Get Students to Focus on *Learning* Instead of *Grades*: Teach Them HOW to Learn!

Saundra Yancy McGuire, Ph.D.
Retired Asst. Vice Chancellor & Professor of Chemistry
Director Emerita, Center for Academic Success
Louisiana State University
MISSION STATEMENT

Bowling Green State University provides educational experiences inside and outside the classroom that enhance the lives of students, faculty and staff. Students are prepared for lifelong career growth, lives of engaged citizenship and leadership in a global society.

LEARNING OUTCOMES

Intellectual and Practical Skills

Critical and Constructive Thinking—Inquiry, Examining Values,
Solving Problems Creatively
Communication—Writing, Presenting
Engaging Others in Action—Participating, Leading

General and Specialized Knowledge

Personal and Social Responsibility

Integrate, Apply and Reflect

promote the social, cultural, and economic health of our community.
Bowling Green State University
Retention and Graduation Rates

BGSU Retention Rate is 78% 
National Average is 71%

BGSU Six-Year Graduation Rate is 55.2%
National Average is 47.6%

Expected BGSU Rate is 49.0%
How Can Bowling Green State University Improve These Rates?

- Teach Students Metacognitive Learning Strategies To Improve Students’ Capability
- Help Students Develop the Right Mindset to Improve Their Confidence
- Motivate Students to Implement Effective Metacognitive Learning Strategies
Metacognition

The ability to:

- think about your own thinking
- be consciously aware of yourself as a problem solver
- monitor, plan, and control your mental processing (e.g. “Am I understanding this material, or just memorizing it?”)
- accurately judge your level of learning
- know what you know and what you don’t know

Why aren’t most students already academically capable?

It wasn’t necessary
Data from UCLA Higher Education Research Institute (HERI)
First Year Student Survey – 2010 - 2016

<table>
<thead>
<tr>
<th>Year</th>
<th>% who spent at least 6 hrs/wk on homework</th>
<th>% who graduated with an A average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>37.3</td>
<td>48.4</td>
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<tr>
<td>2011</td>
<td>39.5</td>
<td>49.7</td>
</tr>
<tr>
<td>2012</td>
<td>38.4</td>
<td>49.5</td>
</tr>
<tr>
<td>2013</td>
<td>41.4</td>
<td>52.8</td>
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<tr>
<td>2014</td>
<td>42.9</td>
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<tr>
<td>2015</td>
<td>44.8</td>
<td>58.7</td>
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<tr>
<td>2016</td>
<td>44.0</td>
<td>55.1</td>
</tr>
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</table>

HERI DATA
2010 - 2016

http://www.heri.ucla.edu
How do you think most students would answer the following?

- What did most of your teachers in high school do the day before the test?
- What did they do during this activity?
- What grade would you have made on the test if you had gone to class only on the day before the test?
Faculty Must Help Students Make the Transition to College

Help students identify and close “the gap”

- Current behavior → Current grades
- Productive behavior → Desired grades

Mind the gap
Power of Metacognitive Learning Strategies

Sydnie’s Story: Intro and emails

- First encounter on September 23, 2013
- Email on October 14, 2013
- Email on January 9, 2014
- Email on January 20, 2014
- Email on May 7, 2014
- Update on July 26, 2016
- Email on February 7, 2017

Cum GPA 3.5
Cum GPA 3.6

Fall Sem GPA 4.18
Sydnie Landry, BS in Biology, May 2017
Louisiana State University
Final Semester GPA: 3.77

Applying to Medical School in Fall 2017
Intended Specialty: Dermatology
Effective Homework Strategy

- **Study material first**, before looking at the problems/questions
- **Work example problems** (without looking at the solutions) until you get to the answer
- **Check** to see if **answer** is correct
- If answer is not correct, **figure out where mistake was made**, without consulting solution
- **Work homework** problems/answer questions as if taking a test
Impact of Using Homework Strategy

Sydnie L.
First Year Biology Pre-Med Honors College Student

Email on January 20, 2014

I started to use the "Get more out of your homework" method. I reviewed my notes right before attempting my homework problems, and tried to work the problems without help from the solutions manual or tutors. If I still could not get the right answer, I'd look at my notes again to get a hint, but not to study the problem and mimic it step by step...
Reflection Questions

• What’s the difference, if any, between *studying* and *learning*?

