



# Personalizing the Learning Experience: Integrating Adaptive Elements in Online Courses

Faculty Seminars in Online Teaching

Center *for*  
Distributed Learning



**“We need to  
prepare students  
for their future, not  
our past.”  
–Ian Jukes**

# Agenda

- Overview of adaptive learning
- Examples at UCF
- The instructor's role and experience
- How to get involved





# Adaptive Learning Approaches and Examples

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# Adaptive Learning

Adaptive learning systems provide each student with a **personalized learning experience**, adapting the *presentation* of content and possibly *assessment* according to differences in student skill sets caused by an **increasingly diverse population**.

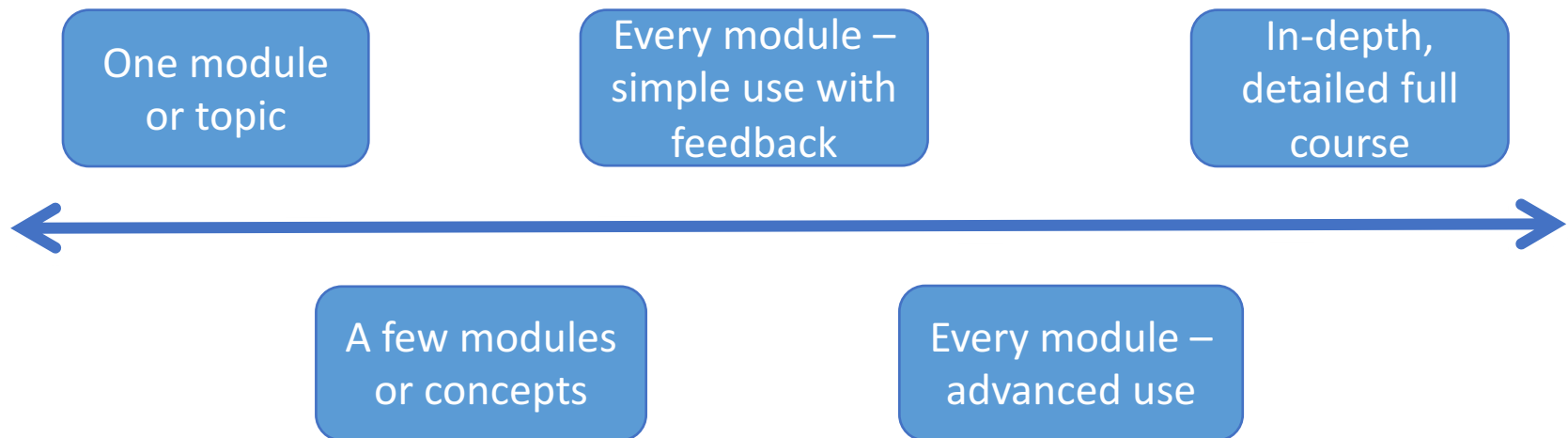


# Adaptive Learning with RealizeIT

- UCF using adaptive learning system called **RealizeIT**
- System adjusts content based on student performance in real-time
- Allows for acceleration and remediation within a course
- Focuses on **student needs** and what they need to know
- System “learns” how students learn and adjusts presentation of content

# Adaptive Learning Approaches

Use can range from in-class individualization to online adaptive systems



# Examples at UCF

- Pilot using RealizeIT began in Fall 2014
  - Three courses: General Psychology, College Algebra, Pathophysiology
- Use of RealizeIT continues
  - College Algebra, Intermediate Algebra
  - Pathophysiology (undergraduate), Pathophysiology (graduate)
  - Bachelor of Applied Science Program – Software Track and IT Track
  - Statistics for Educational Data (graduate)



# Examples at UCF

- Pathophysiology case studies
  - Built-in assessment
    - Adaptive interactions within case study
  - Enhanced Interactions
    - Various question types
    - Variables
    - Conditions
    - Feedback

