youtu.be/dwigt1KgSYM>

Storyteller: Inst. & Stu.

Challenge Level: ●●○

Example: Students were guided into higher order thinking and assigned the task of **brainstorming possible solutions** to the given questions related to academic integrity.

給大學生的參考手冊－ 在高等教育課堂中實踐學術誠信



Case Scenario 1. True Friendship

Jack and one of his close friends, Kai, are enrolled in the same required course this semester. Every week, in-class exams are given; the score results account for 25% of the semester grades. Jack reviews the materials every week in order to get a high score, whereas Kai rarely prepares for the exam, and thus always gets a low score. Kai is in danger of failing this course when the semester draws to a close. One day during the exam, Kai nudges Jack with his arm, indicates with his eyes, and puts his palms together to beg Jack to let him see the answers. Jack does not want to break their friendship as they have known each other since high school and are lucky enough to go to the same university...

1. What would you do if you were Jack during the exam?
2. What can Jack do to help Kai in passing this semester?

(Draft)

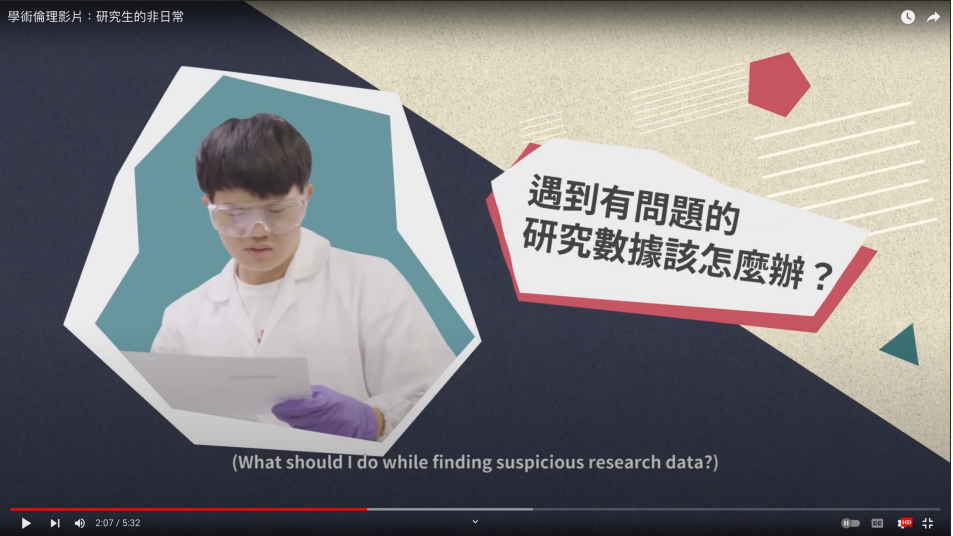
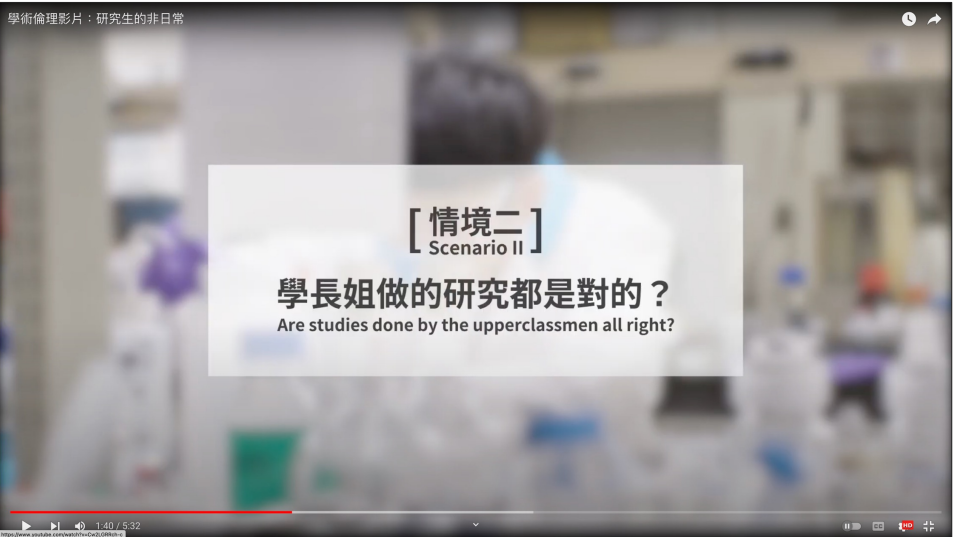
Source: Pan, S. J.-A. Pan. (2021). *A reference manual for college students: Practicing academic integrity in the higher education classrooms* [Case Book / in Chinese]. Center for Taiwan Academic Research Ethics Education. https://ethics.moe.edu.tw/files/resource/ebook/file/ebook_02_cn.pdf