• For which task would you work harder?
  A. Make an A on the test
  B. Teach the material to the class
Power of Teaching to Master Learning
Clint’s Story: Baby Groot and the Licensure Exam

Guardians of the Galaxy

- First encounter on October 29, 2015 at EKU
- Email on January 18, 2016
- Msg on April 14, 2016
- Msg on June 11, 2016

https://www.youtube.com/watch?v=BEPbXYzE5_Y
The Story of Two Students

- **Travis**, junior psychology student
  47, 52, **82, 86**      B in course

- **Dana**, first year physics student
  80, 54, **91, 97, 90 (final)**    A in course
Travis, *junior psychology student*
47, 52, **82, 86**

**Problem:** Reading Comprehension

**Solution:**
- Preview text before reading*
- Develop questions*
- Read one paragraph at a time and paraphrase information

* Developing an anticipatory set
A Reading Strategy that Works: SQ5R

- **Survey** (look at intro, summary, bold print, italicized words, etc.)
- **Question** (devise questions survey that you think the reading will answer)
- **Read** (one paragraph at a time)
- **Recite** (summarize in your own words)
- **Record or wRite** (annotate in margins)
- **Review** (summarize the information in your words)
- **Reflect** (other views, remaining questions)
WITH HOCKED GEMS FINANCING HIM/ OUR HERO BRAVELY DEFINED ALL SCORNFUL LAUGHTER/ THAT TRIED TO PREVENT HIS SCHEME/ YOUR EYES DECEIVE/ HE HAD SAID/ AN EGG/ NOT A TABLE/ CORRECTLY TYPifies THIS UNEXPLORED PLANET/ NOW THREE STURDY SISTERS SOUGHT PROOF/ FORGING ALONG SOMETIMES THROUGH CALM VASTNESS/ YET MORE OFTEN OVER TURBULENT PEAKS AND VALLEYS/ DAYS BECAME WEEKS/ AS MANY DOUBTERS SPREAD FEARFUL RUMORS ABOUT THE EDGE/ AT LAST/ FROM NOWHERE/ WELCOME WINGED CREATURES APPEARED/ SIGNIFYING MOMENTOUS SUCCESS

Dana, first year physics student
80, 54, 91, 97, 90 (final)

Problem: Memorizing formulas and using www.cramster.com

Solution: Solve problems with no external aids and test mastery of concepts
Dana Lewis, MS in Medical Physics, 2015
Univ of Texas Graduate School
of Biomedical Sciences at Houston
Thesis research at UT MD Anderson Cancer Center

Practicing Medical Physicist as of 8/28/2016
when she completed her residency!
Why is Fast and Dramatic Increase Possible?

It’s all about the *strategies*, and getting *them* to *engage their brains*!
Counting Vowels in 45 seconds

A E I O U

How accurate are you?

Count all the vowels
in the words on the next slide.
Dollar Bill
Dice
Tricycle
Four-leaf Clover
Hand
Six-Pack
Seven-Up
Octopus
Cat Lives
Bowling Pins
Football Team
Dozen Eggs
Unlucky Friday
Valentine’s Day
Quarter Hour
How many *words* or *phrases* do you remember?
Let’s look at the words again...

What are they arranged according to?
Dollar Bill  
Dice  
Tricycle  
Four-leaf Clover  
Hand  
Six-Pack  
Seven-Up  
Octopus  

Cat Lives  
Bowling Pins  
Football Team  
Dozen Eggs  
Unlucky Friday  
Valentine’s Day  
Quarter Hour
NOW, how many words or phrases do you remember?
What were two major *differences* between the two attempts?

1. We knew what the task was
2. We knew how the information was organized
What we know about learning

• Active learning is more lasting than passive learning
  -- Passive learning is an oxymoron*

• Thinking about thinking is important
  – Metacognition**

• The level at which learning occurs is important
  – Bloom’s Taxonomy***

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Bloom’s Taxonomy

- **Remembering**: Retrieving, recognizing, and recalling relevant knowledge from long-term memory.
- **Understanding**: Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.
- **Applying**: Carrying out or using a procedure through executing, or implementing.
- **Analyzing**: Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure.
- **Evaluating**: Making judgments based on criteria and standards through checking and critiquing.
- **Creating**: Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.

This pyramid depicts the different levels of thinking we use when learning. Notice how each level builds on the foundation that precedes it. It is required that we learn the lower levels before we can effectively use the skills above.

http://www.odu.edu/educ/lilschult/blooms_taxonomy.htm
When we teach students about Bloom’s Taxonomy...

They GET it!
How do you think students answered?

At what level of Bloom’s did you have to operate to make A’s or B’s in high school?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating
How do you think students answered?

