Developing a Shared Vision for Your Department
Using the STEM Department Evaluation Rubric*

Purposes of the Rubric:

- Focus attention on research-based factors that improve student outcomes and faculty efficacy.
- Quickly build a common vocabulary among members of a department to allow for productive dialogue on the Rubric’s factors.
- Provide a sample of references that support the need to attend to the Rubric’s factors.
- Help a department identify and articulate current strengths and opportunities for improvement.
- Provide a framework to establish a shared set of priorities and aspirational goals from which to develop an action plan.
- Begin to build the grassroots leadership needed to implement the plan.

Here are a few recommendations for making creative use of the Rubric. If this approach is too prescriptive for your context, let a strategy emerge more organically.

1. Dedicate time for individuals to read through the rubric and develop their understanding of unfamiliar terms (e.g., pedagogy, metacognition, etc.).
2. Ask individuals to identify their perceptions of where their department/division falls on the scale for each factor.
3. Ask individuals to identify where their own work falls on the scale for each factor (i.e., "For which factors am I among the leaders in my department? For which factors will I need to look to others to learn more about?")
4. Gather all individuals for a moderated/safe discussion about their ratings and to build consensus on the ratings for each factor. Assist discussion by collecting data from #2 (via anonymous survey) and sharing results in graphical form.
5. Seek consensus on the priority level (low, medium, high) for each factor’s improvement.
6. Develop a plan of action for those factors that have been identified as "top priority." If a high priority factor is currently rated at baseline, what external experts might support next steps?
7. Make sure the action plan includes assessment of progress and outcomes (i.e., if established at the outset, good assessment will yield publishable results and/or guide ongoing reform).
8. Identify leaders for each part of the plan’s implementation.
9. Establish an ambitious but realistic time line for implementation. Schedule follow-up discussions.
10. Invite students to participate in some or all of these activities. They can provide remarkable insight, energy, and creativity.

* PULSE Leadership Fellows have also developed a more extensive set of rubrics intended to be used by Life Sciences departments engaged in self-study and interested in possible future certification (see http://www.lifescied.org/content/12/4/579). If you have any questions or suggestions to improve the STEM Department Evaluation Rubric or its use, please contact Ellen Goldey at mailto:goldeyes@wofford.edu.
<table>
<thead>
<tr>
<th>STEM Department Evaluation Rubric*</th>
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<tr>
<td><strong>Baseline</strong></td>
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<tr>
<td>Authentic Course-embedded Research(^1,2)</td>
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<tr>
<td>Student Cognitive Skills(^3,4)</td>
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<td>Student Metacognitive Skills(^5,6)</td>
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<td>Student Core Competencies(^7)</td>
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<td>Independent Research(^7,8)</td>
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\(\text{*This rubric was developed for the Partnership for Life Sciences Education (join at www.pulsecommunity.org) for use in workshops led by PULSE Fellows and for use by departments engaged in self-study at their home institution. It is intended to stimulate discussion, identify department strengths and opportunities for improvement, and introduce just a few of the abundant resources about the topics. Help us assess its effectiveness by contacting Ellen Goldey at goldeyes@wofford.edu.}\)

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**STEM Department Evaluation Rubric**

