

An Assessment of Two Different Teaching
Formats for Natural Science (GSTR 232),
A General Studies Course:

Background, Assessment Results,
and Recommendations for Consideration

Background/History

Course began in 1984, consisted of several instructors teaching within disciplines with recitation for smaller groups of students.

Tentative Assessment Plan

- Student Attitudinal Survey
- Evaluation of Student Knowledge/Performance
- Faculty Meetings/Discussions
- Individual Instructor Classroom Assessments
- Faculty Feedback/Perspectives

Additional Assessments and Initiatives

- Analysis of Instructor Evaluation Questionnaire Data (old versus new format of teaching the course)
- Faculty Development Proposal (to ensure that new instructors to the course would have preparation)

Student Attitudinal Survey

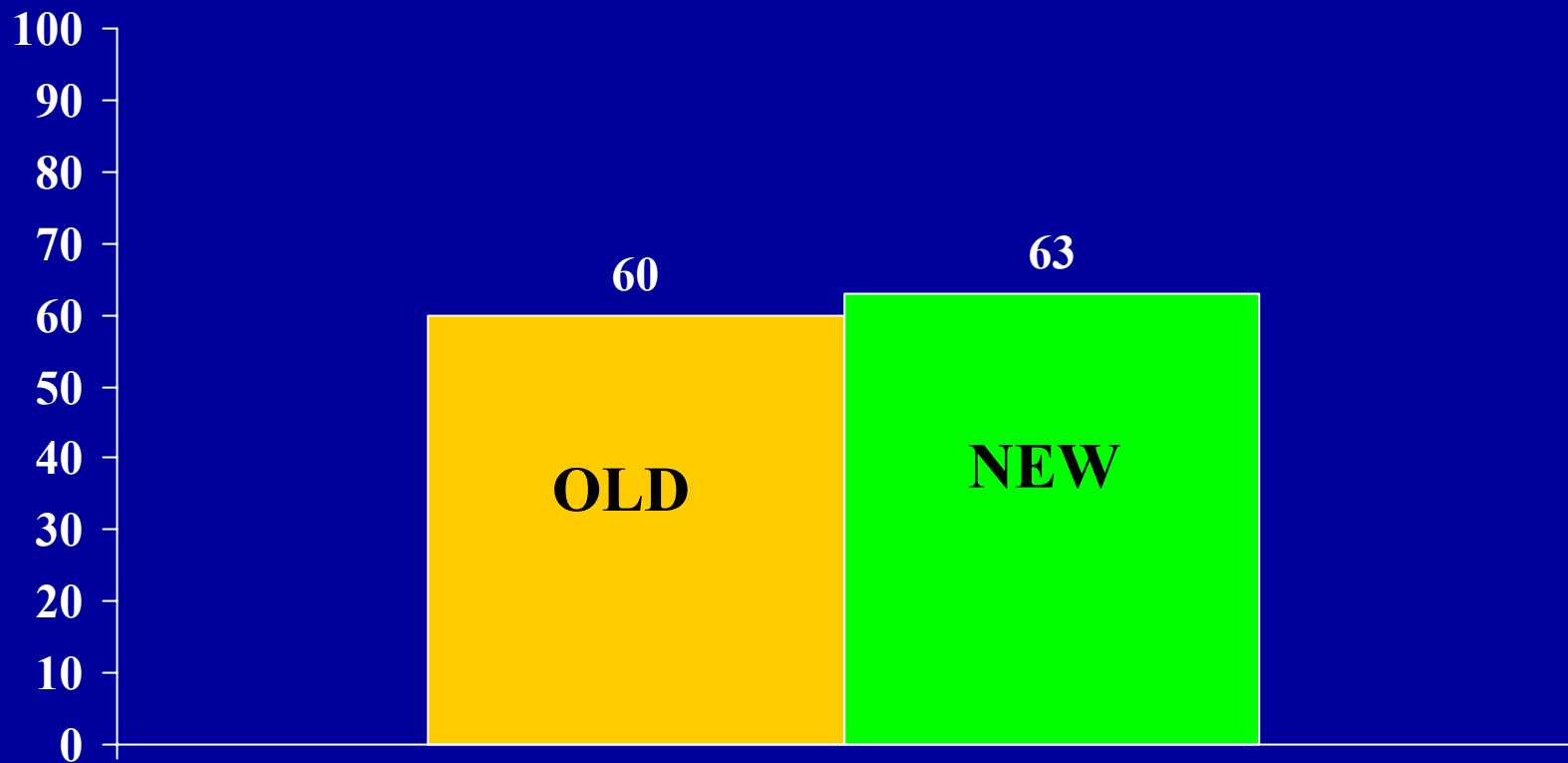
Designed using a collaborative approach of faculty first deciding what the basic and major goals of the course were and also agreeing on what other survey information would be of interest to faculty.

Administered to the last “old format” class in Fall 1999 and then to “new format” classes through Spring 2001; the instrument was administered both at the beginning and the end of each course.

Designed specifically to assess students’ predisposition to studying science, their ratings of the importance of several core learning goals, and the effectiveness of the course in fulfilling the goals (on the “end-of-course” version).

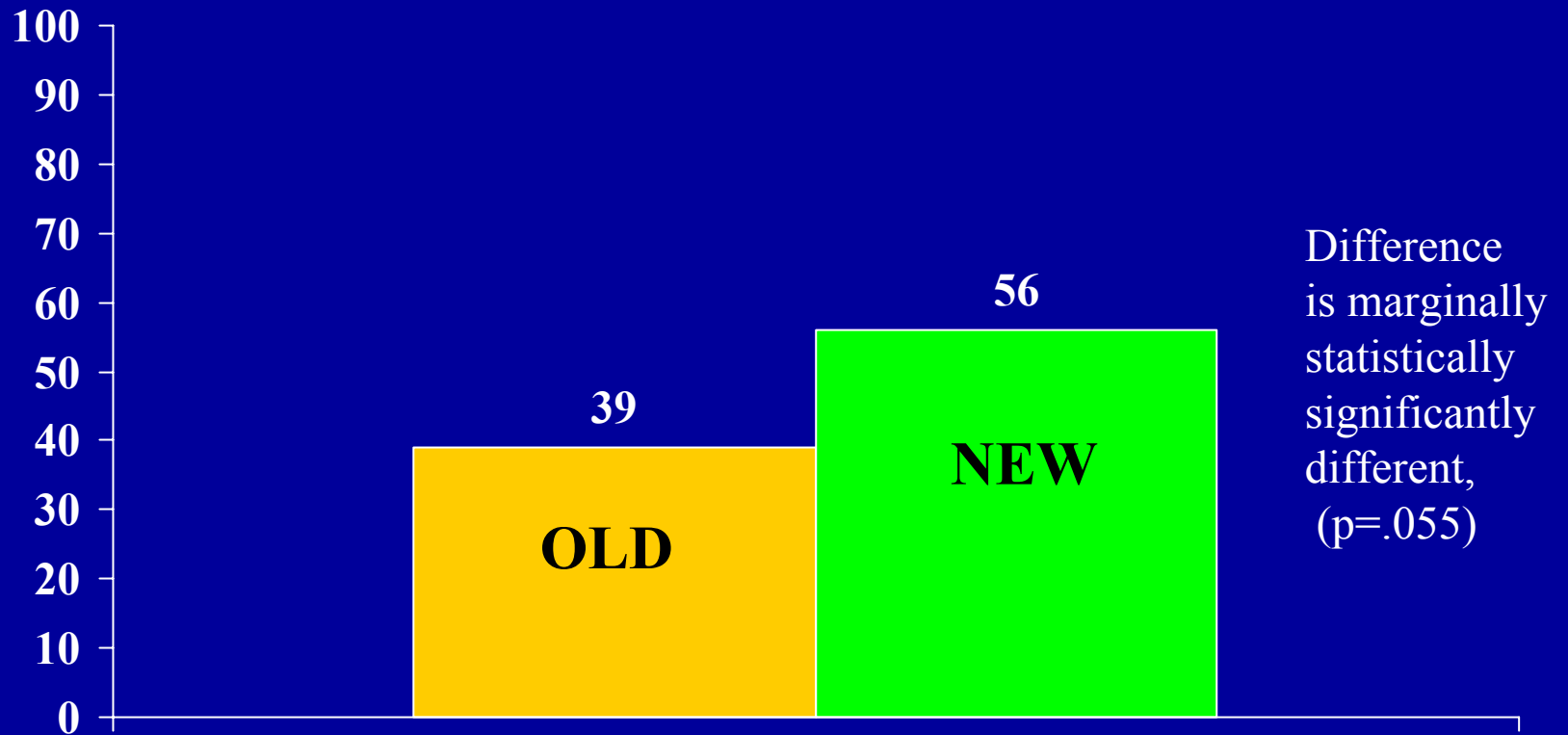
Student Attitudinal Survey Results

“My experience with studying science in high school was...”