At what level of Bloom’s do you think you’ll need to operate to make A’s in college courses?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating
How students answered (2008)

At what level of Bloom’s did you have to operate to make A’s or B’s in high school?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating
How students answered (in 2008)

At what level of Bloom’s do you think you’ll need to operate to make an A’s in college?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating

<table>
<thead>
<tr>
<th>Level</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>1</td>
<td>7%</td>
</tr>
<tr>
<td>2</td>
<td>6%</td>
</tr>
<tr>
<td>3</td>
<td>14%</td>
</tr>
<tr>
<td>4</td>
<td>35%</td>
</tr>
<tr>
<td>5</td>
<td>23%</td>
</tr>
<tr>
<td>6</td>
<td>15%</td>
</tr>
</tbody>
</table>
At what level of Bloom’s did you have to operate to make A’s or B’s in high school?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating
At what level of Bloom’s do you think you’ll need to operate to make A’s in college?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating
At what level of Bloom’s did you have to operate to make A’s and B’s in high school?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating

How students answered (2014)

- Level 1: 28%
- Level 2: 36%
- Level 3: 25%
- Level 4: 8%
- Level 5: 0%
- Level 6: 3%
At what level of Bloom’s do you think you’ll need to operate to make A’s in college?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating

How students answered (in 2014)
At what level of Bloom’s did you have to operate to make A’s and B’s in high school?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating
At what level of Bloom’s do you think you’ll need to operate to make A’s in college?

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating
How do we teach students to move *higher* on Bloom’s Taxonomy?

Teach them the Study Cycle*

*adapted from Frank Christ’s PLRS system
**Set a Goal**
(1-2 min)
Decide what you want to accomplish in your study session

**Study with Focus**
(30-50 min)
Interact with material—organize, concept map, summarize, process, re-read, fill-in notes, reflect, etc.

**Reward Yourself**
(10-15 min)
Take a break—call a friend, play a short game, get a snack

**Review**
(5 min)
Go over what you just studied

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**Preview before class** — Skim the chapter, note headings and boldface words, review summaries and chapter objectives, and come up with questions you’d like the lecture to answer for you.

**Attend class** — GO TO CLASS! Answer and ask questions and take meaningful notes.

**Review after class** — As soon after class as possible, read notes, fill in gaps and note any questions.

**Study** — Repetition is the key. Ask questions such as ‘why’, ‘how’, and ‘what if’.
- Intense Study Sessions* - 3-5 short study sessions per day
- Weekend Review — Read notes and material from the week to make connections

**Assess your Learning** — Periodically perform reality checks
- Am I using study methods that are effective?
- Do I understand the material enough to teach it to others?

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*Intense Study Sessions
What happens when we teach metacognitive learning strategies, Bloom’s Taxonomy, and the Study Cycle to an entire class, not just individuals?
### Performance in Gen Chem I in 2011 Based on One Learning Strategies Session*

<table>
<thead>
<tr>
<th></th>
<th>Attended</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1 Avg:</td>
<td>71.65%</td>
<td>70.45%</td>
</tr>
<tr>
<td>Exam 2 Avg:</td>
<td>77.18%</td>
<td>68.90%</td>
</tr>
<tr>
<td>Final course Avg*:</td>
<td>81.60%</td>
<td>70.43%</td>
</tr>
</tbody>
</table>

**Final Course Grade:**

- B
- C

The one 50-min presentation on study and learning strategies was followed by an improvement of one full letter grade.

# Performance in Gen Chem 1202 Sp 2013

Based on One Learning Strategies Session

<table>
<thead>
<tr>
<th></th>
<th>Attended</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1 Avg:</td>
<td>71.33%</td>
<td>69.27%</td>
</tr>
<tr>
<td>Homework Total:</td>
<td>169.8</td>
<td>119.1</td>
</tr>
<tr>
<td>Final course Avg*:</td>
<td>82.36%</td>
<td>67.71%</td>
</tr>
</tbody>
</table>

**Final Course Grade:**

- **B**
- **D**

The 50-min presentation on study and learning strategies was followed by an improvement of two letter grades
Performance in Gen Chem 1202 Sp 2015 Based on One Learning Strategies Session

<table>
<thead>
<tr>
<th>Attended</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1, 2, 3 Avg:</td>
<td>68.14%</td>
</tr>
<tr>
<td>Exam 4 Avg:</td>
<td>83.45%</td>
</tr>
<tr>
<td>Final Exam Avg:</td>
<td>80.98%</td>
</tr>
<tr>
<td>Final course Avg*:</td>
<td>84.90%</td>
</tr>
</tbody>
</table>