# Examples at UCF

| CHEM panel           |                    | CBC   |           | ABG              |         |
|----------------------|--------------------|-------|-----------|------------------|---------|
| glucose              | w1glucose<br>mg/dL | WBC   | w1wbc     | pH               | w1ph    |
| Na <sup>+</sup>      | w1na mEq/L         | Hgb   | w1hgb     | CO <sub>2</sub>  | w1co2   |
| K <sup>+</sup>       | w1k mEq/L          | HCT   | w1hct %   | O <sub>2</sub>   | w1o2    |
| Cl <sup>-</sup>      | w1cl mEq/L         | neut  | w1neut %  | HCO <sub>3</sub> | w1hco3  |
| BUN                  | w1bun mg/dL        | lymph | w1lymph % | Anion gap        | w1anion |
| Creatinine           | w1creat mg         |       |           |                  |         |
| BUN/Creatinine ratio | w1buncreatra       |       |           |                  |         |

|                      | CHEM panel | CBC   | ABG   |
|----------------------|------------|-------|-------|
| glucose              | 832 mg/dL  | WBC   | 16292 |
| Na <sup>+</sup>      | 140 mEq/L  | Hgb   | 11.6  |
| K <sup>+</sup>       | 3.3 mEq/L  | HCT   | 34.2% |
| Cl <sup>-</sup>      | 91 mEq/L   | neut  | 80%   |
| BUN                  | 51 mg/dL   | lymph | 12.5% |
| Creatinine           | 1.83 mg/dL | Mono  | 4.9%  |
| BUN/Creatinine ratio | 27.9       | Eos   | 0.1%  |

# Examples at UCF



The patient is hypochloremic because  $Cl^-$  is **w1cl** mEq/L which is less than 96 mEq/L.

w1na<135

The patient is hyponatremic because  $Na^+$  is **w1na** mEq/L which is less than 135 mEq/L.

w1na>145

The patient is hypernatremic because  $Na^+$  is **w1na** mEq/L which is greater than 145 mEq/L.

w1k<3.3

The patient is hypokalemic because  $K^+$  is **w1k** mEq/L which is less than 3.3 mEq/L.

w1k>5.2

The patient is hyperkalemic because  $K^+$  is **w1k** mEq/L which is greater than 5.2 mEq/L.

# Examples at UCF


Case Study [Edit path](#)

Case Study Scenario ✓ **Worked Example** You Try It! (Graded)

What electrolyte abnormalities are present? Check all that apply.

- hypernatremia
- hyponatremia
- hyperchlorinia
- hypokalemia
- hyperkalemia
- hypochlorinia

That is incorrect. ⌵ ✖ ✍ Check

 *This one takes some thought. How did you do?*

*The patient is hypochloremic because  $Cl^-$  is 87 mEq/L which is less than 96 mEq/L.*

*The patient is hypokalemic because  $K^+$  is 3 mEq/L which is less than 3.3 mEq/L.*

⌵ CONTINUE ⌵ ALL



A golden statue of a knight on a horse, with a shield featuring the letters 'UCF'. The background is a solid yellow color.

# Instructor Role and Experience

Debbie Hahs-Vaughn, PhD  
Professor, Methodology, Measurement & Analysis  
College of Education and Human Performance

*Center for*  
Distributed Learning



# How I Got Involved

- I was asked!
- It was an easy sell
  - **Differentiation** to students with wide ability levels
  - **Gave ownership to students**
    - Allowed students to **self-pace** (within the confines of a semester)
    - **Increased engagement** with the content

# My Experience in Adapting to Adaptive Learning

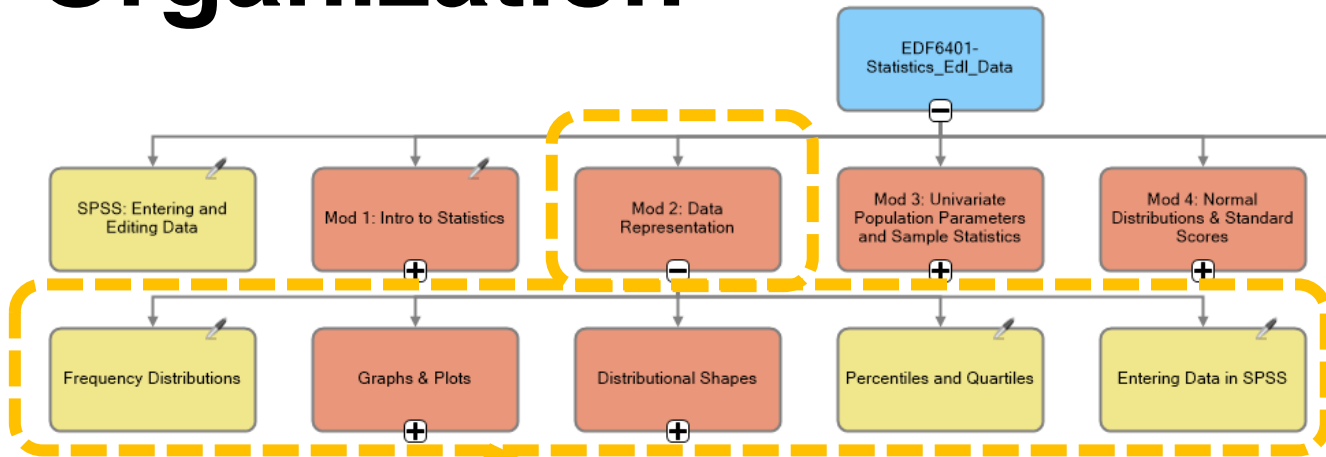
- My course
  - Graduate level introductory statistics course—online
  - 11 modules
    - 4 modules: descriptive statistics
    - 7 modules: inferential statistics
- Converted part of the course to adaptive learning
  - This is a time commitment to build!