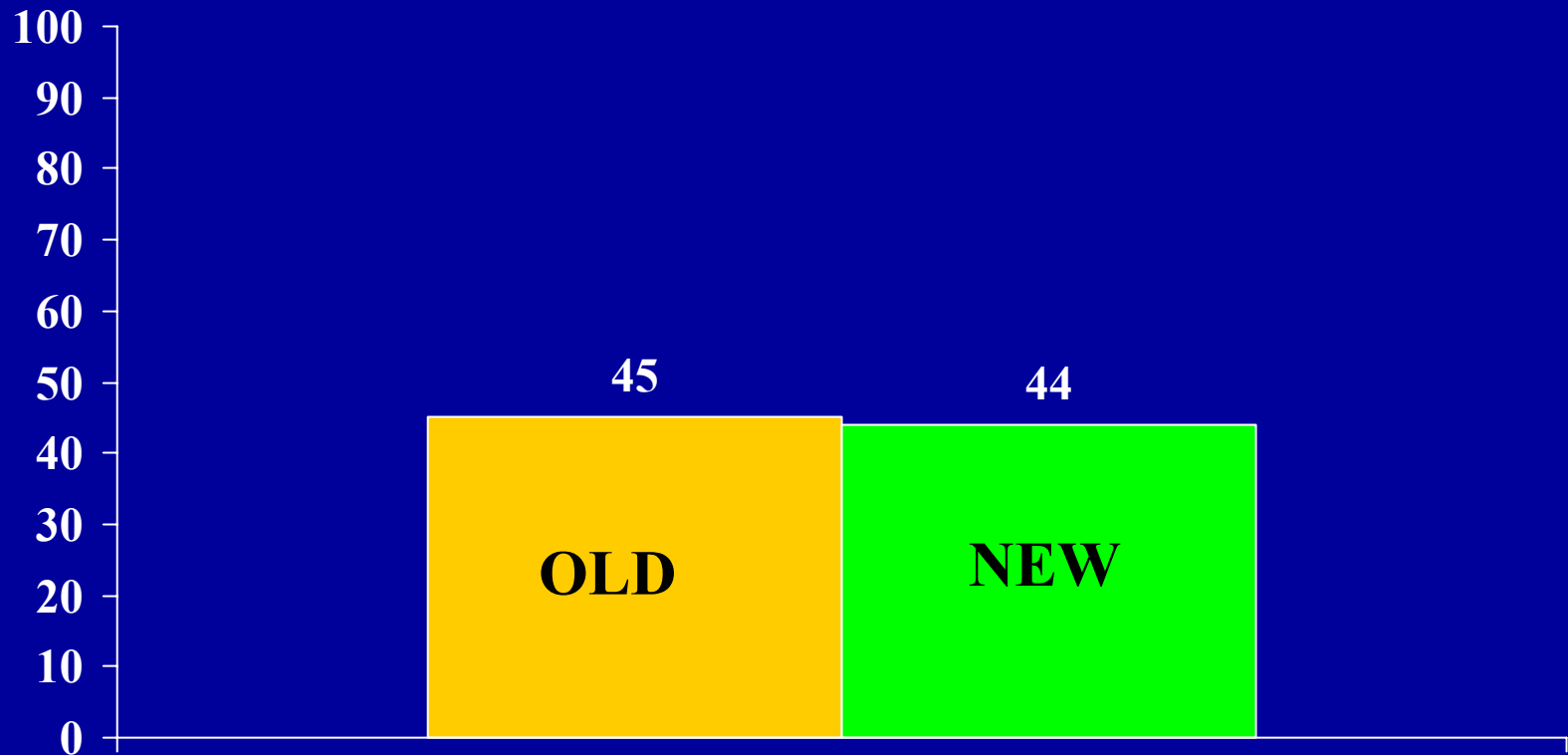
Percentage of students who marked “Very” or “Somewhat Positive”

“I feel prepared to take this course.”



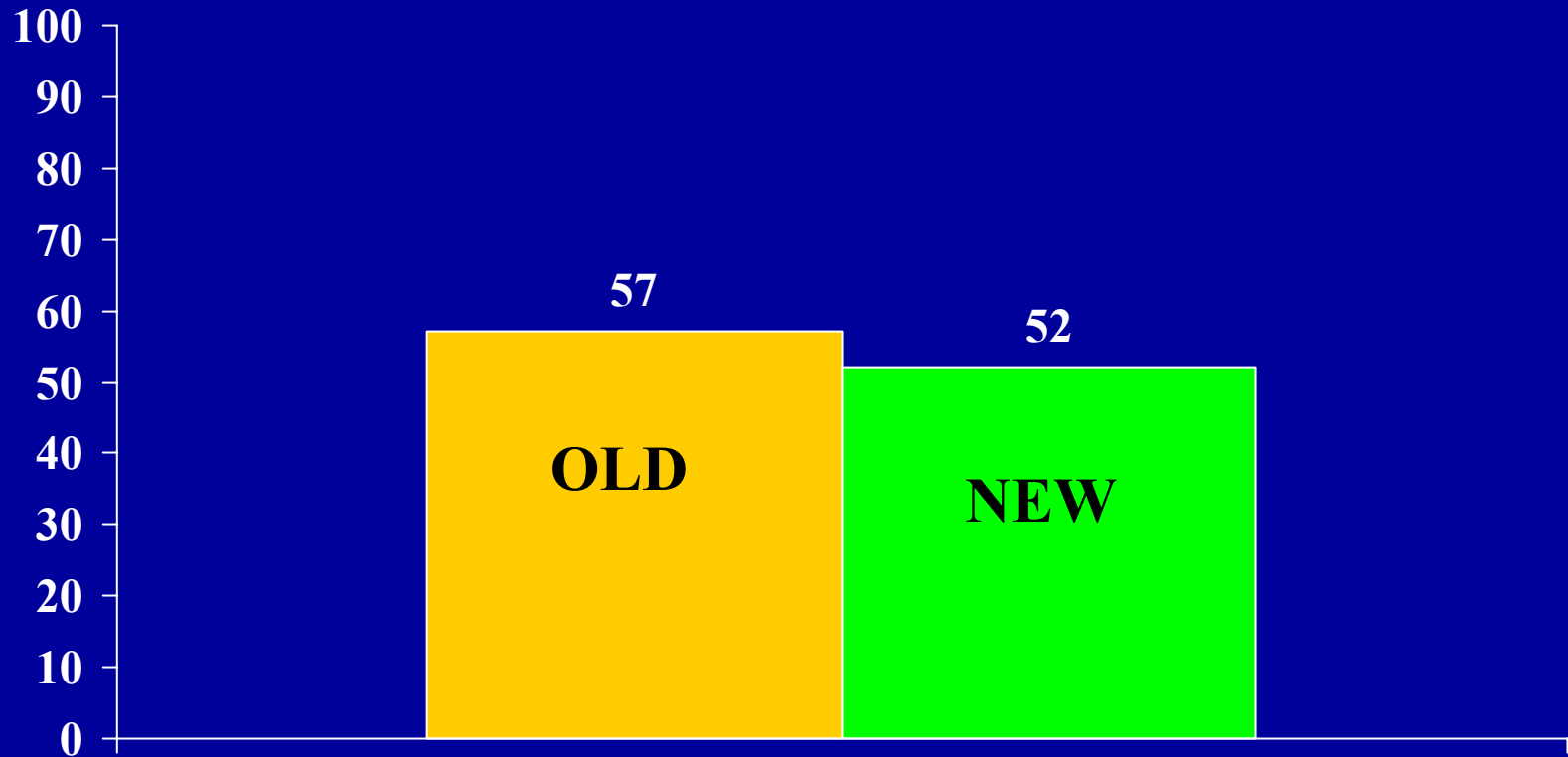
Percentage of students who marked “Completely” or “Somewhat Agree”

