Applied
Universal Design for Learning
In STEM Education

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Systematic Design
Vs Accomodation
Interventions Designed to overcome an identified barrier
Often help people to overcome barriers that may not be identified
Industry has clearly defined Universal Design Standards
Education has not

ONE SIZE

FITS ALL
Three Primary Principles

<table>
<thead>
<tr>
<th>I. Provide Multiple Means of Representation</th>
<th>II. Provide Multiple Means of Action and Expression</th>
<th>III. Provide Multiple Means of Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception</td>
<td>Physical action</td>
<td>Recruiting interest</td>
</tr>
<tr>
<td>Language, expressions, and symbols</td>
<td>Expression and communication</td>
<td>Sustaining effort and persistence</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Executive function</td>
<td>Self-regulation</td>
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Source: [http://www.udlcenter.org/aboutudl/udlguidelines](http://www.udlcenter.org/aboutudl/udlguidelines)
Provide Alternatives
Universal Design for Learning @ UW-Stout

- August 2011 – May 2012
- 10 Faculty members
- Plan to implement Universal Design into class for Spring 2012
- Different approaches by each instructor
Case Study II - Pilot study: AEC-191 The Built Environment

- 100-level general education course; eight weeks
- Enrollment of 25; ten majors, 1 undeclared
- Interdisciplinary study of the built environment, including physical resources and the evolution of human behaviors which inform its design

UDL Strategies implemented

- Overall course delivery prioritizing all three learning networks: representation, engagement and expression
- Students were also introduced to the concept of UDL
AEC-191 Pilot Study

- Choice on topic/material to be researched and method of presentation
- Dialogue-format incorporated into each session encouraging critical-thought and engagement (D2L discussions or in-class discussions)
- Course lectures and resources posted on D2L
- Collaborative group learning assignments (Team research activities and presentations)
- Grading rubrics provided for each assignment, showing how points were earned
- Critical-thinking exercises
### Submittal Options (Choose 1)
- In-class presentation (limited to first 5 requests) @ 20 minutes.
- Paper - minimum of 1500 words (6 pages)
- Voice over power point presentation - 20 minutes
- Educational Visual display (poster, materials board, etc. - confirm with instructor)
- Video summary - 10 minutes
- Other format can be approved by instructor

### Recommended Guidelines:
- Please review the grading rubric
- Professional quality submittals are expected
- Clearly connect the research material back to your field of study
- Analyze and synthesize the research information; do not just repeat it as a summary
- Cite all resources used to find the information - if writing a paper or presentation, use MLA or APA format. All images must be cited.
- Use primary credible resources to acquire the information (.org, .gov, actual client contacts, etc.)
- If you are not sure about a reference, please confirm it with the instructor.
- Clearly state the impact of the topic on the built environment
- Final submittal should be comprehensive (complete, thorough, appropriate in length/detail)

### Remaining Course Timeline:
- Thursday March 1 - Identify topic to research and submittal format. Begin research.
- Tuesday March 6 - *In-class lab time to work with instructors and course evaluation
- Thursday March 8 - Last day of class - presentations and UDL course evaluation

*Work on this project will also require out-of-class time*

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### Assignment: HW10-Final Project

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<tr>
<th>Pts. Possible</th>
<th>Categories</th>
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<tbody>
<tr>
<td>20</td>
<td>Followed assignment criteria:</td>
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<tr>
<td></td>
<td>Cited all resources used to find the information</td>
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<tr>
<td></td>
<td>Used primary credible resources to acquire the information (.org, .gov, actual client contacts, etc.)</td>
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<tr>
<td>20</td>
<td>Clearly ties the research to student’s field of study</td>
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<tr>
<td>20</td>
<td>Clearly states the impact of the topic on the built environment</td>
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<td>20</td>
<td>Individual thought and synthesis of the information - not just a summary of the research findings</td>
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<tr>
<td>20</td>
<td>Final submittal is comprehensive (complete, thorough, appropriate in length/detail)</td>
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<tr>
<td>25</td>
<td>Grammar/presentation quality</td>
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<tr>
<th>Name</th>
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<th>Section</th>
<th>Assignment Title</th>
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Preliminary Qualitative Survey Results

• Positive student evaluations of the course overall
• Students asked to highlight the top 2 UDL strategies that increased their access to learning

Twenty responses collected; Top strategies identified:

1. (12 votes) **Expression**
   – Having choice of material to research
   – Having choice of method to present it

2. (6 votes) **Engagement** (tie)
   – In-class and D2L discussions
   – Access to course lectures/resources on D2L
Preliminary Results

- Critical-thinking assignments: 6 votes
- Assignment Rubrics: 5 votes
- Group learning assignments (team presentations/research): 4 votes
- D2L & In-class dialogue/discussions (Engagement): 2 votes
- Posting lectures & resources on D2L: 1 vote

Number of votes (20 respondents)
Case Study III – Web Design and Distribution

• Implemented in one online and one hybrid section

• Problem identified: Use of instructional videos for Hands-on “Case Study” labs
“The Plan”
Research Questions

• Is there a correlation between the learner’s self-perception of their own preferred learning style and their choice of instructional materials.

• Is there a correlation between the learner’s choice of learning materials and their ability to demonstrate mastery of that week’s learning objectives?
Results related to Research Questions

• Question #1- Correlation between learning style and choice
  – Data has not yet been analyzed.

• Question #2 “Ability to Demonstrate Mastery”-
  – Cannot be answered because assessment tool measures completion, not mastery.
  – Assessment strategy is being revised to better assess mastery of the skills.
Does the Intervention address the problem? – Student Responses

• “The text delivery worked well in this exercise because the tasks were not complex. I am accustomed to reading requirements documents and for this exercise text worked well. If the task was more complicated, I would have also used the video instructions.”

• “I like to be able to read through the assignments myself so I preferred the text and hybrid. These allowed me to set my own pace, sometimes I have a hard time paying attention to the videos because of the pace.”
More Student Response

• “I always prefer video instruction, and believe it is very helpful for understanding the material. I also like that I can learn a lot of material very quickly compared with reading. The ability to pause and re-watch parts is also helpful. When completing the assignment, it is nice to have a text document as a companion to the video. The student can review the material in the text document without having to find the part of the video that pertains to that topic. Most of the time I learn more easily from the video, but like to have the text document as an organized reminder of the details in the material.”
Preliminary Findings

• Students are cognizant of their own learning strategies and what works best for them as individual learners. It also appears that their use of learning strategies is fluid and context specific.
Acknowledgements

• We would like to thank the Nakatani Teaching and Learning Center at UW-Stout for funding this project.
• We would also like to thank David Edyburn from the University of Wisconsin-Milwaukee for introducing us to Universal Design in Learning and walking us through the first steps.
Questions?
Links For Further Information

Center for Applied Special Technology (CAST)
• http://www.cast.org/udl/
Universal Design for Learning- Universe
• http://www.udluniverse.com/

Rubric Resources
The TLT Group
• http://www.tltgroup.org/resources/Rubrics.htm