# My Experience in Adapting to Adaptive Learning

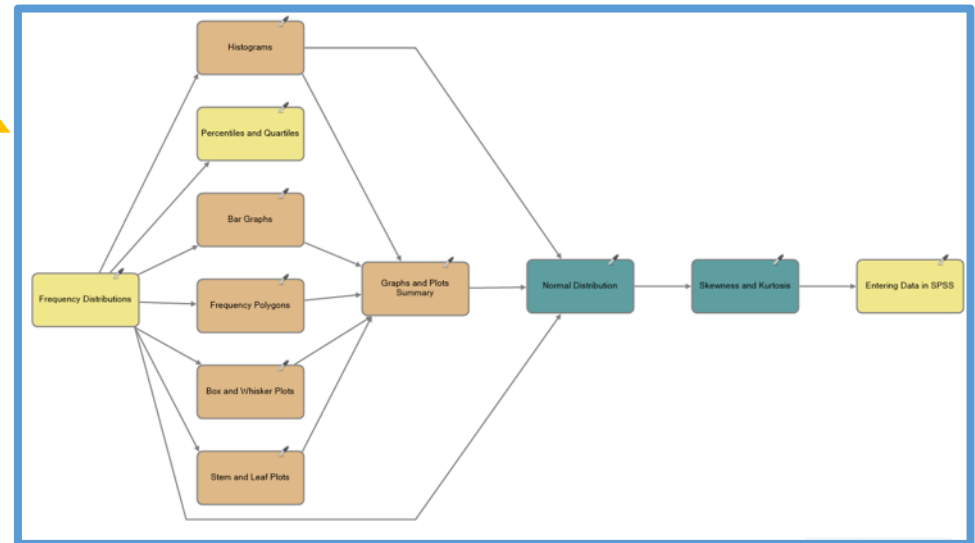
- Components of adaptive learning
  - Content/material (i.e., what students need to learn)
  - Assessment items

| Before Personalized Learning  | After Personalized Learning  |
|---|--|
| <ul style="list-style-type: none"><li>• Voice over slides (i.e., movies)</li><li>• End-of-chapter homework</li><li>• Discussion assignments</li><li>• Midterm</li><li>• Final exam</li><li>• Research study</li></ul> | <ul style="list-style-type: none"><li>• Voice over slides (i.e., movies)</li><li>• End-of-chapter homework</li><li>• Discussion assignments</li><li>• Midterm <b>Personalized learning</b></li><li>• Final exam</li><li>• Research study</li></ul> |

