1967

The
First 40 Years
(1930-1970)
1991
The Next 20 Years
(1970-1990)
Ernie working atop the 746-foot South Tower

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2005

*How College Affects Students (Vol. 2): A Third Decade of Research*

(1989-2002)

The U.S.S. Missouri
The Changing Landscape for Research on College Students in the United States

1. A demographic transformation
The Changing Landscape for Research on College Students in the United States

1. A demographic transformation
2. Increased understanding of how students learn
The Changing Landscape for Research on College Students in the United States

1. A demographic transformation
2. Increased understanding of how students learn
3. Expanded array of pedagogies
The Changing Landscape for Research on College Students in the United States

1. A demographic transformation
2. Increased understanding of how students learn
3. Expanded array of pedagogies
4. Expanded set of policy concerns
Questions Driving the Review for *How College Affects Students (Vol. 2): A Third Decade of Research*

1. Do students change during the college years?
2. How much of that change is due to college?
3. Do different institutions have different effects?
4. Do different experiences have different effects?
5. Does the same experience have a different effect for different kinds of students?
6. What are the long-term effects of college?
### Net\textsuperscript{a} College Effects on Quantitative, Verbal, and Selected Subject Areas

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Fr.- Sr. Net Change</th>
<th>Effect Sizes (in SDs)</th>
<th>Percentile Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td></td>
<td>+ .59</td>
<td>22</td>
</tr>
<tr>
<td>Math</td>
<td></td>
<td>+ .32</td>
<td>13</td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td>+ .47</td>
<td>18</td>
</tr>
<tr>
<td>Social Studies</td>
<td></td>
<td>+ .46</td>
<td>18</td>
</tr>
<tr>
<td>Liberal Arts</td>
<td></td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Adjusted for precollege academic ability, race/ethnicity, age, gender, college grades, credit hours taken, and institutional selectivity.
## Net College Effects on Higher-Order Thinking Skills

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Fr.- Sr. Net Change During College</th>
<th>Effect sizes (in SDs)</th>
<th>Percentile Points$_b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical thinking</td>
<td></td>
<td>+ .55</td>
<td>21</td>
</tr>
<tr>
<td>Post- formal reasoning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective reasoning</td>
<td></td>
<td>+ .90</td>
<td>32</td>
</tr>
<tr>
<td>Epist Sophistication</td>
<td></td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

$^a$ Adjusted for precollege skill level, academic ability, race/ethnicity, age, gender, college grades, credit-hrs. taken, and institutional selectivity.

$^b$ Percentile points
What can we conclude about knowledge acquisition and cognitive growth?

1. Are clear net effects on knowledge acquisition and critical thinking and post-formal reasoning. Gains range from 15-30 percentile points.

2. Between-college effects are inconsistent and, when found, are small.

3. Learning gains due much more to within-college academic and nonacademic experiences than to the traits of the college attended.

4. Changes in moral reasoning, psychosocial characteristics, and attitudes and values also more a function of what happens in college than where students go.
Sources of Influence on Learning

1. Instructional methods and content acquisition
   - Supplemental Instruction (+.39 sd; 15 %ile pts)
   - Computer-based instruction (avg.: +.31 sd; 12 %ile pts)
   - Collaborative/Cooperative learning (+.47 to .54 sd; 18-20 %ile pts)
   - Active learning (+.25 sd; 10 %ile pts)
   - Service learning (??)
Teaching & Learning with Technology: Knowledge Acquisition

- Computer-assisted instruction (+.27 sd; 11%ile pts.)
  - Drill-and-practice (no new material)
  - Tutorial instruction (new material possible)
Teaching & Learning with Technology: Knowledge Acquisition

- **Computer-assisted instruction** (+.27 sd; 11%ile pts.)
  - Drill-and-practice (no new material)
  - Tutorial instruction (new material possible)
- **Computer-managed instruction** (+.43 sd; 17%ile pts.)
  - Tests student performance
  - Guides students to appropriate learning resources
  - Maintains records of students’ performance
Teaching & Learning with Technology: Knowledge Acquisition

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  - Guides students to appropriate learning resources
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- **Computer-enriched instruction** (+.34 sd; 13%ile pts.)
  - Computer as problem-solving tool, data generator to illustrate relations, or executing student-developed programs.

**KEY FINDING:** Students in technology-based classes require less instructional time than those in traditionally taught classes.
Teaching & Learning with Technology: General Cognitive Skills

- Learning a computer programming language
  (.35 sd; 14%ile pts.)

- Modest positive gains in critical thinking when coursework requires:
  - learning to use computers (CC students only?)
  - Using computers to analyze data
  - Making visual displays
  - Searching net for course material
Sources of Influence on Learning

2. Effective instructor behaviors:

- Clarity and understandableness (e.g., uses examples, identifies key points)
- Expressiveness/Enthusiasm (e.g., speaks emphatically, maintains eye-contact)
- Preparation and organization (e.g., provides outlines, clear objectives, uses class time effectively)
- Availability and helpfulness
- Quality and frequency of feedback to students
- Concern for, and rapport with, students
Sources of Influence on Learning

3. The Curriculum

- An interdisciplinary, integrated core curriculum emphasizing links across classes and ideas (+)
Sources of Influence on Learning

4. Social and out-of-class involvement:
   • Quality of student effort/engagement (+)
   • Interactions with peers (+)
   • “Diversity” experiences (+)
   • Interactions with faculty members (+)
Institutional control, size, resources, cost, and selectivity are largely unimportant factors. Effects are more indirect than direct.

Internal institutional influences are far more important.

• What happens to students after enrollment?
• What shapes what happens?
The Bottom Line

Characteristics of learning and development

• Entails encounters with challenging ideas and people
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- Requires active engagement with those challenges
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- Occurs best in a supportive environment
- Involves real-world activities
- Is a relational, social activity
- Is unbounded by time or place
Implications for Instructional Designers

- Current conceptions of how students learn are incomplete.
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- **Learning involves interlaced influences and outcomes:**
  - Multiple influences, operating in
  - Multiple settings, affecting
  - Multiple outcomes
Implications for Instructional Designers

◆ Current conceptions of how students learn are incomplete.

◆ Learning involves interlaced influences and outcomes:
  • Multiple influences, operating in
  • Multiple settings, affecting
  • Multiple outcomes

◆ Multidisciplinary models are needed
  • To avoid under specification of analytical models
  • To avoid confounding through unaccounted variables
  • To map indirect, as well as direct, effects
A comprehensive model of influences on student learning and persistence (Terenzini & Reason, 2005).
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The Challenges Ahead

- Align what we do with what we know.
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◆ In looking to improve: Forget about Silver Bullets.
◆ Think systemically.
◆ Think collaboratively.
◆ Use the 6 characteristics as touchstones in program planning, development, and evaluation.
◆ Focus on first-year students.