

# Exploration And Visualisation Of Security Knowledge For Certified Degrees: Selected Use Cases For Educators And Students

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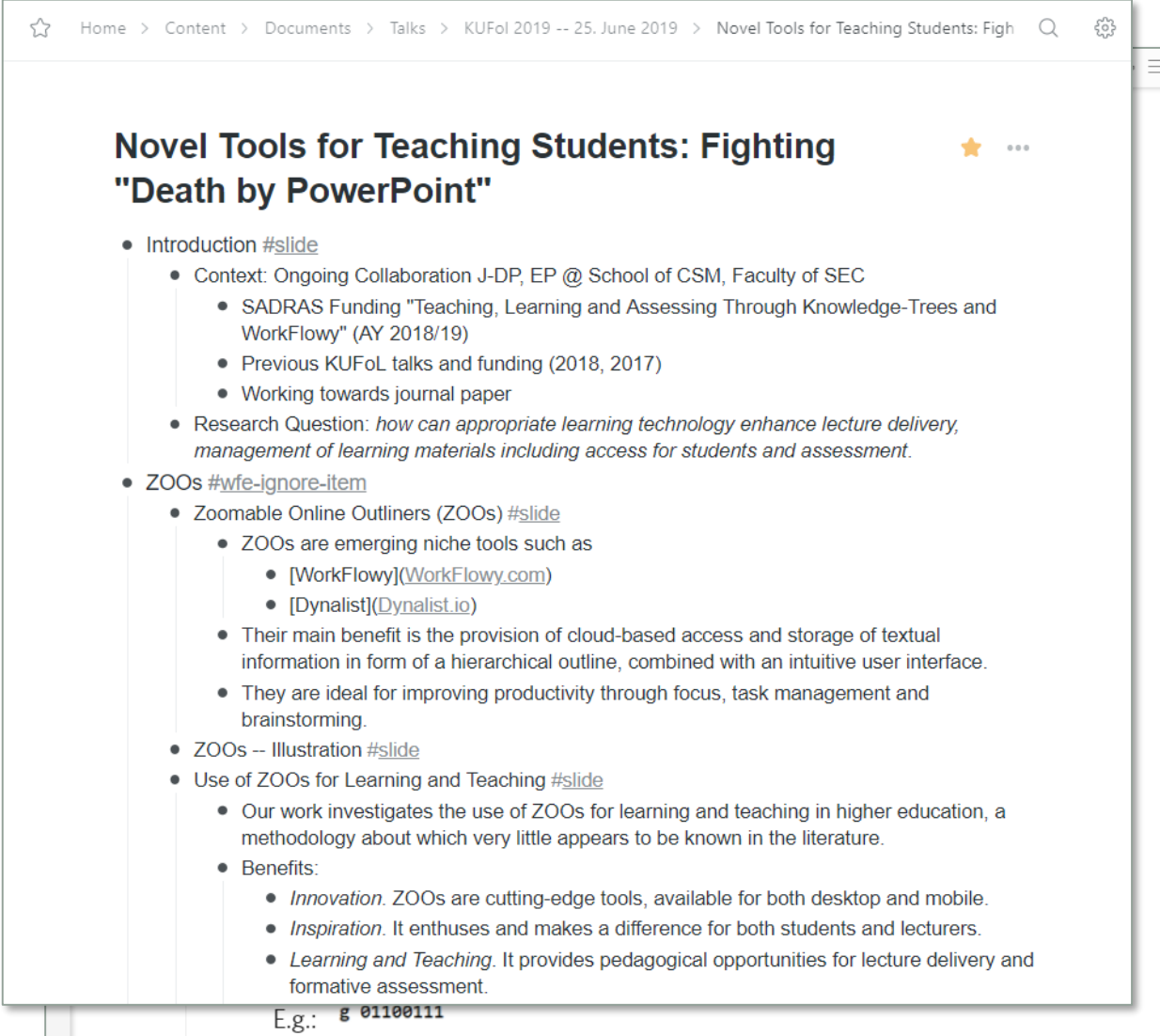
# Motivation

- Background: NCSC Degree Certification uses Security Disciplines and Skills Groups (CESG Knowledge)
- The following questions can be asked: *what is the best holistic representation of cyber knowledge for*
  - empowering student learning and teaching?
  - the use for curriculum design?
  - as a public directory/knowledge base?
- In addition: *what are suitable tools for managing these processes?*

# Zoomable Online Outliners (ZOOs)

- ZOOs are emerging niche tools such as
  - WorkFlowy : <https://WorkFlowy.com>
  - Dynalist : <https://Dynalist.io>
- Their main benefit is the provision of cloud-based access and storage of textual information in form of a hierarchical outline, combined with an intuitive user interface.
- Our work investigates the use of ZOOs for learning and teaching in STEM Higher Education
- This is a methodology about which very little appears to be known in the literature.
- Data based on module evaluations and student surveys consistently give evidence of the positive impact on student learning and experience.

