

USING ZOOMABLE ONLINE OUTLINERS IN STEM EDUCATION



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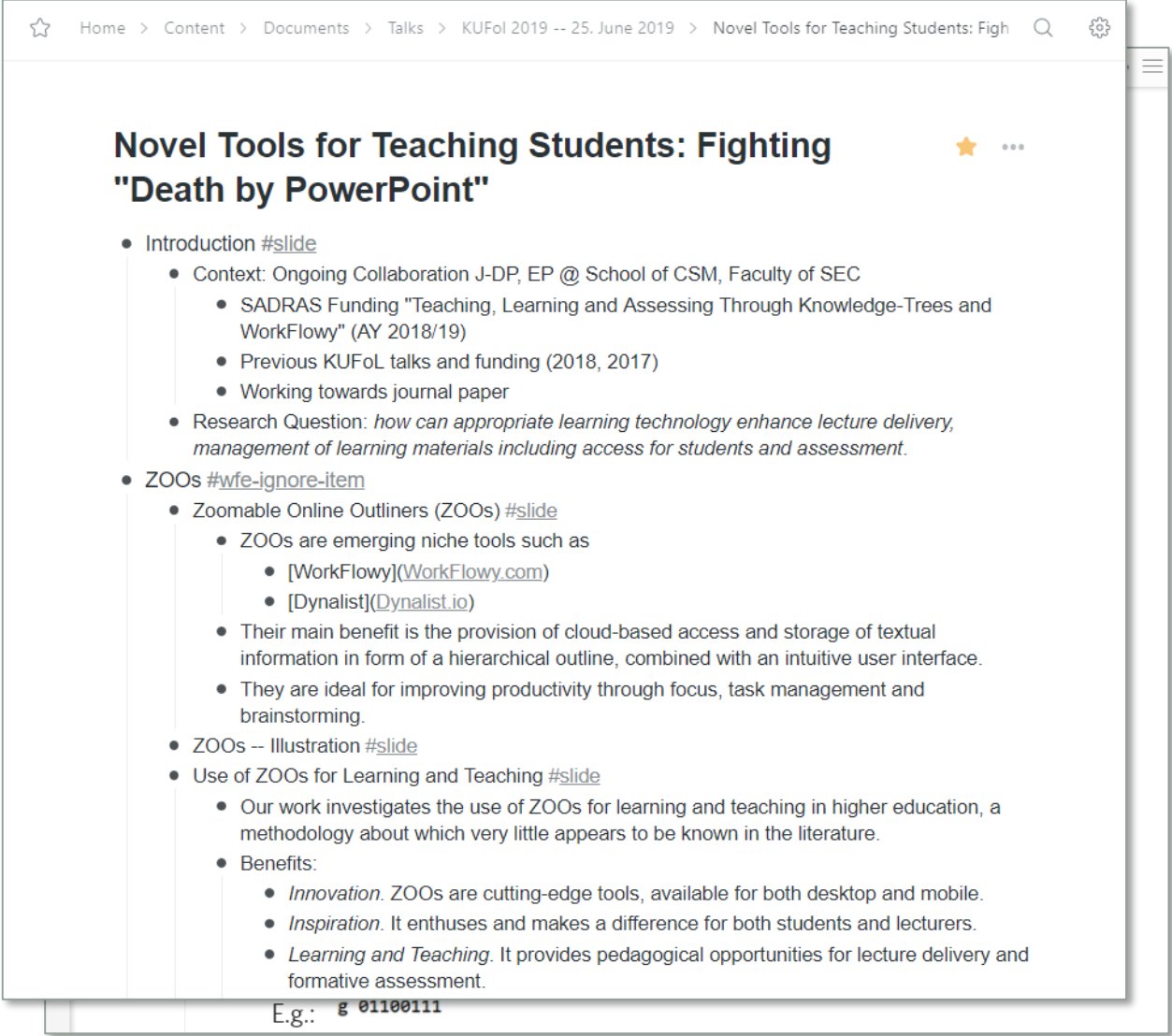
Introduction

- Context: Ongoing Innovative Teaching Collaboration JD-P, EP at the School of CSM, Faculty of SEC
 - SADRAS Funding "Teaching, Learning and Assessing Through Knowledge-Trees and WorkFlowy" (AY 2018/19)
 - Previous KUFoL talks and internal funding (2018, 2017, 2016)
- Research Question: *how can innovative learning technology enhance lecture delivery, management of learning materials including access for students, feedback and assessment.*

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.
- They are ideal for improving productivity through focus, task management and brainstorming.