<table>
<thead>
<tr>
<th>Engaging Pedagogies&lt;sup&gt;9, 10&lt;/sup&gt;</th>
<th>Lecturing without student engagement is the norm in courses and labs. Information is passively received, and there is little need to read text or other sources. Instructor is &quot;authority.&quot;</th>
<th>Traditional lecturing during class time is the norm, and all engaging activity occurs during laboratory sessions. Information received in class may often be repeated in lab.</th>
<th>Instructor pedagogies fall into teacher-centered or learner-centered categories. Students may pick among instructors who &quot;deliver&quot; information and those that require active learning.</th>
<th>All instructors are attempting to adopt best pedagogical practices, and lecturing for 50% or more of class time is rare. Students actively learn on own and from each other in most classes/labs.</th>
<th>Students are engaged in discussion, guided inquiry, and other activities in classes/labs, and instructors intersperse brief lectures if needed. Knowledge is actively constructed by students. Instructor is &quot;coach.&quot;</th>
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<tr>
<td>Faculty Development&lt;sup&gt;11,12&lt;/sup&gt;</td>
<td>Faculty members are unfamiliar with STEM/Higher Ed pedagogical research, and there is no structure/support/incentive for development of their knowledge and/or skills.</td>
<td>Some members of the department are seeking new knowledge/skills needed for transforming their program, but they lack support/time/incentive for this work.</td>
<td>Faculty learning community and/or Center for T&amp;L may aid cadre of practitioners in building knowledge, skills, and leadership capacities. Administrative support is minimally sufficient.</td>
<td>Faculty groups discuss pedagogical literature. A few contribute to the scholarship of teaching and learning (SoTL). Incentives available to learn through Center of T&amp;L, attendance at conferences, etc.</td>
<td>Pedagogical excellence is esteemed by the institution rather than perceived to be in conflict with disciplinary scholarship. Contributing to SoTL is highly valued in T&amp;P decisions and supported with incentives.</td>
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<td>Assessment&lt;sup&gt;13&lt;/sup&gt;</td>
<td>Tools do not assess learning outcomes (e.g., course evaluations judge instructor performance rather than student learning). Assessment perceived as punitive and compulsory.</td>
<td>Novel assessment tools may be used in one or two courses, but there is minimal administrative and/or peer interest for these efforts and findings, and the focus remains on faculty performance.</td>
<td>The assessment portfolio may emphasize quantitative, direct measures (e.g., Major Field Test) and lack insight from qualitative measures (e.g., surveys, interviews).</td>
<td>Periodic (e.g., every 5 years) integration and reflection on variety of direct and indirect assessment evidence inspires episodic reform. Assessment viewed as essential by some, necessary evil by others.</td>
<td>Regular (e.g., yearly) reflection on evidence from diverse assessment tools guides continuous efforts to improve student outcomes. Assessment perceived as essential and inspiring.</td>
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<td>Faculty and Administration Dispositions Toward Change&lt;sup&gt;14&lt;/sup&gt;</td>
<td>Faculty is change-averse. There are no safe places for trial and error. Changes in curriculum may be dictated to the faculty and driven by market forces. There may be an ethos of fear, frustration, and/or apathy.</td>
<td>There is no shared vision for change, and/or there are strong voices that resist change, and/or there is poor communication between administrators or faculty members leading to inertia and/or distrust.</td>
<td>Pockets of reform may be under heightened scrutiny, thus increasing anxiety. Retrenchment may occur without encouragement and opportunities to learn from early failures. The ethos may reflect both anxiety and excitement.</td>
<td>A faculty majority is collaborating with administrators to implement reform. Financial/market realities are taken into consideration, but do not dictate approaches. An ethos of pride is developing as learning outcomes improve.</td>
<td>Instructors and administrators are reflective, open to change, appropriately skeptical of change for change's sake, and risk-tolerant. Reflection on assessment evidence drive continuous reform. There is a collaborative ethos of &quot;positive restlessness.&quot;</td>
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<td>Integration of Department Program with Gen Ed Goals &amp; Institutional Mission&lt;sup&gt;15&lt;/sup&gt;</td>
<td>Faculty members (full or part time) are unaware of general education (GE) goals, institutional mission (IM), or how the department supports these broader issues.</td>
<td>The department chair or a committee determines which courses fulfill GE requirements, but instructors may not know, or know how to achieve, GE goals. IM is rarely considered in department's program.</td>
<td>The department's faculty members work to align courses to meet GE learning goals, but IM goals may be overlooked or perceived as outside the department's duties.</td>
<td>GE goals are well integrated, and some courses target the capacities valued in the institution's mission (e.g., civic engagement, advancement of knowledge; cultural pluralism; social justice).</td>
<td>All full and part time faculty regularly discuss and engage students in practice and development of specific GE learning goals and institutional mission-based outcomes. Department goals are positioned within institutional context.</td>
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3. For sample discussions of core competencies, see the 2009 reports of the AAMC-HHMI Committee Scientific Foundations for Future Physicians and AAAS' Vision and Change in Undergraduate Biology Education: A Call To Action.
**Title** (a chance to be creative)  
**Department, Institution**  
City, State  
Team members

### Institutional Demographics
- Institution type  
- Institution size  
- Department size – # faculty (tenured, tenure-track, adjunct), # majors  
- Types of programs/majors  
- Diversity of student population and faculty

### Priorities and Vision for Department Transformation/Improvement
List the priorities for department-wide improvement (identified from the workshop Rubric and/or others relevant/unique to your institutional context).

Articulate a vision statement of how your department will be different 5 – 10 years from now as a result of this work.