# ZOOs – Illustration (WorkFlowy)



The image shows a screenshot of a presentation slide. At the top, there is a navigation bar with a star icon, a home icon, and a search icon. The breadcrumb trail reads: Home > Content > Documents > Talks > KUFoL 2019 -- 25. June 2019 > Novel Tools for Teaching Students: Fighting "Death by PowerPoint". The slide title is "Novel Tools for Teaching Students: Fighting 'Death by PowerPoint'", followed by a star icon and three dots. The slide content is a bulleted list:

- Introduction [#slide](#)
  - Context: Ongoing Collaboration J-DP, EP @ School of CSM, Faculty of SEC
    - SADRAS Funding "Teaching, Learning and Assessing Through Knowledge-Trees and WorkFlowy" (AY 2018/19)
    - Previous KUFoL talks and funding (2018, 2017)
    - Working towards journal paper
  - Research Question: *how can appropriate learning technology enhance lecture delivery, management of learning materials including access for students and assessment.*
- ZOOs [#wfe-ignore-item](#)
  - Zoomable Online Outliners (ZOOs) [#slide](#)
    - ZOOs are emerging niche tools such as
      - [\[WorkFlowy\]\(WorkFlowy.com\)](#)
      - [\[Dynalist\]\(Dynalist.io\)](#)
    - Their main benefit is the provision of cloud-based access and storage of textual information in form of a hierarchical outline, combined with an intuitive user interface.
    - They are ideal for improving productivity through focus, task management and brainstorming.
  - ZOOs -- Illustration [#slide](#)
  - Use of ZOOs for Learning and Teaching [#slide](#)
    - Our work investigates the use of ZOOs for learning and teaching in higher education, a methodology about which very little appears to be known in the literature.
    - Benefits:
      - *Innovation.* ZOOs are cutting-edge tools, available for both desktop and mobile.
      - *Inspiration.* It enthuSES and makes a difference for both students and lecturers.
      - *Learning and Teaching.* It provides pedagogical opportunities for lecture delivery and formative assessment.

E.g.: [g 01100111](#)

# ZOOs – Illustration (Dynalist)

The image shows a screenshot of a Dynalist note. The browser address bar at the top indicates the note is located at 'Home > Content > Documents > Talks > KUFol 2019 -- 25. June 2019 > Novel Tools for Teaching Students: Figh'. The note itself is titled 'Practical 1 - LSB Embedding Steganography Exercise' and is part of a project by Naomi. The content includes an introduction to LSB Embedding, followed by three numbered steps: Step 1 (Download and unzip resources), Step 2 (Define secret data), and Step 3 (Determine ASCII and binary values). Step 3 includes a list of characters and their binary equivalents, such as 'K 01001011', 'i 01101001', 'n 01101110', and 'g 01100111'.

Home > Content > Documents > Talks > KUFol 2019 -- 25. June 2019 > Novel Tools for Teaching Students: Figh

Naomi > Projects > Practical Exercises >

## Practical 1 - LSB Embedding Steganography Exercise

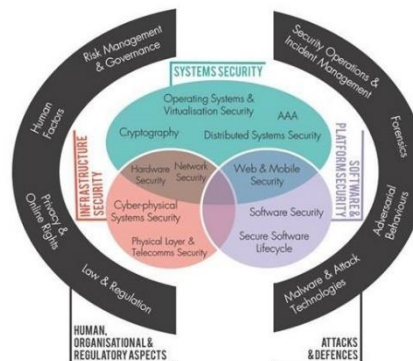
- This workshop gives an insight into a basic steganographic cover-modification technique called LSB Embedding (Least Significant Bit Embedding). The primary learning objective is to become familiar with the basic elements of a steganographic system, via the practical task of hiding secret bits within an image file that will serve as a cover-medium.
- **Step 1 - Download and unzip the practical resources**
  - a) Locate the file "steganography\_practicals.zip" and download it to the root of your H: or USB drive and unzip the file.
  - b) Download HxD Hex Editor from [https://download.cnet.com/HxD-Hex-Editor/3000-2352\\_4-10891068.html](https://download.cnet.com/HxD-Hex-Editor/3000-2352_4-10891068.html)
- **Step 2 - Define the secret data**
- **Step 3 - Determine the ASCII and binary values for each character of secret word**
  - Find the ASCII and corresponding binary values for each character of your secret word. This can be found at sites such as <http://easycalculation.com/ascii-hex.php>
  - Note the binary equivalent of each individual letter of your word (If your secret word includes letters with different cases, be sure to note that upper and lower case characters have different ASCII values and will therefore have different binary values)
  - |   |          |
|---|----------|
| K | 01001011 |
| i | 01101001 |
| n | 01101110 |
| g | 01100111 |

E.g.: 

K	01001011
i	01101001
n	01101110
g	01100111

# Use Case Demonstration

- Use Case 1 : [Enhancing Student Learning](#)
  - Goal: to explore and visualise Security Disciplines and Skills Groups (CESG Knowledge)
- Use Case 2: [The Use for Curriculum Design](#)
  - Goal: to manage Security Disciplines and Skills Groups
- Future Use Case
  - Use Case 3: [Public Knowledge Base](#)
    - Goal: to represent the Cyber Body Of Knowledge (CyBOK)



# Public L&T Tools

- A number of publicly available tools have been created in 2018-2019
- This will make mainstream adoption of ZOOs easier
- WorkFlowy as Teaching Delivery Tool
  - [WorkFlowy Presenter](#): Chrome Extension for customised display/keyboard shortcuts
- ZOO as Learning Material Repository & Management Tool
  - [Export your Outline](#): Chrome Extension for exporting content to OPML, RTF and LaTeX (and more).

# Conclusion

- The use of ZOOs for exploration and visualisation of Security Knowledge for Certified Degrees is beneficial.
- A range of use cases for educators and students have been presented.
- We expect new, additional ones to emerge in the near future.