The Ultimate Course Search Learning Tool

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Agenda

- Millennials!
- Our NSF Grant
- UCS and Learning Preferences
- Demonstration of UCS
- Implementation
- Preliminary Data
- Implications for Higher Education

We are Teaching Millennials!

- Multitask
- Have Short Attention Spans
- Tend to be Visual Learners
- Bore Easily
- Want Instant Gratification
- Want Control Over Their Learning
- Have an Expectation to Achieve
- Lack Self-Reflection Skills
- Need Individualized Educational Opportunities

Our NSF Grant - iSECURE

- To Reduce Attrition in Computer Science Security Courses
  - Increase availability to materials
  - Focus Studying Time
  - Access to Multiple Learning Materials
- Ultimate Course Search (UCS)

Our Objectives for UCS

- Create a program that will accurately search all electronic course materials
- Integrate UCS into Courses
- Help students understand learning preferences as connected to UCS
- Create a user friendly, clean interface
- Determine the effectiveness of the tool

Learning Preferences

- Index of Learning Preferences (Felder & Soloman, 1993)

  Four Types of Learners

- Active – Reflective
- Sensing – Intuitive
- Visual – Verbal
- Sequential - Global

Your Results

- **ACT**_____**REF**

  11a 9a 7a 5a 3a 1a 1b 3b 5b 7b 9b 11b

- **SEN**_____**INT**

  11a 9a 7a 5a 3a 1a 1b 3b 5b 7b 9b 11b

- **VIS**_____**VRB**

  11a 9a 7a 5a 3a 1a 1b 3b 5b 7b 9b 11b

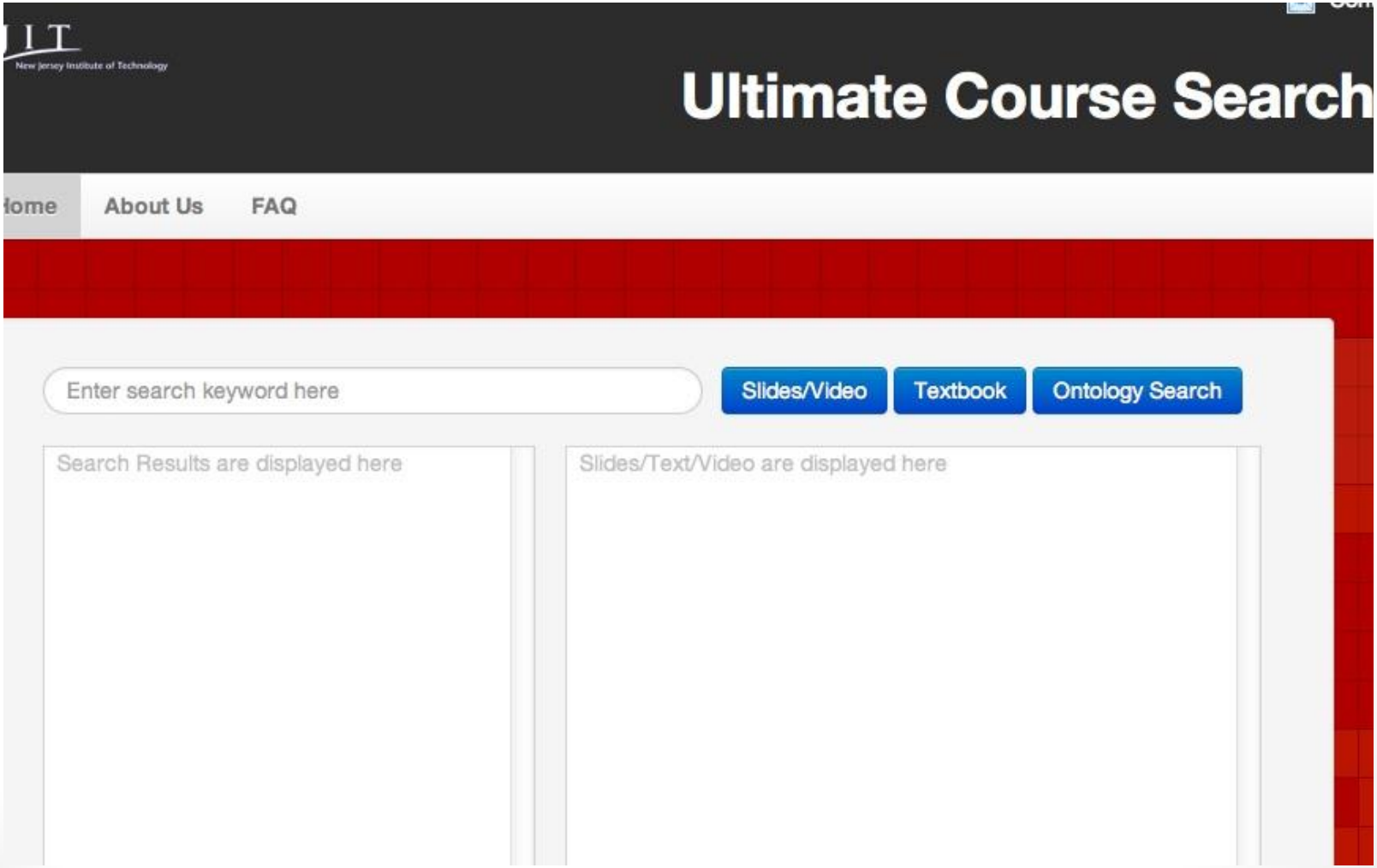
- **SEQ**_____**GLO**

  11a 9a 7a 5a 3a 1a 1b 3b 5b 7b 9b 11b

What UCS Does

- Indexes PowerPoint Slides - The set of slides belonging to a presentation file are mapped relationally to that presentation along with the values of presentation title and presentation filename
- Segments Videos - In order to find where the slide exists in a video, the lecture video transitions are determined, and segmented. Then we determine the transition of videos.
- Indexes Textbook – The Textbook's Index was used to determine the ontology to form our index (Apache Lucene)
