Impacting Student Writing in STEM: WID Enhancements & Small-Group Workshopping

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IWAC 2016
Research Question

What impact does WID curriculum have on student writing growth in their disciplines?

Spring 2015 essays scored an average of 34% higher than Pre-WID Fall 2012 essays across 5 categories of assessment.
“an integrative relationship between writing and knowing”

writing plays ...
“a critical role in both recovering knowledge and generating new knowledge”

Carter (2011)
Writing in the Disciplines

- Rhetorical situations:
  - Contextual and complex
  - Variety of purposes, audiences, and genres
- Encourage exploration, synthesis
- Process: drafts, peer response, reflection
- Scaffolding

Saint Mary’s new Core Curriculum views WAC as an interwoven whole:

- Composition
- Great Books seminars.

Designated WID course in each major:
- Departments develop and propose courses
- Taught by professors in the major
- Follows Composition and is intended to:
  - help students learn their discipline through writing -- i.e., writing to learn.
  - prepare students for writing in their major, while in college, and beyond.

“commitment to the empowerment of students through a constructivist view of knowledge that demands critical thinking”

Bean (2007)
Potential pitfalls:
- students give misguided, too little, or too much advice
- independent critique groups can lack commitment
- many peer-only workshops lack guidance in how to analyze and discuss writing

“productive peer review ... can’t be briefly inserted into a writer’s learning process without extensive preparation.”

Harris (2014)
Writing Circles

Facilitated, structured peer-review groups
3 to 5 students & facilitator
Weekly
Course-based
Partial-Credit
Teach:

Principles of effective peer review:
  - Description and detail over evaluation and judgement
  - Idea-level over sentence-level
  - Organization/structure over punctuation/spelling

Post-outlining: primary method of textual analysis
Writing Circle Facilitators

Moderate discussion of peer texts:
Analyze a prompt or text from class
Generate ideas through brainstorming
Workshop an outline or rough draft
Collaborate:

● With students to set weekly agenda
● With other facilitators
● With WAC Director, Associate Director, & faculty
Writing Circles & WID

Diversification

Increased integration w/ WID courses

Coordinate with WID source course

Facilitators access course docs: syllabi, calendars, prompts, etc.

Ongoing communication between disciplinary faculty and facilitators

Pre-semester planning

Intra-semester check-ins

Inter-semester revision
Objectives

overview of research methods used in kinesiology and increase a student’s understanding of empirical literature

examine how we measure important variables in the field and how cognitive, affective and psychomotor test are constructed and implemented effectively

discipline-specific communication, both written and oral, which will serve as a means for demonstrating understanding of research, measurement, and dissemination in Kinesiology
Evolution of Kinesiology Syllabi

Pre-WID:
- Little formality about how to write
- Focus on modeling research articles
- Emphasis on citation style
- No reference to revision or drafting
- Key assignments: Research paper with 10 resources

WID:
- Added scaffolding
- Emphasis on process, i.e. paraphrasing, organization (funnel method)
- References to revising and editing
- Key assignments:
Methods

Participants:

Kinesiology sophomores & some juniors (n=77)

Pre-WID Curriculum (Fall 2012): n=38

WID Curriculum (Spring 2015): n=39

Measures & Procedures:

Kinesiology Writing Circles: 10
Learning Outcome rubric for research papers

2 trained, independent readers assessed each paper, blinded to condition

19% of papers (n=15) were assessed by a third reader
Methods:
Development of Rubric using Core Curriculum Learning Outcomes

Critical Thinking: Evaluate and synthesize evidence for the purpose of drawing valid conclusions.

Written Communication: Use the process of writing (brainstorming, collaborating, outlining, researching, drafting, revising, & reflecting) to enhance intellectual discovery & unravel complexities of thought.
Results: Mean Scores (SD) by Group & Delta Scores

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre-WID</th>
<th>WID</th>
<th>Δ Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual Discovery</td>
<td>1.63 (0.67)</td>
<td>2.04 (1.09)</td>
<td>0.41 (0.42)</td>
</tr>
<tr>
<td>Synthesize &amp; Analyze</td>
<td>1.77 (0.68)</td>
<td>2.25 (0.82)</td>
<td>0.48 (0.14)</td>
</tr>
<tr>
<td>Organization</td>
<td>1.73 (0.71)</td>
<td>2.43 (0.70)</td>
<td>0.70 (0.13)</td>
</tr>
<tr>
<td>Theoretical Framework</td>
<td>1.72 (0.70)</td>
<td>2.21 (0.84)</td>
<td>0.50 (0.14)</td>
</tr>
<tr>
<td>Format, Tone, Style</td>
<td>1.66 (0.53)</td>
<td>2.47 (0.83)</td>
<td>0.81 (0.30)</td>
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</tbody>
</table>
### Results: One-way Analysis of Variance (ANOVA) Between Pre-WID and WID Papers

<table>
<thead>
<tr>
<th></th>
<th>Pre-WID</th>
<th></th>
<th>WID</th>
<th></th>
<th>F(1,76)</th>
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<td>M</td>
<td>SD</td>
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<td>0.82</td>
<td>7.70</td>
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<td>Organization</td>
<td>1.73</td>
<td>0.71</td>
<td>2.43</td>
<td>0.70</td>
<td>18.45</td>
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<td>Theoretical Framework</td>
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</tr>
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<td>Format, Tone, Style</td>
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<td>2.47</td>
<td>0.83</td>
<td>12.40</td>
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</table>