**Final Course Grade:** B C

The 50-min presentation on study and learning strategies after exam 3 was followed by an improvement of one letter grade.
Metacognition: An Effective Tool to Promote Success in College Science Learning*
Ningfeng Zhao¹, Jeffrey Wardeska¹, Saundra McGuire², Elzbieta Cook²
¹Department of Chemistry, East Tennessee State University
²Department of Chemistry, Louisiana State University

*March/April 2014 issue of JCST, Vol. 43, No. 4, pages 48-54
What happens when we offer metacognitive learning strategies, Bloom’s Taxonomy, and the Study Cycle to an entire university, not just individuals or specific classes?
Dr. McGuire’s Metacognitive Strategies

In March, URI’s Office for the Advancement of Teaching & Learning and the Academic Enhancement Center presented some of Dr. Saundra McGuire’s most powerful metacognitive learning strategies to nearly 250 students.

Over 50 students participated in the *Ace Your Course Challenge* testing out one or more of her strategies for five weeks.
2017 Ace Your Course Student Experience
University of Rhode Island

• **Eric Kaldor**, Assistant Director, Office for the Advancement of Teaching & Learning

• **Skye Mendes**, Assistant Director, Academic Enhancement Center

• **Holly Swanson**, Graduate Student, Science Education and Society Research Program, Department of Biology

• **Joshua Caulkins**, Assistant Director, Office for the Advancement of Teaching & Learning

• **Luckson Omoaregba**, Graduate Student, College Student Personnel Program, Department of Human Development and Family Studies

• **Desiree Harpel**, Graduate Student, Science Education and Society Research Program, Department of Biology
83% Report Improved Grades

• I received my second quiz back from my Italian class. **On the first one I got a 75, and after changing my study habits, I got a 91 this time!!**

• My grades have improved. **97.5, 95 and 90** on three very important exams.

• I got a **93 on my last genetics exam!**

• I can tell that my strategies are working and it is not just simply easy material on those particular exams because the average of the most recent exam was a 70 and I received a **100%, which I am very proud of.**
<table>
<thead>
<tr>
<th>Strategy</th>
<th>Percent Using</th>
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</thead>
<tbody>
<tr>
<td>Spent time on course every day</td>
<td>67.9%</td>
</tr>
<tr>
<td>Used the study cycle</td>
<td>58.5%</td>
</tr>
<tr>
<td>Practiced teaching the material</td>
<td>45.3%</td>
</tr>
<tr>
<td>Completed homework like a test</td>
<td>34.0%</td>
</tr>
<tr>
<td>Bloom’s Taxonomy questions</td>
<td>24.5%</td>
</tr>
<tr>
<td>Did more problems</td>
<td>15.1%</td>
</tr>
</tbody>
</table>
96% Report Increased Confidence

• I feel much more comfortable in class and willing to ask questions that I know other people in the class are thinking too.

• I feel as though I have improved tremendously in not only my numerical grade but in my understanding of the content.

• I've realized I'm understanding things better versus last semester when I was flailing blindly because I couldn't understand anything.

• My learning has become so much more serious and confident since I have been using these strategies for almost a month.
Experiencing Deep Learning

• I feel like it is taking me less time to understand topics because instead of constantly reviewing I can learn "deep" once or twice and know the topics fully.

• I can easily remember information from previous lectures. I'm also able to teach these topics to friends.

• I have retained more and even remembered things like chemical formulas that I didn't intend on learning.

• I finally learned how to study in physics.
Feeling Great!

- I have raised my grade in one class from a B to an A-!!!
- I feel great! I used the technique from last time **studying a little** every day and practice teaching the material and went from a grade of a 65 to a 92 in my **pharmacology** class.
- It has **definitely changed my outlook on how I study and how I think proper studying is done**. I had to change the ways I learned and studied because cramming the day before or just reading over notes or even making of flash cards aren't efficient ways of learning the material.
Advice for Other Students

• Each day after class take 15-20 mins going over the material that was just taught. It not only gets you prepared for an exam but it helps you to also understand the material that same day rather then trying to re-learn it a week later.

• Review material after the class, teach concepts to friends, and do homework like a test.