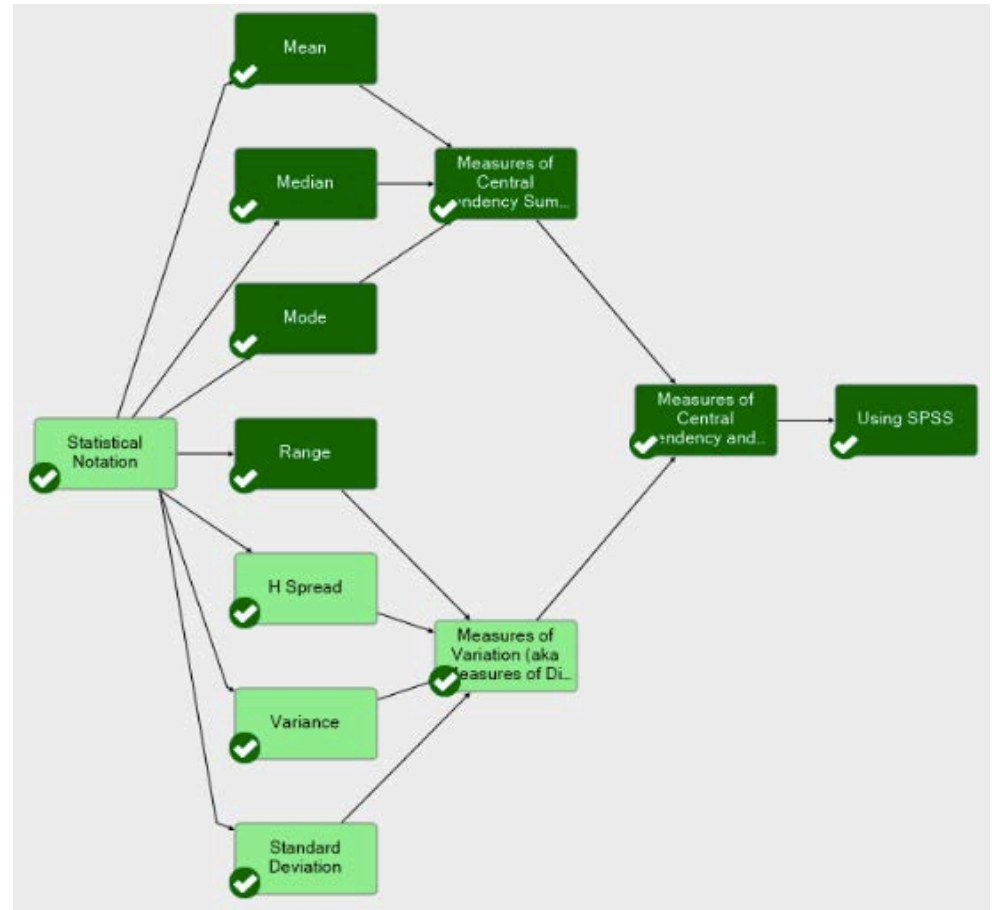
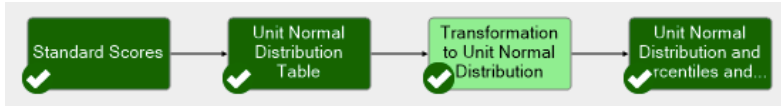
# Organization



*“Adaptive learning forces the rethinking of structure, organization, and timing in contemporary higher education...”*  
 (Dziuban, Moskal, & Hartman, 2016)



# Faculty Perspective





# Student's Perspective

The screenshot shows a web course interface for UCF. The top navigation bar includes the UCF logo, a hamburger menu, the course ID "EDF6401-...", the page title "Assignments", and the "webcourses@UCF" logo. Below the navigation bar is a sidebar with a list of course items: Home, Announcements, Assignments (highlighted in blue), Discussions, Grades (with a notification badge of 11), People, Syllabus, and Quizzes. The main content area displays the text "The instructions for completing the Personalized Learning assignment can be found in the homework assignment link for module 1." followed by "This tool needs to be loaded in a new browser window". Below this text is a button labeled "Load Personalized Learning - Mod 1: Intro to Statistics in a new window". A yellow dashed oval highlights the button, and a blue arrow points to it from the right.

UCF

EDF6401-... > Assignments

webcourses@UCF

Personalized Learning - Mod 1: Intro to Statistics

Fall 2016

- Home
- Announcements
- Assignments**
- Discussions
- Grades 11
- People
- Syllabus
- Quizzes

The instructions for completing the Personalized Learning assignment can be found in the homework assignment link for module 1.

This tool needs to be loaded in a new browser window

Load Personalized Learning - Mod 1: Intro to Statistics in a new window

# Student's Perspective

Module 2: Data Representation due by 9/26/2016

Actions ▾

1

| Steps | Progress       | Advanced  |
|-------|----------------|-----------|
|       | 3 hrs, 40 mins | 9/26/2016 |