Note. N=77; * ANOVA significant at p< .05.
## Relationship between Learning Outcome Variables

<table>
<thead>
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<th>Organization</th>
<th>Theoretical Framework</th>
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<td>1. Intellectual Discovery</td>
<td></td>
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<td></td>
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<tr>
<td>2. Synthesize &amp; Analyze</td>
<td>0.88 (77%)</td>
<td></td>
<td></td>
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<tr>
<td>3. Organization</td>
<td>0.74 (55%)</td>
<td>0.83 (69%)</td>
<td></td>
<td></td>
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<tr>
<td>4. Theoretical Framework</td>
<td>0.60 (36%)</td>
<td>0.66 (44%)</td>
<td>0.62 (38%)</td>
<td></td>
</tr>
<tr>
<td>5. Format, Tone, Style</td>
<td>0.81 (66%)</td>
<td>0.77 (59%)</td>
<td>0.75 (56%)</td>
<td>0.50 (25%)</td>
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</table>

Note. All Correlations significant at 0.01. (R is the shared variance.)
Discussion & Implications

Addition of WID pedagogy and Writing Circles to a Kinesiology course significantly improved research writing.
Implications for Circles

Facilitators

Practical Applications

- Generate samples for students in current Writing Circles
- Identify common mistakes to address proactively

Misunderstandings about APA

- Personal narrative vs. objective writing
Limitations & Further Research

Study Design & Generalizability?

Further Research:

WID Program/Pedagogy

Campuswide Assessment
Acknowledgements

Jaq Davis, Dan Horan, Jill Kolongowski, Josh Rose: the rest of the Norming and Coding Team

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Jim Sauerberg, SMC Core Curriculum Committee Chair for WID and Assessment Funding

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Steve Miller, SMC Kinesiology Department Chair & WID Collaborator

Chase Manning, Research Assistant

Kinesiology students

Thank You!!


Writing Circles Organization and Logistics

2012-13: 12 Circles - 25 students
2013-14: 64 Circles - 221 students
2014-15: 108 Circles - 416 students
2015-16: 102 Circles - 414 students
<table>
<thead>
<tr>
<th></th>
<th>4 - Highly developed</th>
<th>3 - Developed</th>
<th>2 - Emerging</th>
<th>1 - Initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual discovery - Written &amp; Oral Communication</td>
<td>Solidly situates writer’s hypothesis and research question within the discipline, in the context of a well-reasoned gap in the literature, demonstrating the importance of the study.</td>
<td>Situates writer’s hypothesis and research question within the discipline, in the context of a pertinent, well-defined gap in the literature, demonstrating the importance of the study.</td>
<td>Discusses writer’s hypothesis and research question in terms of the discipline generally, in the broad context of a gap in the literature.</td>
<td>Attempts to form a hypothesis and research question and describe a gap in the literature. May make unsupported connections.</td>
</tr>
<tr>
<td>Synthesize and Analyze evidence for the purpose of drawing valid conclusions - Critical Thinking</td>
<td>Skillfully summarizes, analyzes, and synthesizes evidence, identifying relevant assumptions and theses and outlining their limits with respect to the research question.</td>
<td>Summarizes, analyzes, and synthesizes evidence, identifying some assumptions and theses and outlining their limits with respect to the research question.</td>
<td>Summarizes, analyzes, and begins to synthesize evidence to support ideas in the context of the research question. May be addressed in a piecemeal or mechanical manner.</td>
<td>Summarizes and attempts to analyze evidence. May not clearly support ideas.</td>
</tr>
<tr>
<td>Organization of ideas and complexity of thought within the discipline - Written &amp; Oral Communication</td>
<td>Uses disciplinary conventions of logical and systematic organization, with clear topic sentences and effective transitions from the general topic, through specific sub-topics, to the research question and hypothesis.</td>
<td>Uses disciplinary conventions of organization, with mostly clear topic sentences and mostly effective transitions from the general topic, through specific sub-topics, to the research question and hypothesis.</td>
<td>Uses some conventions of organization, including some transitions or topic sentences and at least two subtopics, in a piecemeal or mechanical progression.</td>
<td>Mentions subtopics. Minimal attempt to organize, perhaps by source rather than topic.</td>
</tr>
<tr>
<td>Theoretical Framework - Written &amp; Oral Communication</td>
<td>Clear and concise explanations of key terms, concepts, theories, or principles and their implications in the context of the research question.</td>
<td>Explains key terms, concepts, theories, or principles in the context of the research question.</td>
<td>Discusses key terms, concepts, theories, or principles.</td>
<td>Attempts to identify key terms, concepts, theories, or principles. May be misidentified.</td>
</tr>
<tr>
<td>Format, Tone, and Style - Written &amp; Oral Communication</td>
<td>Uses &gt;90% professional, concise language. Paraphrases evidence. Integrates sources elegantly, citing accurately in APA. Includes title page, problem description, summary of research, research question, hypothesis, and References page.</td>
<td>Uses about 75% professional, concise language. Privileges paraphrase over quotes. All sources cited accurately in APA. Includes title page, problem description, summary of research, research question, hypothesis, and References page.</td>
<td>Uses &lt;50% professional, concise language. Privileges quotes over paraphrase. All sources cited. Includes all and only: title, problem description, summary of research, research question, hypothesis, cycle, and References page.</td>
<td>Uses 25% or less professional, concise language. Privileges quotes over paraphrase. Includes some citations. Missing some required elements or includes improper ones.</td>
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</tbody>
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