*The English version of *A Reference Manual for College Students* is expected to be released in Spring 2023.

Example #4: Videos of Incomplete (Unfinished) Stories of Research Integrity

Storyteller: Inst. & Stu.
 Challenge Level: ●●○

Example: Students were guided to watch the videos, design potential solutions to the given questions of research integrity, as well as **complete the unfinished stories.**



Source: Center for Taiwan Academic Research Ethics Education. (2020). “Un”usual daily life in graduate school [Chinese video with English subtitles]. <https://youtu.be/xrt7lcfjc0s>

Storyteller: Students

Challenge Level: ● ● ●

Example: Students should complete the unfinished scenarios on scientific authorship and **take educational diagnostic tests** to evaluate their learning effectiveness.

學術倫理案例情境：作者列名篇 Research Integrity Case Scenarios: Authorship

潘璿安



《學術倫理案例情境：作者列名篇》屬於教學診斷評量，主要用於瞭解學生對於作者列名的另有概念；其以多層次測驗的形式開發而成，並用案例情境的方式呈現題組與選項。在內容發展上，《學術倫理案例情境：作者列名篇》主要參照由「國際醫學期刊編輯委員會」與「國家科學及技術委員會對研究人員學術倫理規範」所訂定之作者列名的相關原則，以及過去相關實證研究的結果。本文件包含《學術倫理案例情境：作者列名篇》的研發背景、五組已開發的案例情境式題組，以及教學使用建議等說明。



2022 年 10 月 版本編號 CH-Version 1.0

Research integrity case scenarios: Authorship

5 The Potential Author Who Cannot be Reached

(Draft)



Ms. Chiu | Technician

Has gone to Europe to study in a grad school

- Introduce a new imported instrument into the research.
- Operate the instrument and collect research data.
- Carry out data processing and visualization work.



Dr. Lin | Lead author

PI and Director of the HC Lab

- Arrange and chair the meeting to discuss the author list for the paper
- Intend to include Ms. Chiu as an author
- Unable to reach Ms. Chiu recently



Should we consider adding Ms. Chiu as an author without her consent?



A journal paper

Content and design: Sophia J. Pan (2022). Icons were created by DinosoftLabs, Natee, SANB, and Zlatko Najdenovski from Freepik.

Content of the Case Book

- Text-based case scenarios on scientific authorship
- Visual character relationship diagrams for each scenario
- Educational diagnostic tests including multiple-choice questions
- Answer keys
- Scales for evaluating cognitive load and learning effectiveness