• Use the study cycle! While it may seem like extra work in the beginning, it really just separates and spreads out the studying.
<table>
<thead>
<tr>
<th>Date</th>
<th>Result</th>
<th>Description</th>
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<tr>
<td>10/04</td>
<td>Failed</td>
<td></td>
</tr>
<tr>
<td>11/04</td>
<td>Failed</td>
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</tr>
<tr>
<td>12/04</td>
<td>Failed</td>
<td></td>
</tr>
<tr>
<td>1/05</td>
<td>Passed</td>
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</tr>
<tr>
<td>2/05</td>
<td>Failed</td>
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<tr>
<td>3/05</td>
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</tr>
<tr>
<td>4/05</td>
<td>Failed</td>
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<tr>
<td>10/05</td>
<td>Passed</td>
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<tr>
<td>11/05</td>
<td>Failed</td>
<td></td>
</tr>
<tr>
<td>12/05</td>
<td>Passed best in group</td>
<td>Began work with CAS and the Writing Center in October 2005</td>
</tr>
<tr>
<td>1/06</td>
<td>Passed</td>
<td></td>
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<tr>
<td>2/06</td>
<td>Passed</td>
<td></td>
</tr>
<tr>
<td>3/06</td>
<td>Failed</td>
<td></td>
</tr>
<tr>
<td>4/06</td>
<td>Passed last one!</td>
<td></td>
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<tr>
<td>5/06</td>
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</table>
From a Xavier University student to Dr. Kelley in Fall 2011

Oct. 17, 2011

Hello Dr. Kelley. ... I am struggling at Xavier and I REALLY want to succeed, but everything I've tried seems to end with a "decent" grade. I’m not the type of person that settles for decent. What you preached during the time you were in Dr. Privett's class last week is still ringing in my head. I really want to know how you were able to do really well even despite your circumstances growing up. I was hoping you could mentor me and guide me down the path that will help me realize my true potential while here at Xavier. Honestly I want to do what you did, but I seriously can't find a way how to. Can I please set up a meeting with you as soon as you’re available so I can learn how to get a handle grades and classes?

Oct. 24, 2011

Hey Dr. Kelley, I made an 84 on my chemistry exam (compared to the 56 on my first one) using your method for 2 days (without prior intense studying). Thanks for pointing me in the right direction. I’ll come by your office Friday and talk to you about the test.

Nov 3, 2011

Hey Dr. Kelley! I have increased my Bio exam grade from a 76% to a 91.5% using your system. Ever since I started your study cycle program, my grades have significantly improved. I have honestly gained a sense of hope and confidence here at Xavier. My family and I are really grateful that you have taken time to get me back on track.
Conclusion

We can significantly increase learning by:

- teaching students *how* to learn
- making learning *visible*
- *not judging* student potential on initial performance
- encouraging students to *persist in the face of initial failure*
- encouraging the *use of metacognitive tools for deep and integrative learning*
An Awesome Resource:

LEARNING COMMONS
Bowling Green State University / Learning Commons

Located inside Bowling Green State University's Jerome Library, this collaborative learning environment provides FREE tutoring, academic coaching, study skills classes, as well as math tutors and writing consultants. Get help online, during drop-in hours or set up an appointment with one of our academic coaches or tutors. The Fly Program, a BGSU Learning Community, is a new program offered to support students with learning differences and attention challenges.

THIS WEEK’S HOURS

<table>
<thead>
<tr>
<th>Day</th>
<th>Hours</th>
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<tr>
<td>Sunday</td>
<td>6 PM – 10 PM</td>
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<tr>
<td>Monday</td>
<td>8 AM – 10 PM</td>
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<tr>
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<td>8 AM – 10 PM</td>
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<tr>
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<td>8 AM – 10 PM</td>
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<tr>
<td>Thursday</td>
<td>8 AM – 10 PM</td>
</tr>
<tr>
<td>Friday</td>
<td>8 AM – 5 PM</td>
</tr>
<tr>
<td>Saturday</td>
<td>Closed</td>
</tr>
</tbody>
</table>

If you would like to reserve a study room within the Jerome Library or the Learning Commons you can Book Now!
Final Reflection Questions

Who is *primarily* responsible for student learning?

a) the student  
b) the instructor  
c) the institution
Who do you think *students* say is *primarily* responsible for student learning?

a) the student  
b) the instructor  
c) the institution
The reality is that...

when *all three* of these entities take *full responsibility* for student learning, we will experience an *increase* in academic capability, confidence, retention, and graduation rates!
Useful Websites

• www.lsu.edu/students/cas/
• www.howtostudy.org
• www.vark-learn.com
• www.drearlbloch.com
References


[http://academic.pg.cc.md.us/~wpeirce/MCCCTR/metacognition.htm](http://academic.pg.cc.md.us/~wpeirce/MCCCTR/metacognition.htm)

*Excellent student reference*