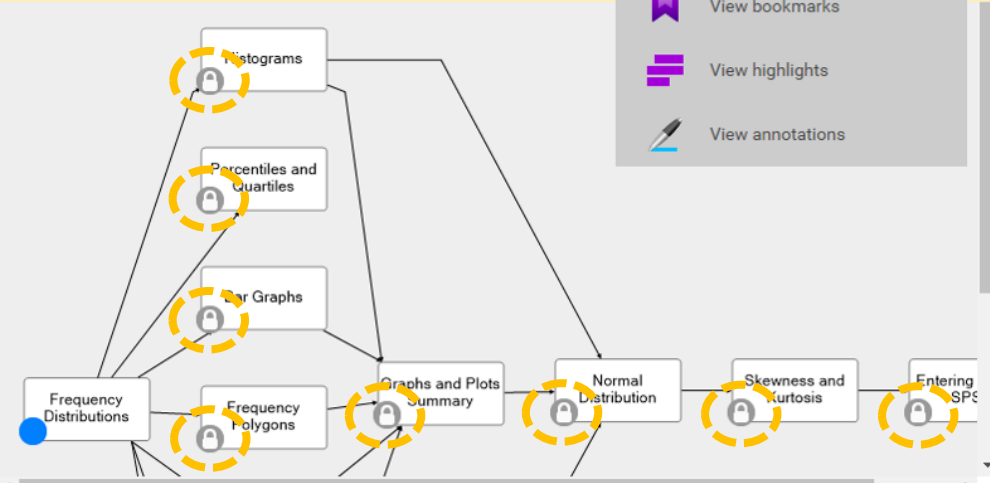
First step ▾

Your first step is to let the system determine your level of knowledge.

Determine knowledge

Messages from system (2) ▾

My learning path (showing full module)



- Start determine knowledge
- View bookmarks
- View highlights
- View annotations

2

How well do you think that you know the material in Module 2: Data Representation?

It is important that you take the time to answer the questions; the system uses your responses to figure out your path through the material. You could end up with more work to do if you don't try your best now.

Not at all    Small amount    Reasonable amount    A lot    All of it

Determine knowledge

# Student's Perspective

- My performance on 'determine knowledge' directs me to the appropriate learning path.

Mod 4: Normal Distributions & Standard Scores due by 9/26/2016

Knowledge state 61% composite score

| Steps    | Progress                 | Advanced                       |
|----------|--------------------------|--------------------------------|
| 25% done | 4 mins Time spent so far | 1 hr Estimated work to be done |
|          |                          | 9/26/2016 Due date             |

Next steps

The following is your next step:

| Item                                   | Action                 |
|--|------------------------|
| Resume <a href="#">Standard Scores</a> | <a href="#">Resume</a> |

[show alternative](#)

Messages from system (2)

Your knowledge has been assessed for this module. Your learning map is now ready.

OK

My learning path (showing full path)

Standard Scores → Unit Normal Distribution Table → Transformation to Unit Normal Distribution → Unit Normal Distribution and Percentiles and...

I need more engagement with the content

# Student's Perspective

The screenshot shows a student's view of a learning management system. At the top, there is a navigation bar with the text 'Measurement Scales Summary' and an 'Edit path' link. To the right of this bar are several icons for navigation and actions, including a pencil, a list, a star, a bookmark, a mail icon, a menu, a bar chart, a document, a plus sign, a globe, and a 'Stop' button. Below the navigation bar are three main tabs: 'Measurement Scales' (highlighted with a yellow circle and a blue arrow pointing to it), 'Summarizing Measurement Scales', 'Practice', and 'Questions'. The main content area is titled 'Measurement Scales' and contains the following text:

Measurement is assigning numerical values to persons or things (i.e., the unit of analysis, whatever that may be) according to explicit rules.

Understanding the measurement scale of variables is important because the measurement scale helps determine the type of statistical procedure that can be used with your data.

Measurement scales, in order from simplest to most complex, are: nominal, ordinal, interval, and ratio. We'll talk about each in detail.

Below the text is a diagram showing the relationship between measurement scales and their categories:

- Nominal
- Ordinal
- Interval
- Ratio

Arrows point from the 'Categorical' box to 'Nominal' and 'Ordinal', and from the 'Continuous' box to 'Interval' and 'Ratio'. At the bottom of the content area, there is a navigation bar with a dropdown menu, a 'NEXT' button, and an 'ALL' button.

# Student's Perspective

Measurement Scales Summary [Edit path](#)

Measurement Scales ✓ Summarizing Measurement Scales ✓ Practice ✓ Questions

Well done! Check

2 Which one of the following is an example of a variable that is interval measurement scale?

- temperature (measured on a Fahrenheit scale)
- employment status: employed full or part time, unemployed, retired, other
- income (measured in dollars and cents)
- average: far above average, slightly above average, average, slightly below average, far below average

one attempt Check

*You answered 1 out of 1 correctly. Asking up to 12.*



# Student's Perspective

Module 3: Univariate Population Parameters and Sample Statistics due by 9/26/2016