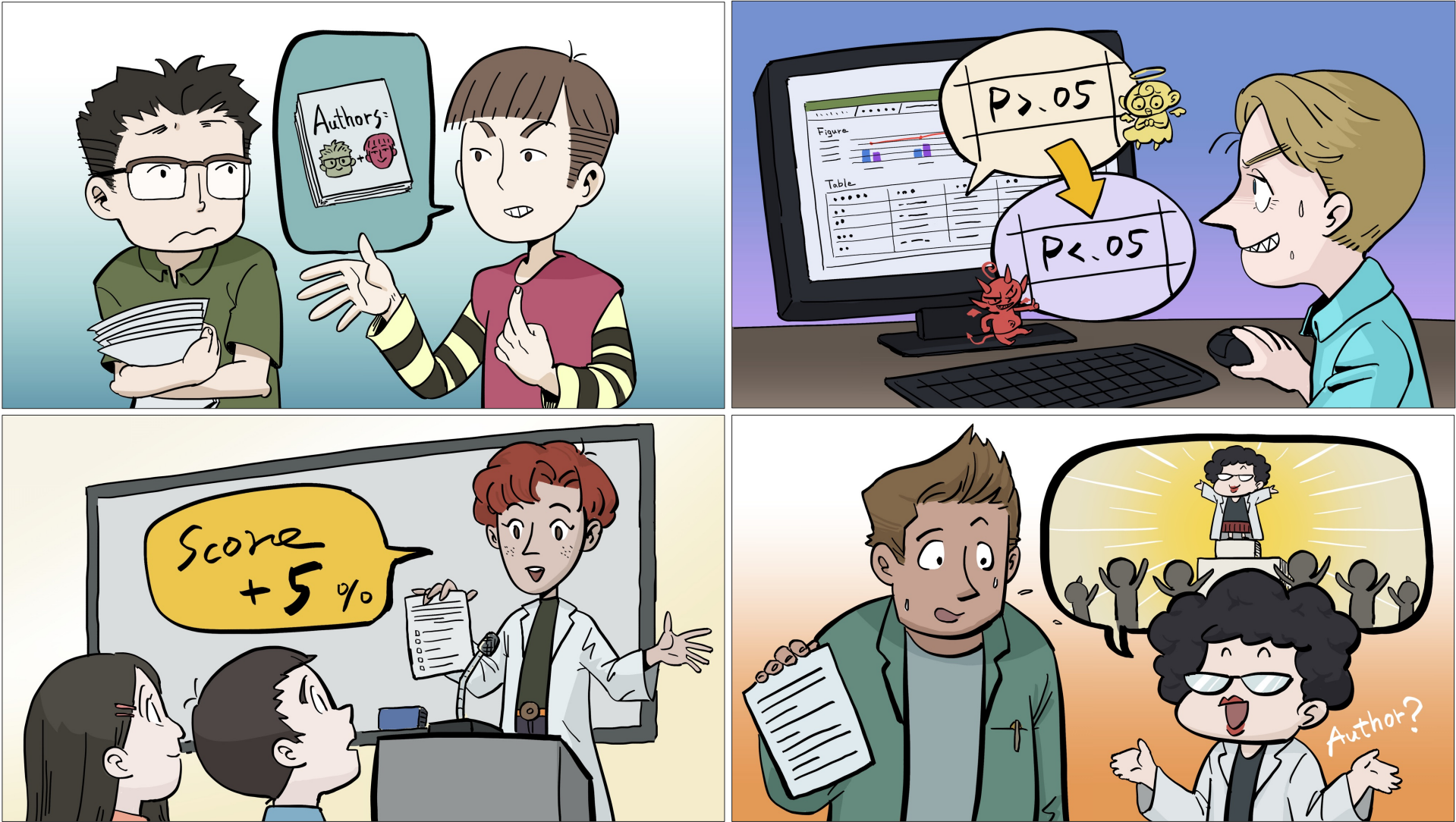
Source: Pan, S. J.-A. (2022). *Research integrity case scenarios: Authorship (Chinese version)* [Case book]. <https://doi.org/10.5281/zenodo.7145980>

*The English version of *Research Integrity Case Scenarios: Authorship* is expected to be released in Spring 2023.

