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International Institute for Innovative Instruction

10-7-2016

Statistical Strategies: Meeting the Needs of Struggling Math Students through Self-Guided Interactive Multimedia

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Recommended Citation

Alpay, Nimet; Koehler, Natalya; LeVally, Carolyn; and Washington, Tawana, "Statistical Strategies: Meeting the Needs of Struggling Math Students through Self-Guided Interactive Multimedia" (2016). *Learning Showcase 2016: A Celebration of Discovery, Transformation and Success.* 45. https://fuse.franklin.edu/ss2016/45

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Nimet Alpay, Ph.D. Statistical Strategies: Natalya Koehler, Ph.D. Meeting the Needs of Struggling Math Students through Self-Guided Interactive Multimedia Carolyn LeVally & Tawana Washington 2015 - 2016 Franklin University

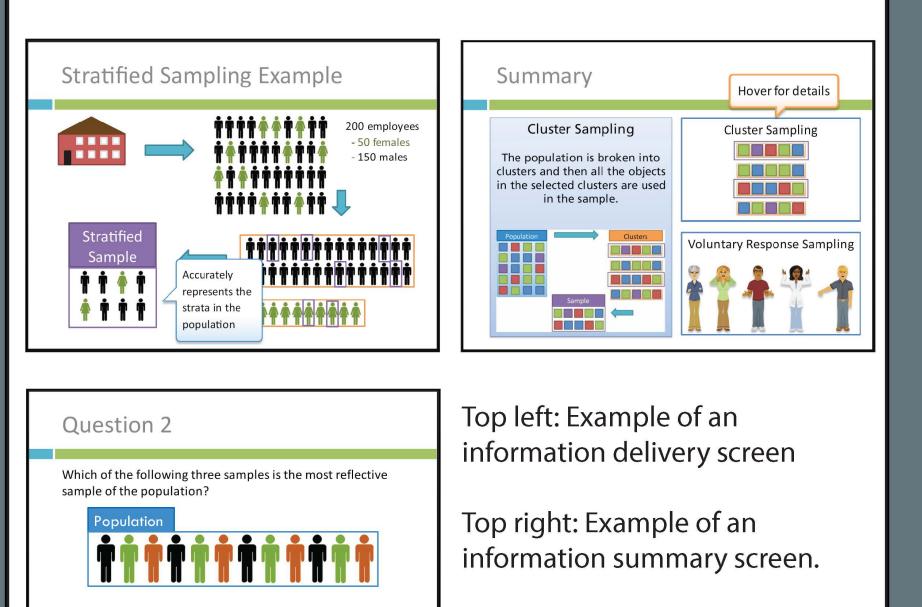
Goals of our Research

- As part of the MATH 215 redesign, we developed weekly web-based interactive multimedia lectures, based on the 12 principles of multimedia learning (Mayer, 2001).
- The goal of our research study was to determine, using formative evaluation, if these multimedia pieces were useful and if they should continue to be used.

Media Components

The interactive multimedia lectures contain the following components:

- New information delivery: In this section, there is visual and auditory information, as well worked examples.
- Information summary: This section summarizes the new information learned in the media.
- "Check Your Learning" comprehension questions: This section of the media provides questions over the material covered. Questions can be multiple choice, drag and drop, fill in the blank, and many other types of interactions.



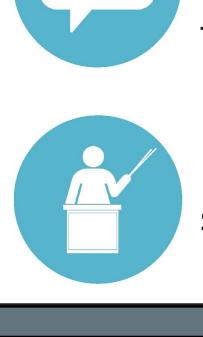
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Bottom left: Example of a comprehension question screen.

We conducted a formative evaluation of student use of the multimedia lectures. Some of the evaluation details are as follows:

- Over 2 trimesters
- 86 student participants in Fall 2015
- 81 student participants in Winter 2016





Survey Questions		Average ratings
1. I liked the layout of the sections in the lecture.		4.7
2. I liked the navigation in the sections in the lecture.		4.7
3. I liked the explanation and the examples used in the informational slides of the lecture sections.		4.6
4. I liked the summary slides used thought the sections.		4.5
5. I found the transcript option useful.		3.6
6. The sections helped me understand this weeks' material.		4.6
7. The section design helped me retain the new information.		4.4
8. The section design helped me maintain my attention.		4.5
9. I found the self-assessment feature (Check Your Learning questions) helpful		4.5
10. The answer feedback to the Check Your Learning questions (explanations of the correct answers) were helpful.		4.5
11. The answer feedback to the Check Your Learning questions was sufficient.		4.3
12. I liked the supplemental content (if any), such as calculator tips and topic videos.		3.9
13. The pace of the content was good.		4.6
14. I enjoyed my experience.		4.5
Student Survey	Themes from Student Comments	Number of
Ratings		Comments
	Supports well self-paced learning.	25

Student Com Themes

Research on Media Use

- Data were collected from 3 sources for
- triangulation purposes. These sources were:

Student survey ratings of the media on a rating scale of 1 - 5 (5: strongly agree, 1: strongly disagree)



Themes from students' comments about the helpfulness of the media features

Instructor perceptions about the students' use of multimedia

Student Comments Conclusions The 167 students who participated in the Below are some student comments about the evaluation of the web-based interactive multimedia lectures over a period of 2 trimesters were overwhelmingly positive about "The explanations break the material their experiences. The lectures helped them down in terms I can understand and understand challenging statistical concepts relate to therefore making it easier to before performing statistical procedures. <u>retain</u> the information." The increase in student performance and retention was especially pronounced in online "I had a terrible time in previous math sections because the multimedia lectures classes and dreaded taking this one. As it turns out, this class has not been bad at all. provided systematic instruction to online The interactive lectures make a difference students whose synchronous interaction with for me." the instructor was limited to one hour per week 'I have enjoyed these interactive multimedia We continue using this approach in other STEM lectures since I began using them at the start of the course. I think they would be very courses. useful in other classes where topics tend to need more explanation than just written text." References Instructor Perceptions & Responses to Multimedia Below are some instructor comments about the multimedia: (AACE). These are highly recommended to view before class for my students. I ask them to take this little bit of time to view these lectures so they know what we will talk about in class as reading the text does take more time. I find these lectures hit the main topics of the content for the week and the explanations are very good. Keep these. I would often watch the multimedia pieces, first out of curiosity, then in order to get a sense as to how I could approach topics during my meet sessions. I found them to be a helpfu

multimedia:

Research Data Results

70		Comments	
32	Supports well self-paced learning.	25	
	The pace is appropriate.	17	
	The quality of narration is appropriate.	14	
	Lectures are easy to navigate.	44	
	Colors are visually appealing.	10	
nment	Color coding supports the information processing.	7	
$s \longrightarrow$	The length of mini lectures is appropriate.	16	

suggestions about what I could do during my meet session to help students understand the concepts we were discussing.

For media demonstration, check out <u>http://</u> tinyurl.com/z5vc7zg.

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