ZOOs – Illustration (WorkFlowy)



The image shows a screenshot of a presentation slide. The slide title is "Novel Tools for Teaching Students: Fighting 'Death by PowerPoint'". The content is organized into a bulleted list with sub-bullets. The slide is displayed in a window with a navigation bar at the top and a search icon. The text on the slide is as follows:

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

Novel Tools for Teaching Students: Fighting "Death by PowerPoint"

- 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.*
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 - Zoomable Online Outliners (ZOOs) [#slide](#)
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 - [\[WorkFlowy\]\(WorkFlowy.com\)](#)
 - [\[Dynalist\]\(Dynalist.io\)](#)
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 - 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 page. The browser's address bar at the top contains the path: Home > Content > Documents > Talks > KUFol 2019 -- 25. June 2019 > Novel Tools for Teaching Students: Figh. The page title is 'Naomi > Projects > Practical Exercises >'. The main heading is 'Practical 1 - LSB Embedding Steganography Exercise'. The content includes a paragraph about LSB Embedding, followed by three numbered steps: Step 1 (Download and unzip the practical resources), Step 2 (Define the secret data), and Step 3 (Determine the ASCII and binary values for each character of secret word). Step 3 includes a list of characters and their binary values, with an example 'E.g.'.

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
- **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.:

Use of ZOOs for Learning and Teaching

- 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:**
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 - *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.
 - *Productivity.* Easy to manage teaching-related content, independent from any specific format.

ZOO L&T Use Cases

- We consider four use cases for learning and teaching.
- Creation and management of teaching materials:
 - (1) The use of ZOOs as learning management systems.
 - (2) As content management system for e-learning.
- Presentation of lectures using an alternative approach to PowerPoint:
 - (3) ZOOs as presentation tool for delivering lectures.
- The promotion of best practice in assessment and feedback:
 - (4) Formative assessment using ZOOs.

Demonstration

- We will demonstrate several of these use cases, based on the WorkFlowy ZOO tool:
 - [Hosting, Managing and Delivering an Entire Module](#)
 - [Creating and Managing Student Feedback](#)

Evaluation

- We have trialled the ZOO tools WorkFlowy and Dynalist for improving student satisfaction over the course of the last four academic years.
- Have used methodology in one undergraduate and several postgraduate cyber security modules, as well as a postgraduate mathematics revision session.
- Data based on module evaluations and student surveys consistently gives evidence of the positive impact on student learning and experience.
- In particular, a majority of students prefers hierarchical delivery of content using ZOOs to a linear delivery using PowerPoint (averaging to 60%).

Results

- Module CI6240 – "Agree that WorkFlowy has advantages to PPT", using Likert scale:

2016/17 (22)	0%	14%	23%	45%	18%	63%
2017/18 (35)	3%	6%	23%	51%	17%	68%
2018/19 (23)	14%	9%	27%	36%	14%	50%

- Last column is % of students who either agreed or strongly agreed that using WorkFlowy had advantages compared to using PowerPoint.

Results

- Module CI7000 – "Agree that WorkFlowy has advantages to PPT", using Likert scale:

Jan-18 (17)	0%	0%	24%	41%	35%	76%
Sep-18 (32)	0%	0%	16%	62%	22%	84%

- Last column is % of students who either agreed or strongly agreed that using WorkFlowy had advantages compared to using PowerPoint.

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).

The Use of ZOOs – A Student Perspective

- Student and Staff perspectives – 2 very different applications for the same ZOOs
- Digital student – Students are moving from pen and paper to tablets and laptops
- Organised chaos – Organising revision and assignments during deadline/ exam season
- Collaboration – Using ZOOs for group projects

Conclusion

- **Summary:**
 - We believe the presented learning and teaching approaches are unique and highly beneficial.
 - The results are proven to yield better quality delivery and student engagement.
 - They have given us a competitive advantage in managing learning activities.
- **Drawbacks/limitations:**
 - Initially methodology requires getting used to and time for setting up.
 - Relies on online availability of ZOO tool and its continuous compatibility with 3rd party plugins.
- **Future Plans:**
 - Submit results to a Journal Paper