Example #6: Concept Illustrations of Research Integrity

Storyteller: Students
 Challenge Level: ●●●

Example: Students were instructed to engage in higher-order thinking and asked to **construct meaningful narratives around RI** based on the content of concept illustrations.



Source: Pan, S. J.-A. Pan. (2022). *Concept illustrations of research integrity – 10 illustrations.*



臺灣學術倫理教育資源中心
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學術倫理領域辭典

負責任研究行為
Responsible Conduct of Research, RCR

釋義 Definition or explanation

負責任的研究行為是指研究者必須遵守誠實 (honesty)、正確 (accuracy)、效率 (efficiency) 及客觀 (objectivity) 等執行研究的核心價值；包括精實地蒐集和處理研究資料、精確地報告研究發現、適當地運用研究資源並避免浪費社會成本、致力於使科學事實能正確呈現，以及不故意針對研究結果進行偏差詮釋等 (Steneck, 2007；台灣聯合大學系統信義榮譽講座編輯小組編譯，2009)。

RCR is simply conducting research in ways that fulfill the professional responsibilities of researchers, as defined by their professional organizations, the institutions for which they work and, when relevant, the government and public.

資料來源 Reference

- 中文釋義出處：周倩、潘瑞安 (2021)。研究倫理的定義與內涵 (線上課程)。臺灣學術倫理教育資源中心。
<http://ethics.moe.edu.tw/>
- 釋義中引用的文獻：台灣聯合大學系統信義榮譽講座編輯小組 (譯) (2009)。研究倫理教學手冊 (原作者：N. H. Steneck)。台灣聯合大學系統。(原著出版年：2007)
- 釋義中引用的文獻：Steneck, N. H. (2007). *ORI Introduction to the responsible conduct of research*. U.S. Government Printing Office.

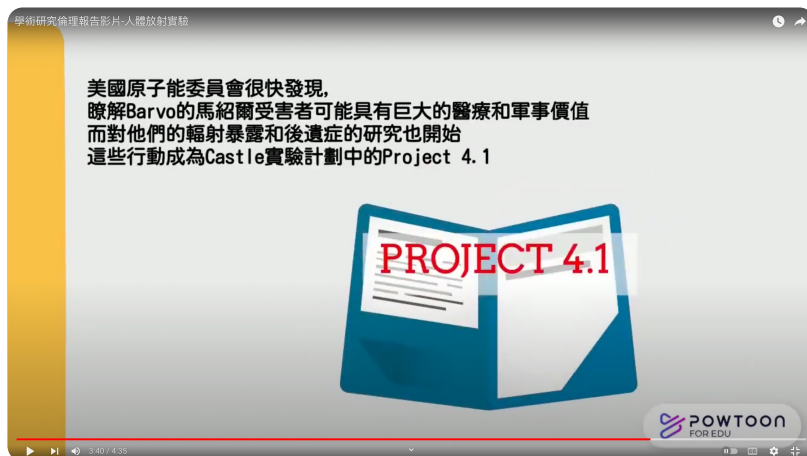
Steneck, N. H. (2006). Fostering integrity in research: Definitions, current knowledge, and future directions. *Science and Engineering Ethics*, 12(1), 53–74. <https://doi.org/10.1007/PL00022268>

相關詞彙 Related Words

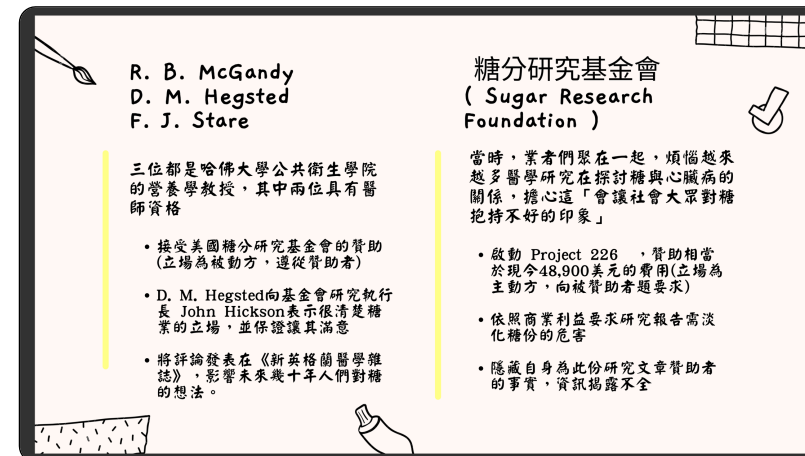
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◆ IV. Students' Feedback and Future Work

