The Context for an Undergraduate Research Program at WMU

A three-phase investigation into the state of undergraduate research

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Agenda

1. Introduction and Background
2. Phase 1: National Perspective
3. Phase 2: WMU Faculty Perspective
4. Phase 3: WMU Student Perspective
5. Students vs. Faculty
6. Recommendations & Conclusion
Introduction and Background
Defining Terms

Research =

- Undergraduate Research
- Creative Scholarship
- Experiential Learning

David Kolb’s Experiential Learning Cycle

Concrete Experience
Active Experimentation
Reflective Observation
Abstract Conceptualization

About Me
Why It Matters - Retention

Why It Matters – Retention

Retention Rates of Public Michigan Universities*

- EMU: 74%
- MSU: 92%
- WMU: 79%
- U of M: 97%
- CMU: 79%

*retention data from www.collegefactual.com
Students of color that participated in UROP were...

- 39% more likely to pursue a graduate education
- 82% more likely to pursue a professional education
- 96% more likely to be involved in research activity post-graduation
- 159% more likely to receive a recommendation from faculty for a job

...than students of color that did not participate in UROP

Phase 1 – National Perspective
Research Question

How does WMU’s undergraduate research activity (URA) compare to the undergraduate research activity of other institutions?
Methodology

1. Created a ranking system measuring the strength of an institution’s URA

2. Surveyed R1 and R2 Carnegie-classified research institutions similar to WMU (public, not-for-profit, undergraduate majority) (stratified random sample, n = 131 with 65 R1 and 66 R2 institutions)

3. Ranked each institution based on URA variables

4. Analyzed correlations between URA rank and other variables via SAS
<table>
<thead>
<tr>
<th>Category</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>Internal Listings</td>
<td>Private, competitive program to apply to, OR &gt; 15 public project</td>
<td>1-15 public project listings that students can apply to</td>
<td>No project listings or private program to apply to</td>
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<td>listings</td>
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<tr>
<td>Seminars and Workshops</td>
<td>Workshops/seminars are abundant (&gt; 10 per year) or required for</td>
<td>2-10 seminars/workshops relating to undergrad research per year</td>
<td>Little to no (0-1) seminars/workshops relating to undergrad</td>
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<td></td>
<td>program</td>
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<td>research</td>
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<tr>
<td>External Opportunities</td>
<td>&gt; 15 external undergraduate research opportunities listed</td>
<td>2-15 external undergraduate research opportunities listed</td>
<td>Little to no (0-1) external undergraduate research opportunities</td>
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<td>Student Compensation</td>
<td>Students guaranteed credit or pay for participation, OR &gt; 5</td>
<td>Students can potentially receive credit or pay, but not</td>
<td>No opportunities to get paid or get credit, little to no (0-1)</td>
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<td></td>
<td>undergrad grants offered</td>
<td>guaranteed, OR 2-5 grants for undergrad are offered</td>
<td>grants offered for undergraduates</td>
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<tr>
<td>Program Type</td>
<td>Different tiers of undergrad research programs for different</td>
<td>A single designated undergraduate research program</td>
<td>No designated undergraduate research program</td>
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<td>class standings. E.g. one program for freshman/sophomores and</td>
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<td>another for juniors/seniors</td>
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<tr>
<td>WMU’s Ranking</td>
<td>Internal Listings</td>
<td>Seminars and Workshops</td>
<td>External Opportunities</td>
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<td>WMU’s Ranking</td>
<td>3 – WMU has no centralized database of internal research assistantships or projects</td>
<td>2 – WMU offers a seminar every month pertaining to undergraduate research</td>
<td>1 – WMU is a member of the Student Opportunity Center, with opportunities for grants, REUs, and research opportunities</td>
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**Overall (mean) ranking: 2.2**
Compared URA mean rankings between R1 and R2 institutions

**Overall Ranking**
- R1 Institutions: 1.89
- R2 Institutions: 2.30

**Internal Listing Ranking**
- R1 Institutions: 1.63
- R2 Institutions: 2.14

**Seminar and Workshops Ranking**
- R1 Institutions: 2.09
- R2 Institutions: 2.45

**External Opportunities Ranking**
- R1 Institutions: 1.62
- R2 Institutions: 2.34

**Student Compensation Ranking**
- R1 Institutions: 1.92
- R2 Institutions: 2.09

**Program Type Ranking**
- R1 Institutions: 2.17
- R2 Institutions: 2.49
URA Rankings – Linear Regression

Regressed URA ranks against relevant variables

US News Ranking vs. Overall URA Rank

- $p = .06$
- $r^2 = .0318$

URA Rank vs. Retention Rate

- $p = .04$
- $r^2 = .0324$
In one model, 88% of the variance of retention rates was explained by these three variables:

- US News Ranking
- Students per Faculty
- Acceptance Rate
Limitations

- Abundant opportunity for bias or human error
- Incomplete data for some variables
- Unavailability of more relevant variables (grant funding)
- Not very significant findings
Hundreds of variables likely contribute to a school’s retention rate.