“Generally, I would describe my science background as...”



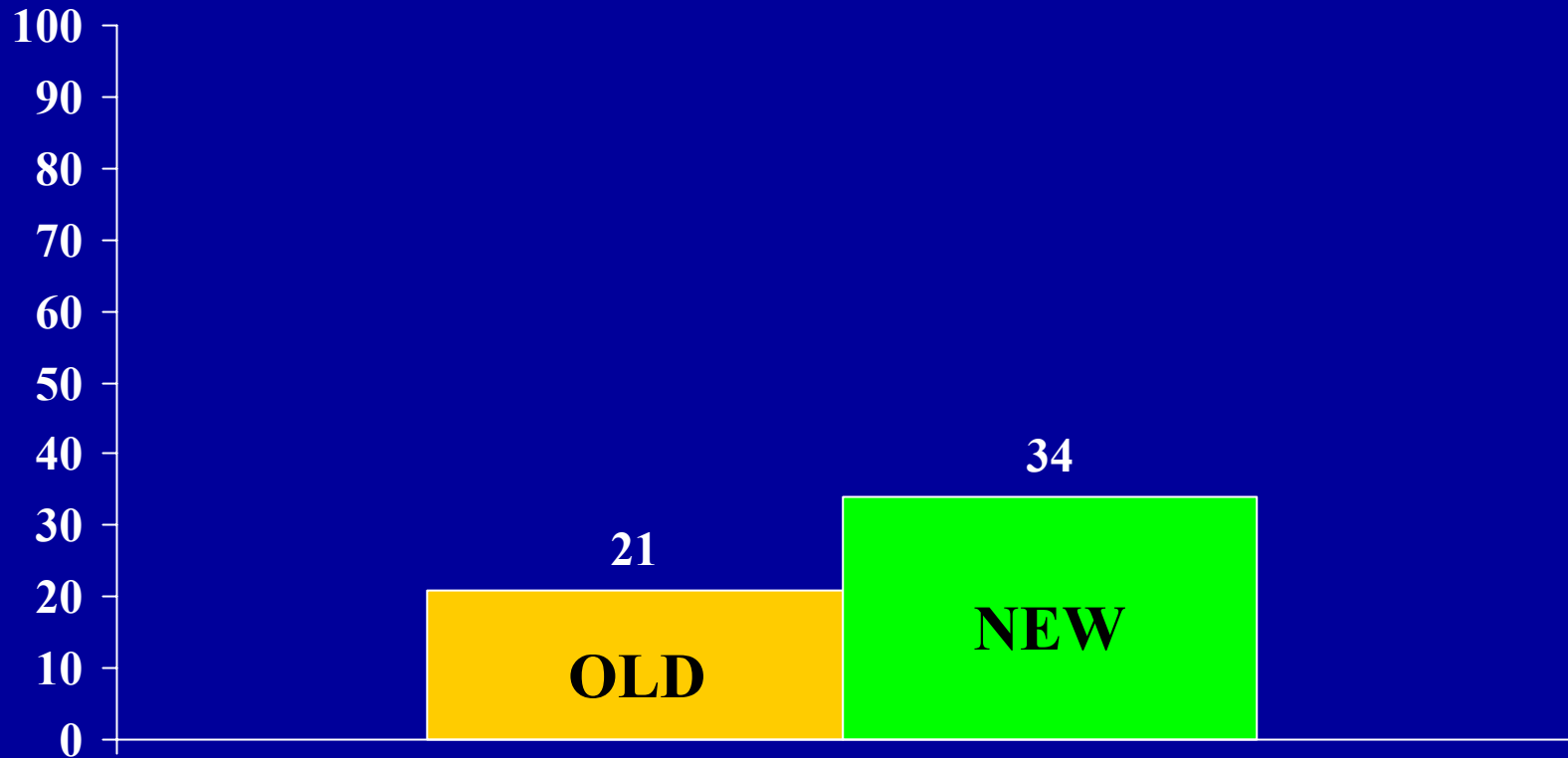
Percentage of students who marked “Excellent” or “Good”

“The amount of time that I expect to devote to this course outside of class in an average week.”



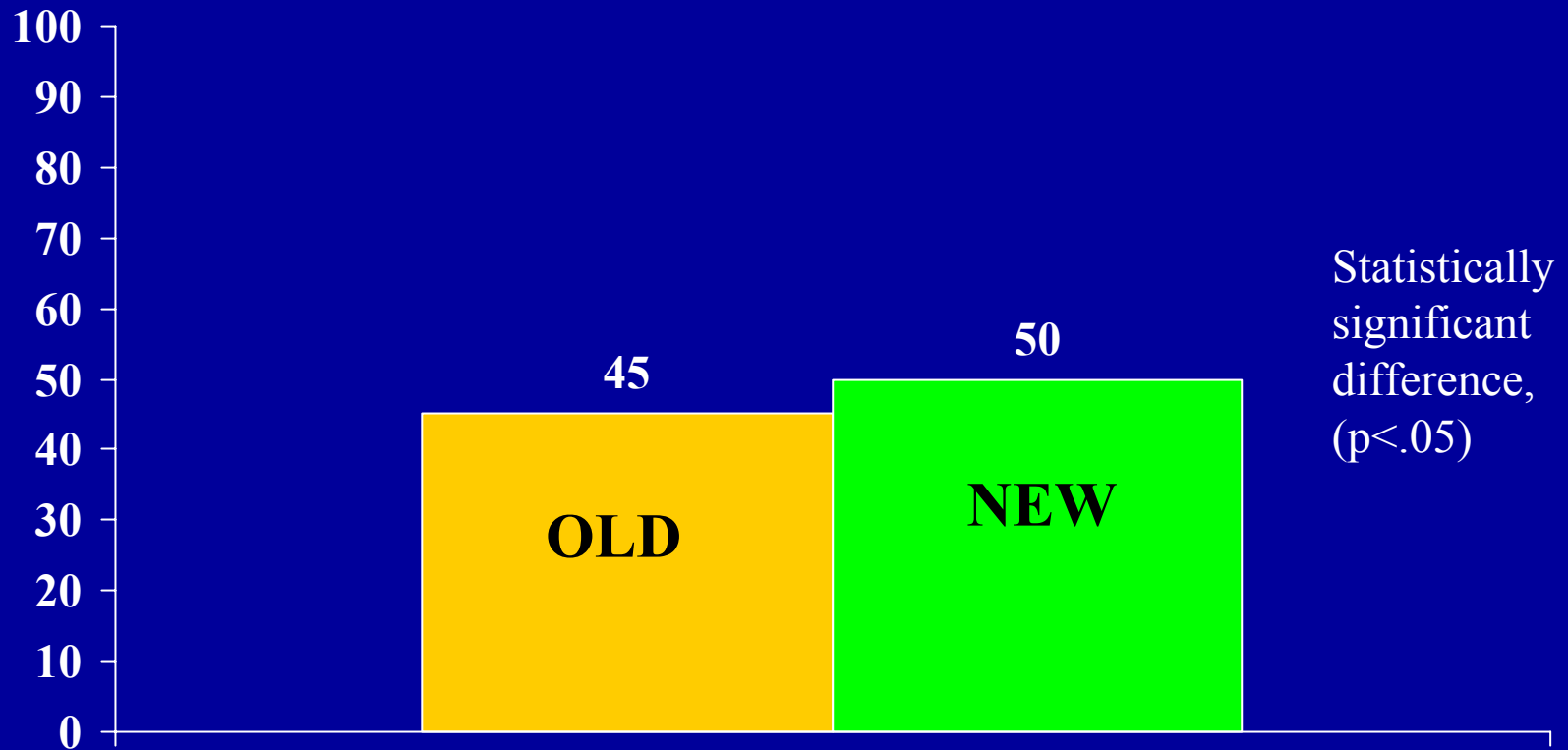
Percentage of students who marked more than 5 hours