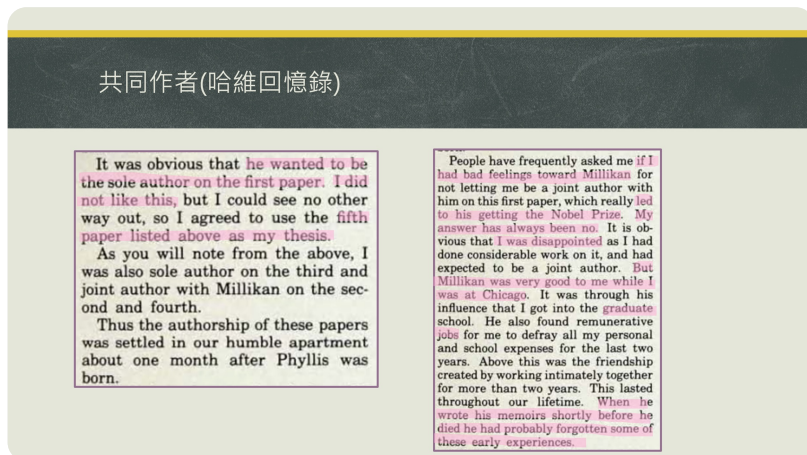




Project 4.1: Nuclear Testing in the Marshall Islands (Human-subject Protection)



Project 226: Sugar Research by Harvard Researchers (Financial Conflict of Interest)



The Oil Drop Experiment by R. Millikan and H. Fletcher (Scientific Authorship)

Course Evaluation (First time offering the course in NYCU)

Students' overall satisfaction: 4.57/5.00*

*Note: 5=very satisfied to 1=very dissatisfied

- "The instructor's presentation slides were beautifully concise, with key points clearly outlined and accompanied by detailed logical descriptions or storylines."
- "The classroom discussion process was very enjoyable."
- "It was a very interesting class where one could learn a lot without feeling too much pressure."
- "Overall, it was a fun class, and I hope the instructor will continue to offer the course in next semester."

Students

- Maintain **eye contact** with the instructor during class
- Proactively **seek more information** by asking questions
- Actively **answer questions** from classmates
- Actively **participate in classroom discussions** and assignments
- **Take an active role** in the EDS projects
- **Request additional RI-related learning resources** at the end of the semester

Instructor

- Be more engaged and enjoy teaching
- Encouraged by the fact that students engage in learning RI outside of a eLearning environment
- Gain a better understanding of the challenges that students face while practicing RI
- Find ways to support students through challenges

The Course

- Develop more multimedia materials for teaching and learning research integrity (RI)
- Continue to offer the semester-length RI course within the university
- Share my experiences and reflections on teaching RI
- Encourage more faculty to offer RI courses to the campus community
- Create more formal/informal dialogues with students
- Exchange ideas, thoughts, and experiences about practicing RI

Research

- Conduct educational experimental research
- Verify the effectiveness of the pedagogical approach (i.e., educational digital storytelling)
- Improve the current semester-length RI course

◆ V. Reference and Acknowledgment



Main Reference for Preparing the Presentation

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Declaration

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Teaching Research Integrity: An Educational Digital Storytelling Approach Facilitated by Multimedia

Thank you for your time and attention!

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