Knowledge state 94% | composite score

| Steps    | Progress                     | Advanced                             |
|----------|------------------------------|--------------------------------------|
| 92% done | 42 secs<br>Time spent so far | 20 mins<br>Estimated work to be done |
|          |                              | 9/26/2016<br>Due date                |

Next steps

The following is your next step:

| Item            | Action                   |
|-----------------|--------------------------|
| Practice module | <a href="#">Practice</a> |

Messages from system (2)

My learning path (showing full module)

Mean ✓

Median ✓

Mode ✓

Measures of Central Tendency Sum ✓

H Spread ✓

Variance ✓

Standard Deviation ✓

Measures of Variation (aka Measures of Dispersion) ✓

Using SPSS

Your knowledge has been assessed for this module. Your learning map is now ready.

OK

I have shown mastery of this content

The learning path directs me to a few more assessment items (not content), which were answered correctly and...

We can stop now, I think. That was some good work. Of course, you can always practice again, if you want. Your knowledge state for this module has increased from 94% to 99%.

OK

# Faculty Perspective: Student Details



EDF6401-16Fall OW61 » Mod 4: Normal Distributions & Standard Scores

Knowledge state 84% | 0/4 items | 25/28 finished

| Status | Details | Analysis |
|--------|---------|----------|
|--------|---------|----------|

### Due date reached ▾

The due date of 9/26/2016 has been reached. You can access summary information for this module using the [Grading](#) button. Grading information should have been transferred by 9/25/2016 if it is overdue.

### Question answer queries ▾

There are some [queries on answers](#) that were judged incorrect from people in this section. Press [Questions](#) to examine the queries that have not been responded to.

### Knowledge covered ▾

This module was due on 9/26/2016.

3 people have not started.

25 people are finished.

3 people have not yet done determine knowledge for this module.

Items of the graph are colored by knowledge state

|           |            |           |
|-----------|------------|-----------|
| 0% - 29%  | 30% - 59%  | 60% - 69% |
| 70% - 89% | 90% - 100% |           |

Symbols used: (prior items are faded)

|          |        |           |
|----------|--------|-----------|
| Complete | Locked | Available |
|----------|--------|-----------|

# “What are you **MOST** enjoying about the class so far?” (Fall 2016)

- “What I liked most so far is that there are **multiple ways to learn the material**. Reinforces what we are learning. If you don't understand it one way you have a chance to get it another way. Especially like the personalized learning modules.”
- “The personalized learning modules. Those really help a lot and I do enjoy it. **They are difficult** however, the practice questions **really help me know if I actually understand the concept.**”
- “The **interactive lessons** in the personal learning modules.”

# “What are you MOST enjoying about the class so far?” (Fall 2016)

- “This is my first class ever using the adaptive learning feature and it has been a fantastic experience. **Without the adaptive learning, I would have never learned the material.** It sets a direct path for you based off your current knowledge of the subject, teaches you the material, and then quizzes you on it. If it doesn't think you have learned enough, it will send you back for more practice. I have truly enjoyed this experience with adaptive learning and I would highly recommend using adaptive learning. It's easy to use and helpful for learning. I would 100% take a course that uses adaptive learning. To me, it is a real benefit to any class and it is a great tool to help students succeed.”

# “What are you **LEAST** enjoying about the class so far?” (Fall 2016)

- “That sometimes the personalized learning modules can be difficult to increase your grade even if you understand the concept and are doing things right. Getting one wrong out of 10 can bring your grade down and it takes a while for some sections to get them all right. **I will say though I got it down very well in those areas.** It was frustrating getting there sometimes.”

# Challenges

- Self-inflicted problems
- Confines of a ‘regular’ semester
  - “Students’ challenges regarding adaptive learning indicated a **dissonance between a ‘linear’ course and an adaptive one...** Although adaptive learning allows students to progress at their own pace, **the nature of semesters and course rhythms** meant that there was a time schedule for exams that required students to complete a certain amount of work beforehand” (Dziuban, Moskal, & Hartman, 2016)
- Not one-size-fits-all—there are courses for which adaptive learning is likely not a good solution





# Available Support and Resources

Center for Distributed Learning

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# Resources

- Personalized Learning at UCF
  - <https://online.ucf.edu/support/realizeit/>
- How do I get involved?
  - Fill out the following brief Google Form:  
<https://goo.gl/forms/KJZ6FiuCjDrtbwQl3>

# References

- Dziuban, C., Moskal, P., & Hartman, J. (forthcoming 2016). Adapting to learn, learning to adapt. *ECAR Research Bulletin*.

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