“The amount of time that I devoted to this course outside of class in an average week.”



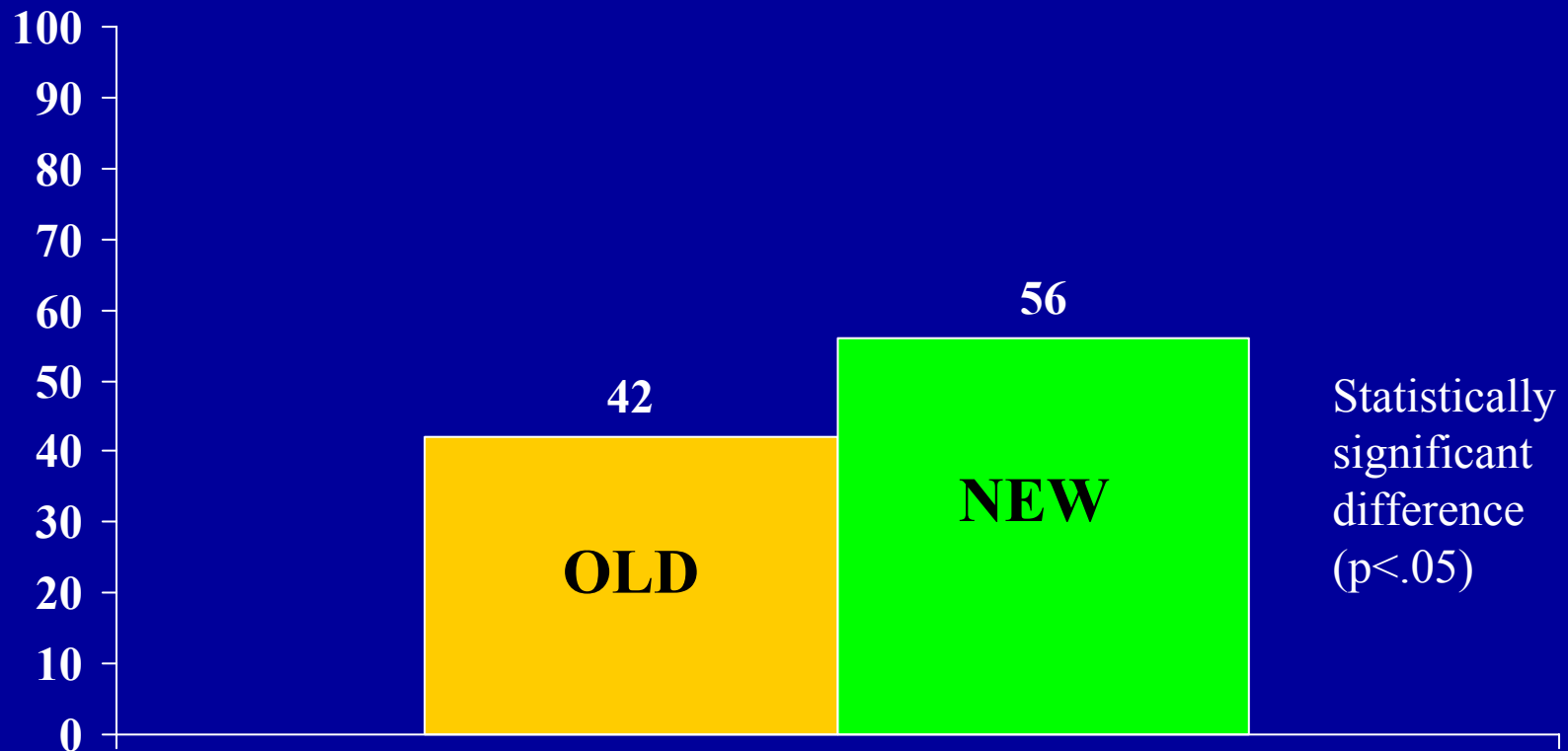
Percentage of students who marked more than 5 hours.

“My personal feeling about studying science this term *is...*”



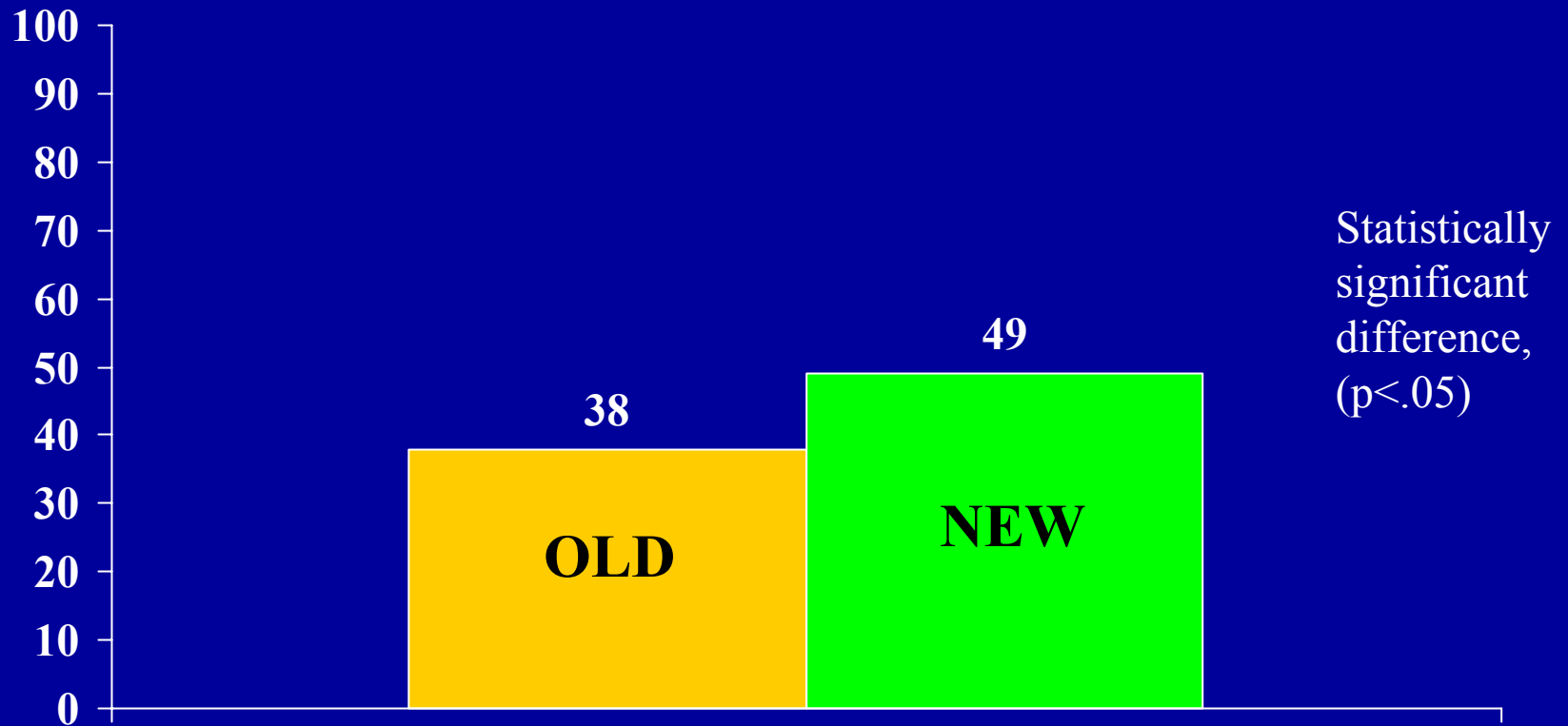
Percentage of students who marked “Very” or “Somewhat Positive”

