Scalable, web-delivered supports to help students "Learn to Learn"

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Scalable, web-delivered supports to help students “Learn to Learn”

Matthew L. Bernacki
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PROJECT OVERVIEW: Learning Theory and Analytics as Guides to Improve Undergraduate STEM Education (Learning TAGs)

The Need
- Many graduate K-12 without skills necessary to manage learning (ACT, 2008)
- Incoming STEM majors typically fail to complete a STEM degree; more pronounced trend in underrepresented populations (Eagen, Hurtado & Chen, 2006)
- 6-year completion rate:
  - All STEM majors
  - From underrepresented groups
- Primary reasons for leaving STEM include
  - perceived lack of skills to perform critical STEM tasks
  - lack of motivation to continue with training (Perez, Cromley & Kaplan, 2013)

THE SCIENCE OF LEARNING TO LEARN
- Web-delivered set of training modules delivered via LMS
- Embedded in students’ course site, teach students (in 30-45 min per module):
  1. cognitive strategies known to improve learning outcomes
  2. methods of managing their learning process
  3. methods of managing self, behaviors, & one’s environment
- Instructional methods aligned to research on learning (Table 1)
- Ongoing trace data on student learning behaviors collected from University servers using Splunk application, performance data from LMS gradebook

Table 1: Instructional Design of Science of Learning to Learn Modules

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction &amp; Learning Principles</td>
</tr>
<tr>
<td>2</td>
<td>Planning, Organizing &amp; Monitoring Learning</td>
</tr>
<tr>
<td>3</td>
<td>Regulating Behavior &amp; Environment</td>
</tr>
</tbody>
</table>

1. Plan study: set goals & subgoals, enact strategies
2. Regulate their environment to avoid distraction
3. Make efficient use of study time, avoid pitfalls

PROJECT OVERVIEW: Learning Theory and Analytics as Guides to Improve Undergraduate STEM Education (Learning TAGs)

The Project
- Learning management systems (LMSs) are ubiquitous in higher education, provide a platform for scalable, web-delivered support
- Learning sciences provide insight about ways learning skills can be built and motivation can be supported
- LMSs + Learning Theory + Analytics provide an opportunity to
  1. Provide resources to students
  2. Teach students how to use resources effectively
  3. Observe & adaptively respond to student learning data
- Prompt to develop a specific plan how to use the learning principle in the course
- Prompt to evaluate course resources that afford use of the learning principle
- Vignette where learning principle is applicable, opportunity to advise a protagonist
- Description of studies showing practical effect on performance in a college course

RESULTS & FUTURE DIRECTIONS
- Learning to Learn training had a demonstrable impact on biology students’ (N = 205) learning behavior & achievement in a lecture course
- Learning to Learn training benefits struggling students, burdens others
- NEW CHALLENGE: 1) identify students who need help
  - Struggling students – students with poor prior exam scores – experienced the greatest benefits from Learning to Learn.
  - A pilot project (underway) targets training to students in need.

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More details can be found at: faculty.unlv.edu/wpmu/bernacki/