### Challenges/obstacles to Achieving Priorities
- e.g., we need more:  
  - shared vision  
  - time, resources, incentives  
  - safe zones for trial and error  
  - recognition/support  
  - leadership development  
  - pedagogical development  
  - Etc.

### Motivations for improvement
- e.g., our desire to increase:  
  - retention of at-risk students  
  - professional development  
  - job satisfaction  
  - collaboration among colleagues  
  - alignment with V&C principles  
  - Etc.

### Immediate (next three months) steps
**Ideas:**
- How will you flesh out your SERP Institute planning?  
- Who needs to be on the “home team”?  
  - Which students, faculty, staff, and administrators?  
  - Who are the leaders that you can draw in?  
- Change can be threatening – what will be the hot-button issues? Who will need convincing, and what voices (internal or external) can help?  
- How will your home team establish an ethos of safety and respect while asking people to change?  
- What will be your method(s) of communication across all team members and beyond?  
- What tools will your department use to develop a shared vision (e.g., external review, department self-study, STEM Department Evaluation Rubric, PULSE Certification Rubrics, BioCore Guide, etc.)?  
- What other PULSE resources might help your department make progress?  
- What other professional societies could help and, ultimately, broaden the impact of your work?

### Action steps for upcoming academic year
**Ideas:**
- How will your team engage your full department in this work? (e.g., on-campus workshops, journal clubs, strategic planning sessions, Gen. Ed. task force, etc.).  
- Who might you invite to help you with this work (from PULSE or elsewhere)?  
- How will your team build intramural leadership?  
- What will leaders for each initiative be responsible for?  
- How and to whom will they share/report?  
- What collaborations (e.g., other schools, community members) will you develop to build interest and support for your work?  
- What courses might you pilot? What curriculum changes do you envision?  
- What summer bridge programs or other student support programs might be planned/initiated?  
- How will you assess current practices so that you can evaluate change and its effectiveness? How can you leverage SACS positively?  
- How will your department reflect on assessment evidence and use it to continuously improve?

### Actions for end of year and beyond
**Ideas:**
- What will be your new “normal” in a few years?  
- How will ongoing administrative support be assured?  
- Do you need extramural funding to build on pilot work? How do you build expertise for a strong proposal? Should it be a collaborative proposal with other schools? Who writes it?  
- How will the department’s new “normal” influence job descriptions, hiring decisions, promotions, etc.?  
- When/how will your team meet to develop a poster to report on the department’s progress at Association of Southeastern Biologists conference (April, 2015)? Who will represent the team at ASB?  
- What information will you present on your poster and what evidence will you need to support your findings?  
- How will you broaden the impact of your department’s work in the Southeast and beyond?
Scientific Metacognitive Active Revision of Teaching (S.M.A.R.T.)
Biology, Miami Dade College
Miami, Florida
Loretta Adoghe, Alfredo León, Juan Morata, Meera Nair, Alex Viera

Institutional Demographics
- State College
- 164,378
- Department size (3 largest campus) – 32 FT-Faculty, +100 PT-Faculty
- AA, AS, BS/BS
- 7% White non-Hispanic, 18% black non-Hispanic, 71% Hispanic, 4% other ethnicity; 58% female, 42% male.
- Employees: 78% ethnic minority & 58% FT-employees.

Priorities and Vision for Department Transformation/Improvement
1. Develop authentic course-embedded research which enhances student’s cognitive and metacognitive skills.
2. Encourage students to seek mentored research opportunities to be showcased.
3. Develop active-learning pedagogies for faculty.

Challenges/obstacles to Achieving Priorities
- Time
- Funding / Resources
- Institutional Structure
- Organizational Structure
- Lack of Incentives
- Safe zones for trial & error
- Heterogeneous student body

Motivations for improvement
- Completion of at-risk students
- Large Scale professional development
- Coordination and distribution of the organizations resources to improve access

Actions for end of year and beyond
- At least 45% science students would have participated in active-learning experiences.
- Student participants in active-learning experiences will demonstrate at least 10% gains in pre-identified learning outcomes.
- Administrative support would be apparent with the establishment of the Undergraduate Student Research Office.
- Extramural funding will be sought to incentivize and accelerate faculty engagement.
- Faculty leadership would consider new policy to incentivize participation in mentoring independent research.
- At least 2 team members will report at Association of Southeastern Biologists conference (April, 2015).