“My personal feeling about studying science this term *was...*”



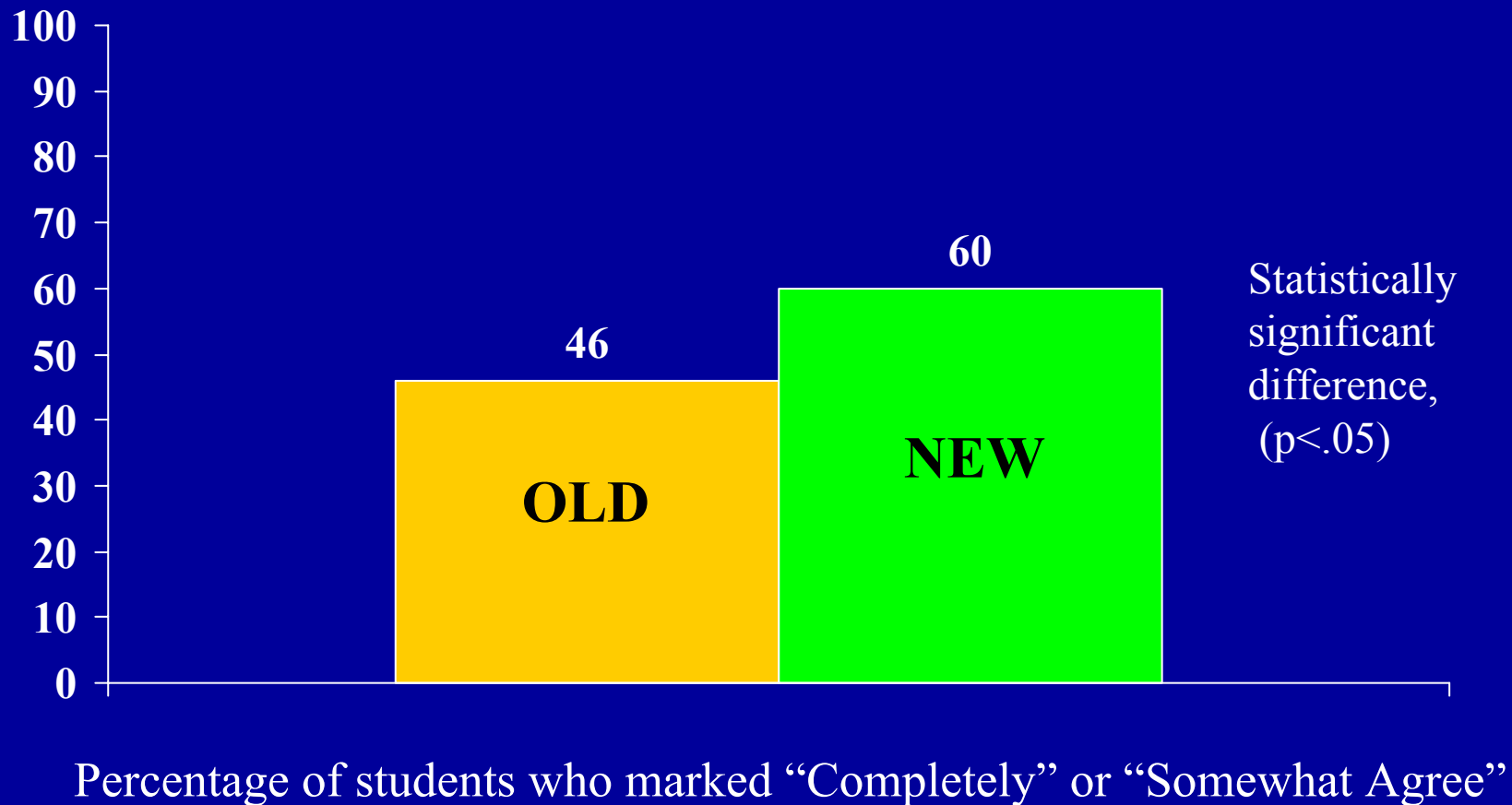
Percentage of students who marked “Very” or “Somewhat Positive”

“I look forward to taking this course.”

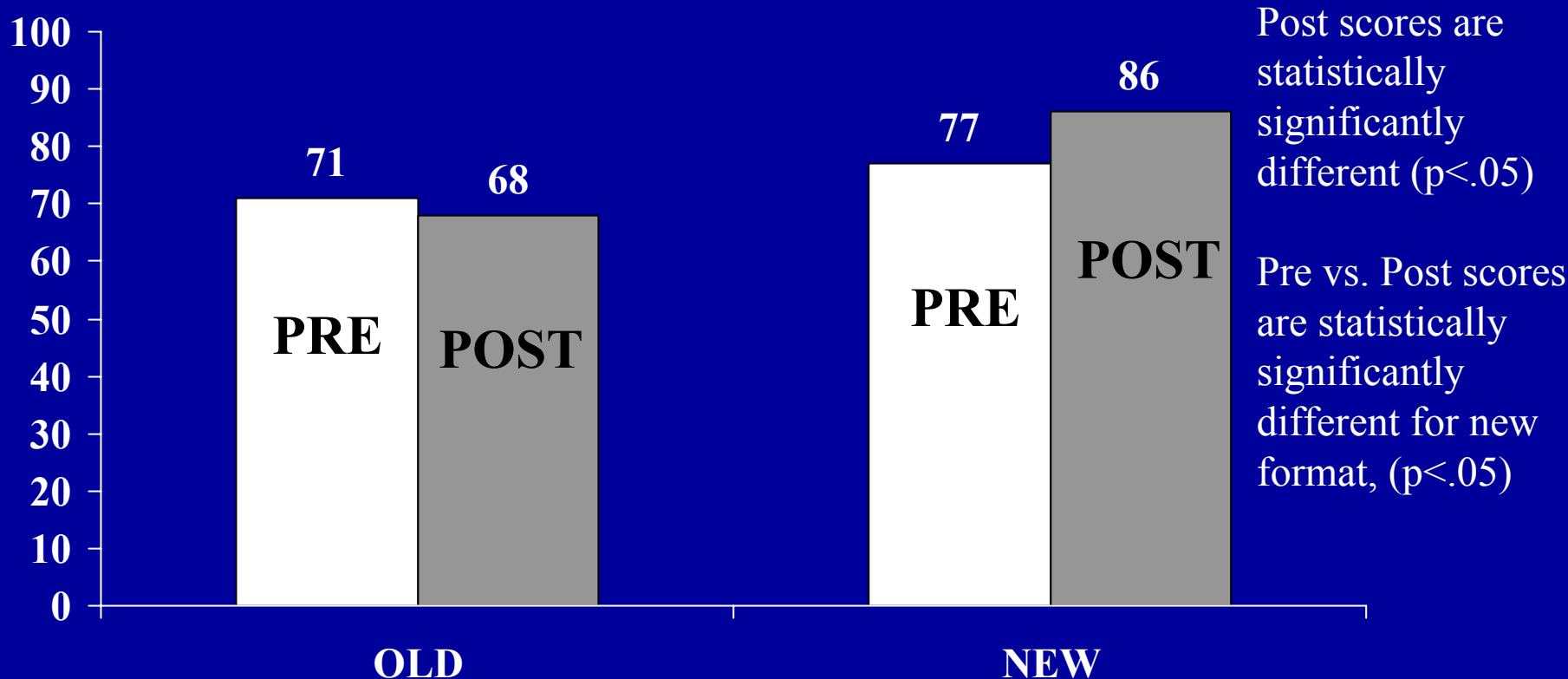


Percentage of students who marked “Completely” or “Somewhat Agree”

“I enjoyed taking this course.”