- Creates Search Terms - The materials are searched for matches in keywords, and a presentation's relevancy is calculated

The Tool!


NJIT
New Jersey Institute of Technology
Ultimate Course Search
Home
About Us
FAQ
Enter search keyword here
Slides/Video
Textbook
Ontology Search
Search Results are displayed here
Slides/Text/Video are displayed here

The Research

Collected Data in a Security Course

- Control and Experimental
- Face-to-Face and Hybrid
- Same teacher, same book, same lectures

Research Questions

- Is there a statistically significant difference in post-test and final exam outcomes between the control and experimental groups?
- Is there a difference in attrition between the control and experimental classes?
- How did the students utilize the tool?
- How did the students utilize the learning preferences information?

Student Learning Preferences Face-to Face

Control

- Active = 6
- Reflective = 21
- Sensing = 20
- Intuitive = 7
- Visual = 21
- Verbal = 6
- Sequential = 14
- Global = 13

Experimental

- Active = 10
- Reflective = 9
- Sensing = 15
- Intuitive = 4
- Visual = 17
- Verbal = 2
- Sequential = 12
- Global = 7

Student Learning Preferences Hybrid

Control

- Active = 10
- Reflective = 7
- Sensing 13
- Intuitive = 4
- Visual = 13
- Verbal = 4
- Sequential = 13
- Global = 4

Experimental

- Active = 18
- Reflective = 12
- Sensing = 22
- Intuitive = 8
- Visual = 28
- Verbal = 2
- Sequential = 19
- Global = 11

Student Demographics F2F

Control

- N = 28 (66 enrolled in course)
- Mean Age = 23.8
- Year in School = 3.54
- Gender
  - Female = 4
  - Male = 24
- Racial/Ethnic Identifiers
  - African American/Black = 5
  - American Indian or Alaska = 0
  - Asian = 3
  - Caucasian/White = 12
  - Hispanic/Latino = 9
  - Pacific Isl/Native Hawaiian = 1
  - Other = 4
  - No Answer = 3

Experimental

- N = 21 (30 enrolled in course)
- Mean Age = 23.19
- Year in School = 3.52
- Gender
  - Female = 1
  - Male = 20
- Racial/Ethnic Identifiers
  - African American/Black = 2
  - American Indian or Alaska = 1
  - Asian = 6
  - Caucasian/White = 6
  - Hispanic/Latino = 8
  - Pacific Isl/Native Hawaiian = 1
  - Other = 5
  - No Answer = 0