R1 > R2 at URA

“Trickle-down research”

WMU has room for improvement, and a lot of potential
Students need to be compensated for their experiential learning.
Phase 2 – WMU Faculty Perspective
Research Question

How do WMU faculty feel about 
undergraduate involvement in their research?
Methodology

1. Developed a paper survey to learn more about URA from the perspective of WMU faculty – conducted in-person interviews, probing as needed

2. Snowball sampling method

3. Survey results: n = 19, with representation from every college except Aviation

4. Conducted a qualitative and quantitative analysis based on responses
Major Themes

53% of all respondents said that students primarily find opportunities by contacting faculty and asking about opportunities.
said that their research is interdisciplinary, and that undergraduates from other departments would be able to participate, and sometimes even improve the research.
Minor Themes

Focus is on upper-classmen for opportunities

Strong concern about faculty workload

Qualifications for undergraduate researchers included ethics training, methodological training, intangible qualities, and more
The variable “student relations”...

- Feeling valued as a mentor
- Opportunity to mentor students
- Able to attract students to work with them
- Intellectual stimulation from students

...was the **strongest predictor of career satisfaction for female faculty**

Benefits of Undergraduate Involvement

How beneficial is undergraduate involvement in research to you?

68% of faculty found undergraduate involvement in research “extremely beneficial” to them.
Benefits of Undergraduate Involvement

WMU faculty on how undergraduates are valuable:

- More flexible schedule than graduate students
- Gateway to master’s programs at WMU
- Academic discipline cross-pollination
- Physical capability/youth
- Help with tedious & time consuming work
Limitations

- Small sample size, selection bias
- Social desirability bias
- Mixed methods survey instrument
Phase 3 – WMU Student Perspective
How do WMU undergraduates feel about partaking in research, and what barriers are there to getting involved?
Methodology

1. Developed a Qualtrics survey to learn more about undergraduate research from the perspective of undergraduates themselves

2. Conducted a focus group with volunteers from the survey

3. Convenience sampling method – email lists, etc.

4. Survey results:
   n = 416, with representation from every college

5. Conducted a qualitative and quantitative analysis based on responses
Focus Group

4 participants
From CAS, CHHS, and HCOB
Roughly an hour long conversation
Despite low turnout, INCREDIBLE results
5 major themes from discussion
Focus Group - Themes

Lack of volition in selecting a research topic

“I still have really enjoyed [my project], even though I didn’t have that initial self-direction”

“I did choose getting paid over the more interesting subject.”
Focus Group - Themes

Laissez faire supervisory experiences

“Very hands off, but not when I needed the support”

“I would like more hands on support just because I’d be more motivated”
Focus Group - Themes

Ideal qualities of a supervisor

“Confidence in your ability”

“Acceptance of failure”

“Getting really excited”

“When they’re excited, you get excited and it makes you want to keep going”
Focus Group - Themes

Lack of awareness of research opportunities

“It took me 2 years before I figured out there was an opportunity for research in my field”

“Knowing where to start is the hardest part”
Experienced difficulties in research

“There’s this stigma on research”

“They don’t advertise it enough”

“Easier to find opportunities...at the higher levels of classes”

“Loneliness, I feel it a lot in research”
Survey Results - Demographics

**Class Standing**
- Third-year: 27%
- Second-year: 23%
- Fourth-year: 19%
- First-year: 19%
- Fifth-year or higher: 12%

**Home College**
- College of Arts and Sciences: 51%
- College of Engineering and Applied Sciences: 23%
- College of Education and Human Development: 2%
- College of Fine Arts: 4%
- College of Health and Human Services: 9%
- College of Aviation: 1%
- Haworth College of Business: 9%
- Undecided: 1%
How happy would you be to receive only volunteer hours for the following:

Students are not satisfied with simply being volunteers.
How happy would you be to receive **only monetary compensation** for the following:

Students are really satisfied with getting paid for their research.
Survey Results

Average reported hourly wage for paid undergraduate research positions:

$12.49/hr
Limitations

- Analysis paralysis
- Poor wording/coding of questions
- Sample not very diverse
Students vs. Faculty
How **supportive** is your department of undergraduate involvement in research?

- Not at all supportive
- Somewhat supportive
- Moderately supportive
- Supportive
- Extremely supportive

- Students
- Faculty
Students vs. Faculty

How accessible are opportunities in undergraduate research?
How beneficial to undergraduates is involvement in undergraduate research?
Recommendations
Recommendations

- Collect project information from faculty willing to take on young students
- Target first and second year students with opportunities
- Prioritize populations with higher risk of attrition
- Introduce more applied workshops, e.g. how to use SPSS, how to do a theme analysis, etc.

Alternatively, have methods classes earlier in curriculum (special first-year seminar course?)
Recommendations

- Provide either credit or pay for any student looking to partake in research
- Have upperclassmen that have participated in research act as “peer research mentors”
- Have 2-3 students work on the same project
- Have students work on projects that will be beneficial for both the faculty and students
By investing in its students, WMU can invest in itself for years to come.
Thank you!
Questions?