

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!

The screenshot shows the 'Ultimate Course Search' tool interface. At the top left is the NJIT logo (New Jersey Institute of Technology). The main title 'Ultimate Course Search' is displayed in large white text on a dark background. Below the title is a navigation menu with links for 'Home', 'About Us', and 'FAQ'. A prominent red horizontal bar is positioned below the navigation. The main content area features a search input field with the placeholder text 'Enter search keyword here'. To the right of the input field are three blue buttons labeled 'Slides/Video', 'Textbook', and 'Ontology Search'. Below the search field are two large, empty rectangular boxes. The left box contains the text 'Search Results are displayed here', and the right box contains the text '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

- Pre Test Mean = 9.39
- Standard Dev = 2.25

- Post Test Mean = 12.18
- Standard Dev = 2.29

- Change in Scores = 2.79

Experimental

- Pre Test Mean = 9.10
- Standard Dev = 2.16

- Post Test Mean = 11.70
- Standard Dev = 3.09

- Change in Scores = 2.60

Pre and Post Test Results Hybrid

Control

- Pre Test Mean = 8.89
- Standard Dev = 2.424

- Post Test Mean = 12.59
- Standard Dev = 2.647

- Change in Scores = 3.7

Experimental

- Pre Test Mean = 10.13
- Standard Dev = 2.569

- Post Test Mean = 11.69
- Standard Dev = 3.253

- 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/financial-ucs-eld-2015>