Student Demographics Hybrid

Control

- N = 19 (27 enrolled in course)
- Mean Age = 22.89
- Year in School = 3.16
- Gender
  - Female = 1
  - Male = 18
- Racial/Ethnic Identifiers
  - African American/Black = 2
  - American Indian or Alaska = 0
  - Asian = 9
  - Caucasian/White = 4
  - Hispanic/Latino = 5
  - Pacific Isl/Native Hawaiian = 0
  - Other = 2
  - No Answer = 2

Experimental

- N = 30 (36 enrolled in course)
- Mean Age = 21.97
- Year in School = 3.40
- Gender
  - Female = 6
  - Male = 24
- Racial/Ethnic Identifiers
  - African American/Black = 2
  - American Indian or Alaska = 0
  - Asian = 11
  - Caucasian/White = 11
  - Hispanic/Latino = 9
  - Pacific Isl/Native Hawaiian = 1
  - Other = 5
  - No Answer = 0

Pre and Post Test Results F2F

Control	Experimental
• Pre Test Mean = 9.39	• Pre Test Mean = 9.10
• Standard Dev = 2.25	• Standard Dev = 2.16
• Post Test Mean = 12.18	• Post Test Mean = 11.70
• Standard Dev = 2.29	• Standard Dev = 3.09
• Change in Scores = 2.79	• Change in Scores = 2.60

Pre and Post Test Results Hybrid

Control	Experimental
• Pre Test Mean = 8.89	• Pre Test Mean = 10.13
• Standard Dev = 2.424	• Standard Dev = 2.569
• Post Test Mean = 12.59	• Post Test Mean = 11.69
• Standard Dev = 2.647	• Standard Dev = 3.253
• Change in Scores = 3.7	• Change in Scores = 1.56

Final Exam Results - F2F

Control

- Mean Score = 144.57 (out of 200)
- Standard Dev = 47.60

Experimental

- Mean Score = 150.86 (out of 200)
- Standard Dev = 17.59

An independent T-test showed no between statistical significance in the final exam scores: $t(47) = 6.286$, $p=.568$.

Final Exam Results Hybrid

Control

- Mean Score = 116.68 (out of 200)
- Standard Dev = 24.347

Experimental

- Mean Score = 123.97(out of 200)
- Standard Dev = 23.576

Attrition Findings - F2F

Control

- 66 students enrolled
- 39 students completed the semester
- 41% attrition rate

Experimental

- 30 students enrolled
- 26 students completed the semester
- 13% attrition rate

Attrition Findings Hybrid

Control

- 27 students enrolled
- 26 students completed the semester
- 4% attrition rate

Experimental

- 36 students enrolled
- 36 students completed the semester
- 0% attrition rate

Survey Feedback: How did the students use UCS?

- Study for the exam
- Review lecture videos – past and present
- Search for Information/specific words & terms
- Review video podcast lectures
- As a reference and to take notes
- To help complete homework assignment/class projects
- To ‘test the tool’

Survey Feedback: What did the students like about UCS?

- User friendly
- Freeware
- Search engine
  - Fast and accurate
  - Search exact words
  - Tabs and specific information
  - Search Videos
  - Searches lead to a lot of information
- Helped Students Understand Concepts
  - Made studying easier
  - Able to better understand material covered in class

Survey Feedback: Comments About UCS

- “I didn’t feel overwhelmed cause I had all the information in tools.”
- “…it was like having the professor actually explaining & answering the questions I had.”
- effectiveness of the search when looking for a topic to study about”
- “All needed information in one place.”
- “it was excellent reference on slides where the prof. talked about how to do something like spinning tree”
- “fast search engine.”
- “taught me tricks I didn’t know.”
- “it saves me the work of actually taking notes.”
- “maybe have most viewed notes, or what topic most students have problems maybe put as the 1st thing.”

Implications for Higher Education

- Reduce attrition
- Increase clarity of course organization
- Increase accessibility of materials – One stop shop
- Increase student interaction with materials
- Individualize learning
- Create connections within and between courses

Questions?

- Our YouTube Channel: http://bit.ly/1imcF8o

- This Presentation on Slideshare:

http://www.slideshare.net/renfromichel/final-ucs-eld-2015