“I believe science is useful in my everyday life.”



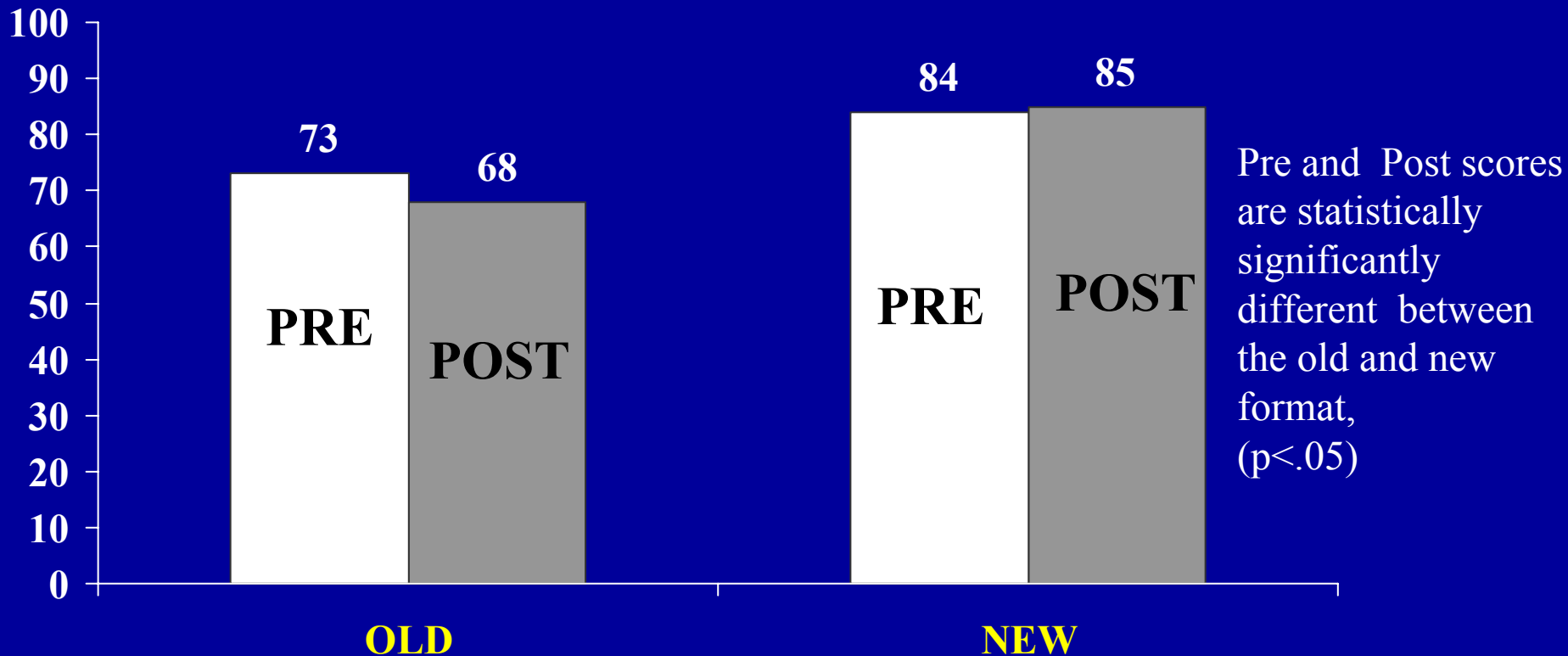
Percentage of students who marked “Completely” or “Somewhat Agree”

Students rated the importance of six major goals:

- Increasing my general understanding of scientific knowledge.
- Increasing my general understanding of the development of science over time.
- Increasing my general understanding of the methods scientists use.
- Knowing more about particular topics in science.
- Increasing my understanding and appreciation of natural phenomena.
- Broadening my world view.

Rate the Importance of..

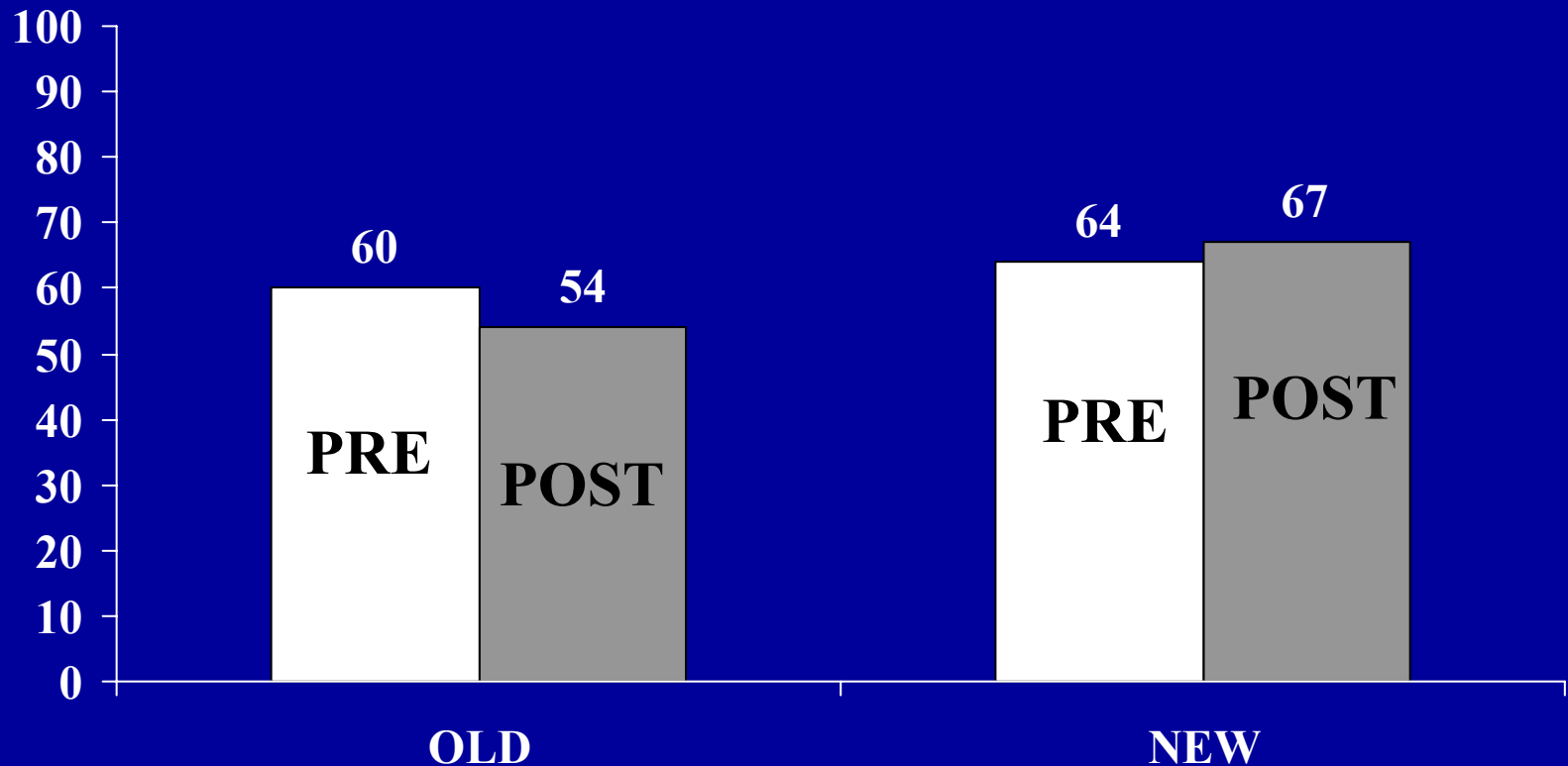
“Increasing my general understanding of scientific knowledge.”