Action steps for this summer
- Share with the discipline the STEM Department Evaluation Rubric and ask faculty to review and complete.
- Home team will share findings of the SERP Institute and the Vision and Change; copies for distribution will be facilitated.
- Share resources such as: PULSE Community Website, PULSE Community Stories of Change, the online V&C Toolkit and PULSE Workshops.
- Communication methods: emails, discipline meetings, opening year Convocation.

Action steps for upcoming academic year
- School of Science Dean to charge departments with the completion of STEM Department Evaluation Rubric.
- Collaborate with department grassroots leaders to discuss department evaluation and dissemination of results and the Dean of the School of Science.
- Establish Active-Learning Science task-force to develop initiatives to be shared across the academy.
- Distribute Core Competency Rubric to be completed by faculty in Principles of Biology 1 & 2.
- Explore existing community partners and local institutions for student research opportunities.
- Leverage the Fall-term SACS visit to encourage need for change and re-direction if necessary.
- Initiate the conversation about metacognition within departments through speaker facilitation.

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The Southeast Regional PULSE (SERP) Network is supported by award 1435389 from the National Science Foundation and support from the Howard Hughes Medical Institute.
Advancing Academic and Scholarly Engagement in Biology
School of Biology, Georgia Institute of Technology
Atlanta, GA
Jung Choi, David Collard, Linda Green, and Chrissy Spencer

Institutional Demographics
- R1 Research University
- 15,000 undergraduates
- Department size – 44 faculty (tenured, tenure-track, instructional), 395 majors
- BS in Biology
- 15% URM biology undergraduates; 3% URM biology faculty

Priorities & Vision:
To align the Biology undergraduate experience with Vision and Change, we’ve identified four priorities:
1) Mentor new and existing faculty to practice student-centered learning strategies
2) Engage students in metacognitive reflection and the practice of successful learning strategies
3) Create curricular cohesion as students develop mastery of core concepts and competencies in biology program
4) Motivate and equip students to initiate undergraduate research in the freshman and sophomore years.

Motivations for improvement
We seek to:
- Improve retention in the major
- Increase student learning
- Increase student identification as scientists
- Increase opportunities to engage in research scholarship
- Increase collaboration among faculty

Priority: Faculty Development
Vision: A majority of faculty, including all new and recent faculty, will have experience in the practice of student-centered learning
Challenges: Faculty prioritize research, default to traditional teaching practices, inconsistency of teaching assignments, resources to encourage effective mentorship interactions (lunch meetings)
Action Plan: Formalize existing practice for placing new faculty with co-instructors in a core course for their first teaching semester. New faculty will receive feedback and mentoring for their first three semesters of teaching, via classroom visits and personal discussions.
Long-term Actions: Provide resources for continued professional development, including department-specific workshops and institutional resources.
Assessment: Quantify the number of courses that rely on student-centered teaching practices.

Priority: Metacognition
Vision: Intro Bio instructors will engage students in metacognitive reflection and practice of successful learning strategies.
Challenges: Faculty buy-in and time away from content in class, effective training to implement metacognition training for students
Action Plan: Explore literature to develop core instructional materials for faculty
Establish ties with Center for Academic Success regarding our goal and their role in helping students implement strategies
Convene fall Intro Bio faculty to teach skills and methods of presentation to students
Long-term Actions: Encourage CoS and CETL to bring a speaker on metacognition. Stimulate catered luncheon thru CETL that highlights multiple depts’ approach to teaching metacognitive strategies
Assessment: Compare exam ranges, DFW rates, final course average for students between 13-14 and 14-15.

Priority: Curricular Cohesion
Vision: Vertically integrated core curriculum with articulated learning objectives for each course, sequentially building on prior knowledge.
Challenges: Faculty training on learning goals, resistance to assessing with pre-post tests, loss of academic freedom in courses
Request support from the Biology Undergraduate Committee.
Long-term Actions: Encourage CoS and CETL to bring a speaker on metacognition. Stimulate catered luncheon thru CETL that highlights multiple depts’ approach to teaching metacognitive strategies
Assessment: Measure student learning gains from matriculation to graduation.

Priority: Early initiation of research
Vision: Increase research opportunities for early-career students with research faculty and graduate students
Challenges: Keeping the job listing current, establishing and maintaining the research mentor training program.
Action Plan
Students in new "Science and Math Research Training" (SMART) LLC will meet with research faculty.
Long-term Actions: Establish graduate student mentoring program for undergraduate researchers, and create website to post UG research positions. Provide workshops on mentoring to graduate students.
Assessment: Quantify the number of students in UG research and the duration of research semesters per student.

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