Percentage of students who marked “Extremely” or “Somewhat Important”

Rate the Importance of..

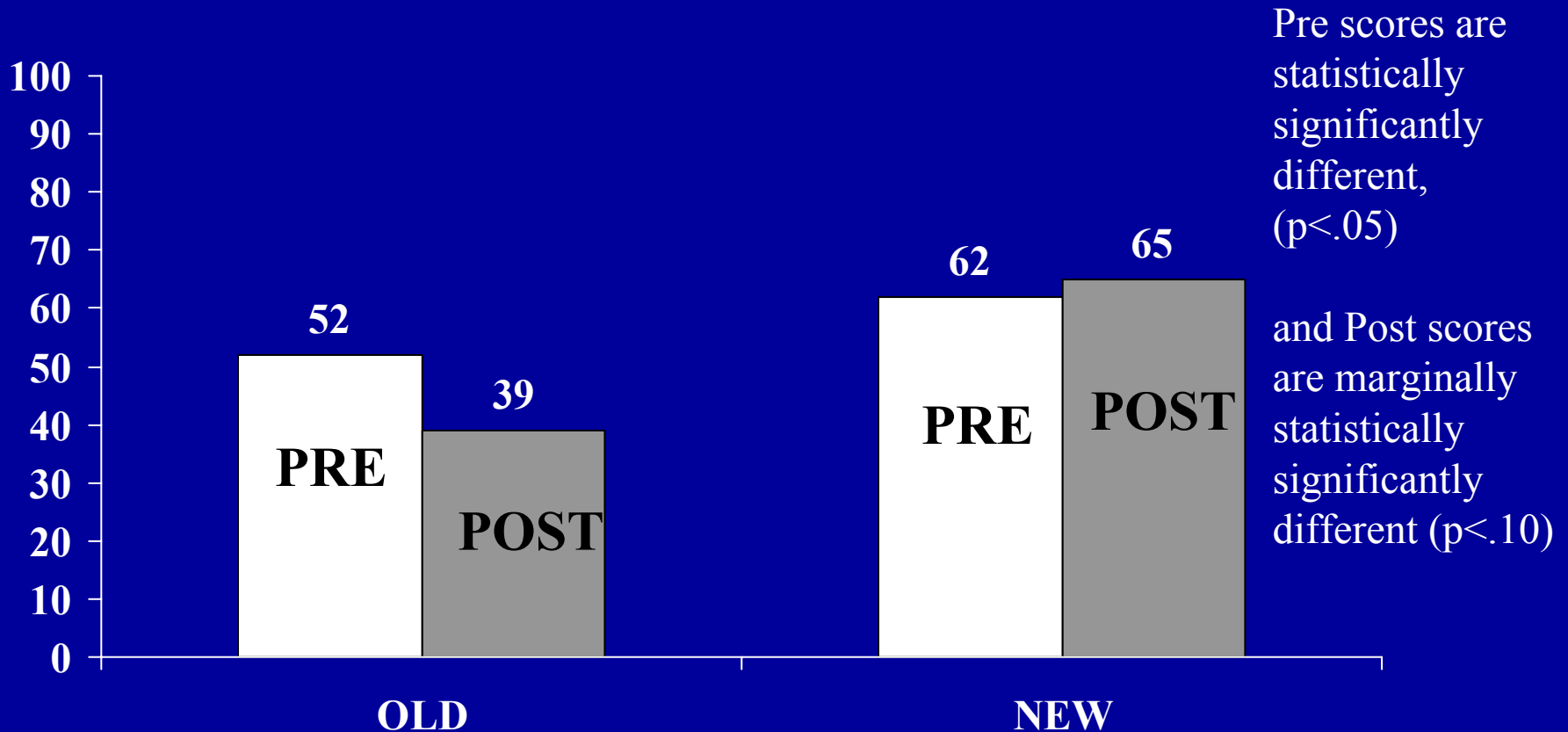
“Increasing my general understanding of the development of science over time.”



Percentage of students who marked “Extremely” or “Somewhat Important”

Rate the importance of..

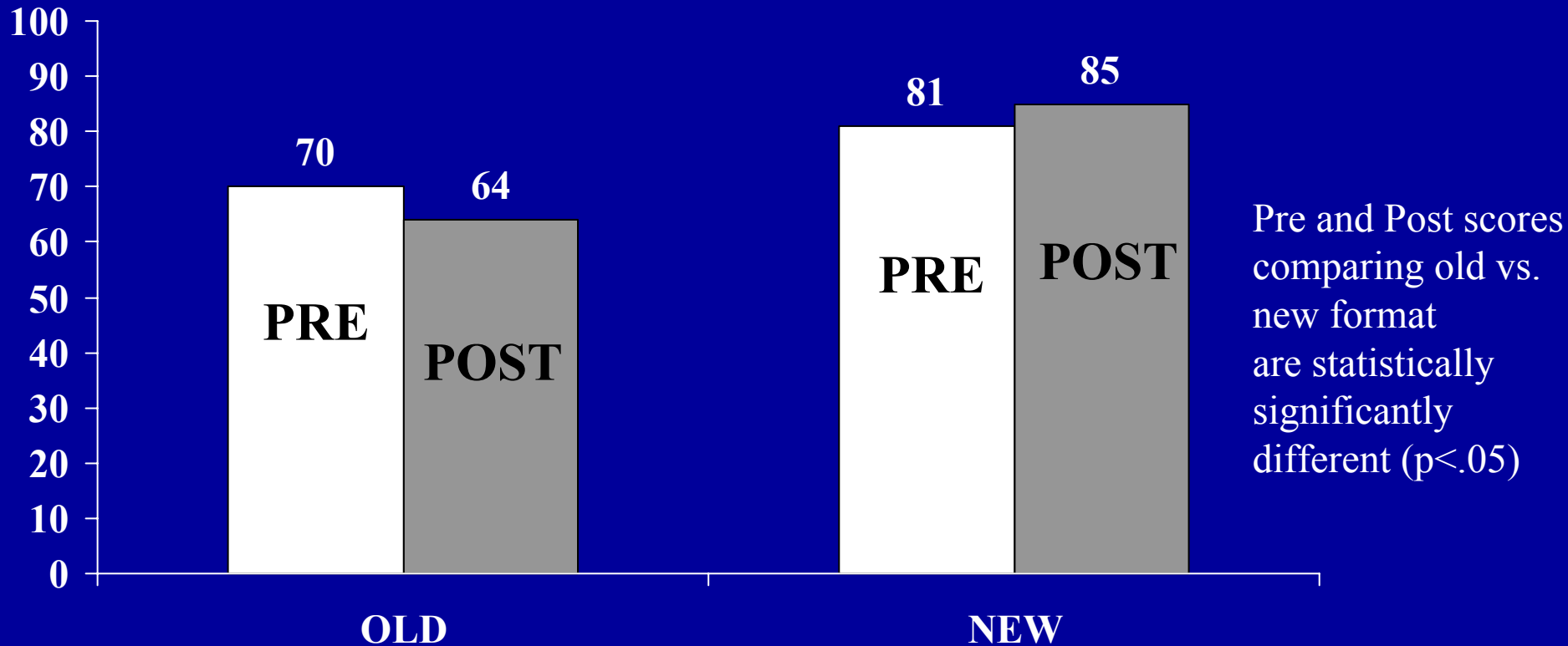
“Increasing my general understanding of the methods scientists use.”



“Percentage of Students Who Marked “Extremely” or “Somewhat Important”

Rate the importance of..

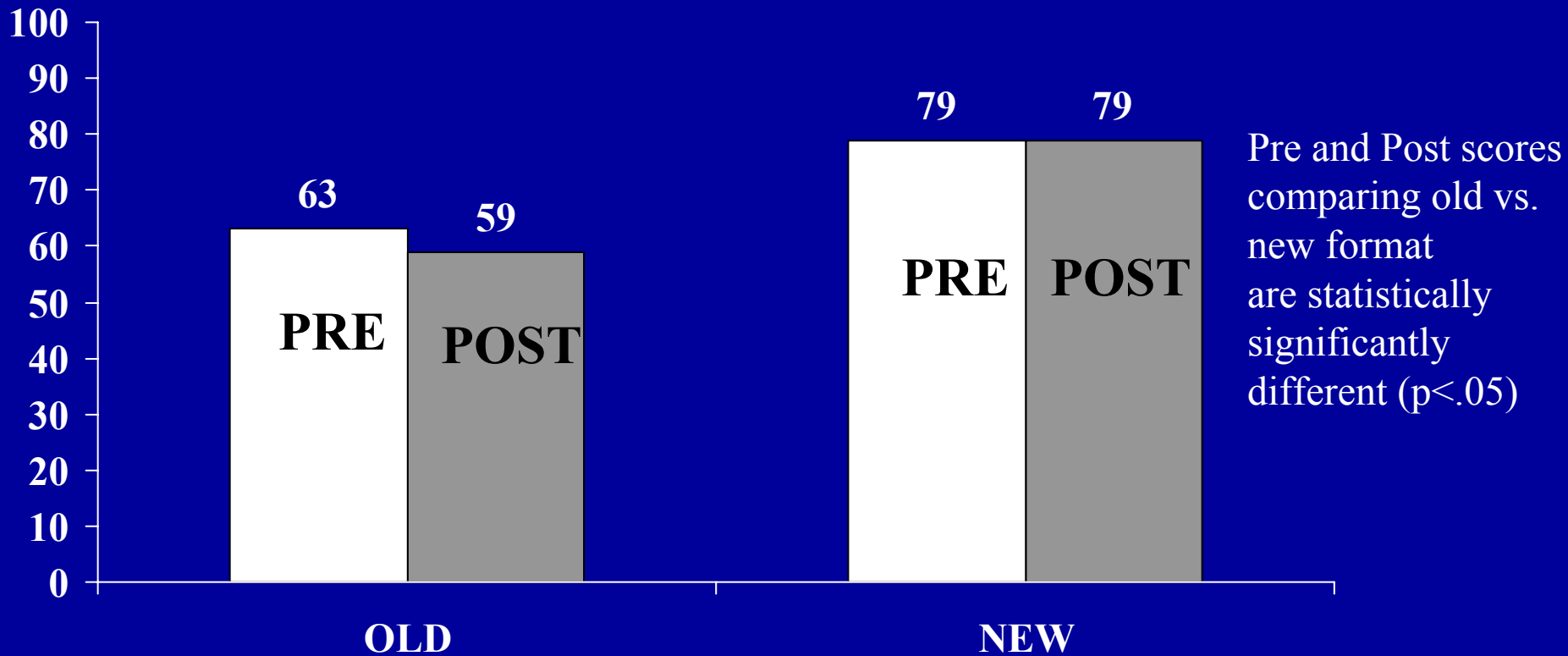
“Knowing more about particular topics
in science.”



Percentage of students who marked “Extremely” or “Somewhat Important”

Rate the importance of..

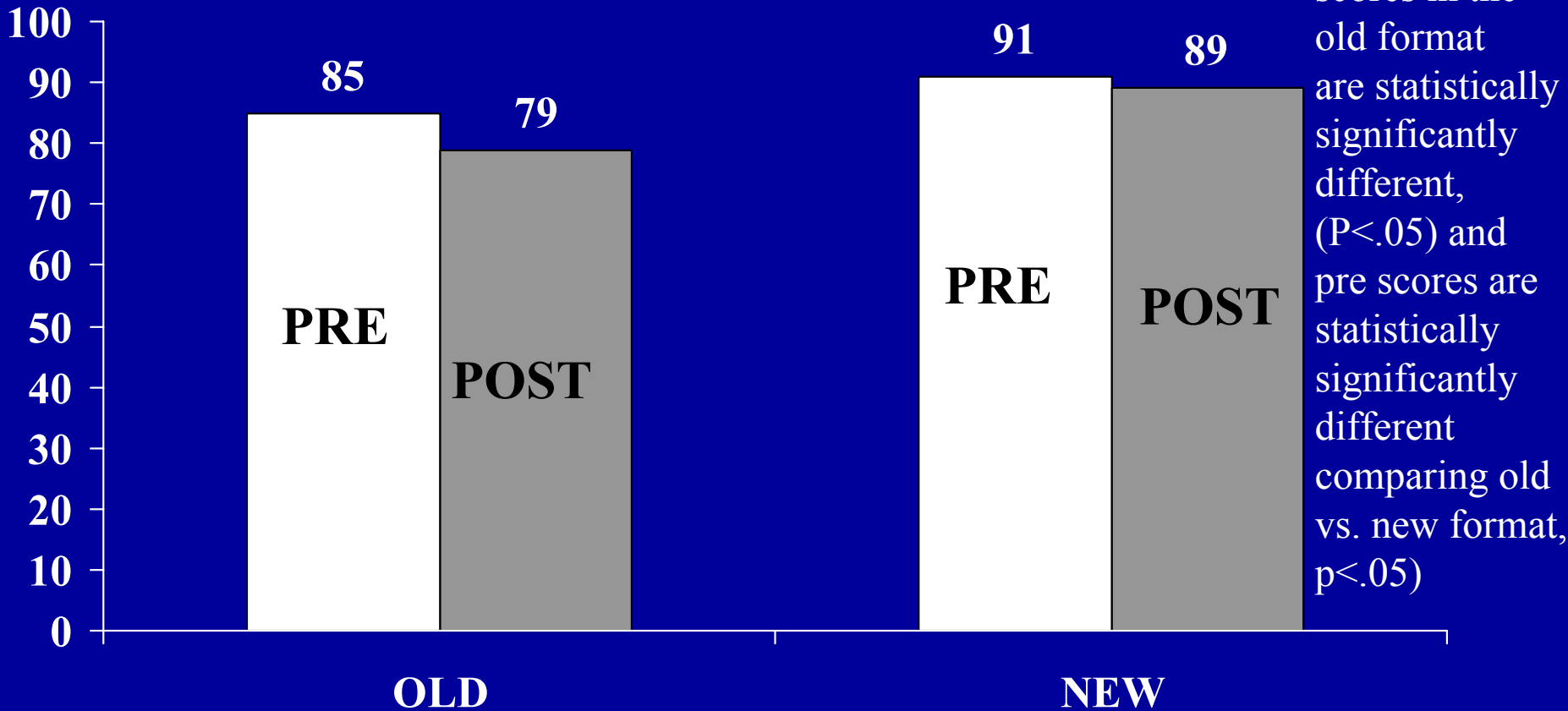
“Increasing my understanding and appreciation of natural phenomena.”



Percentage of students who marked “Extremely” or “Somewhat Important”

Rate the importance of..

“Broadening my world view.”

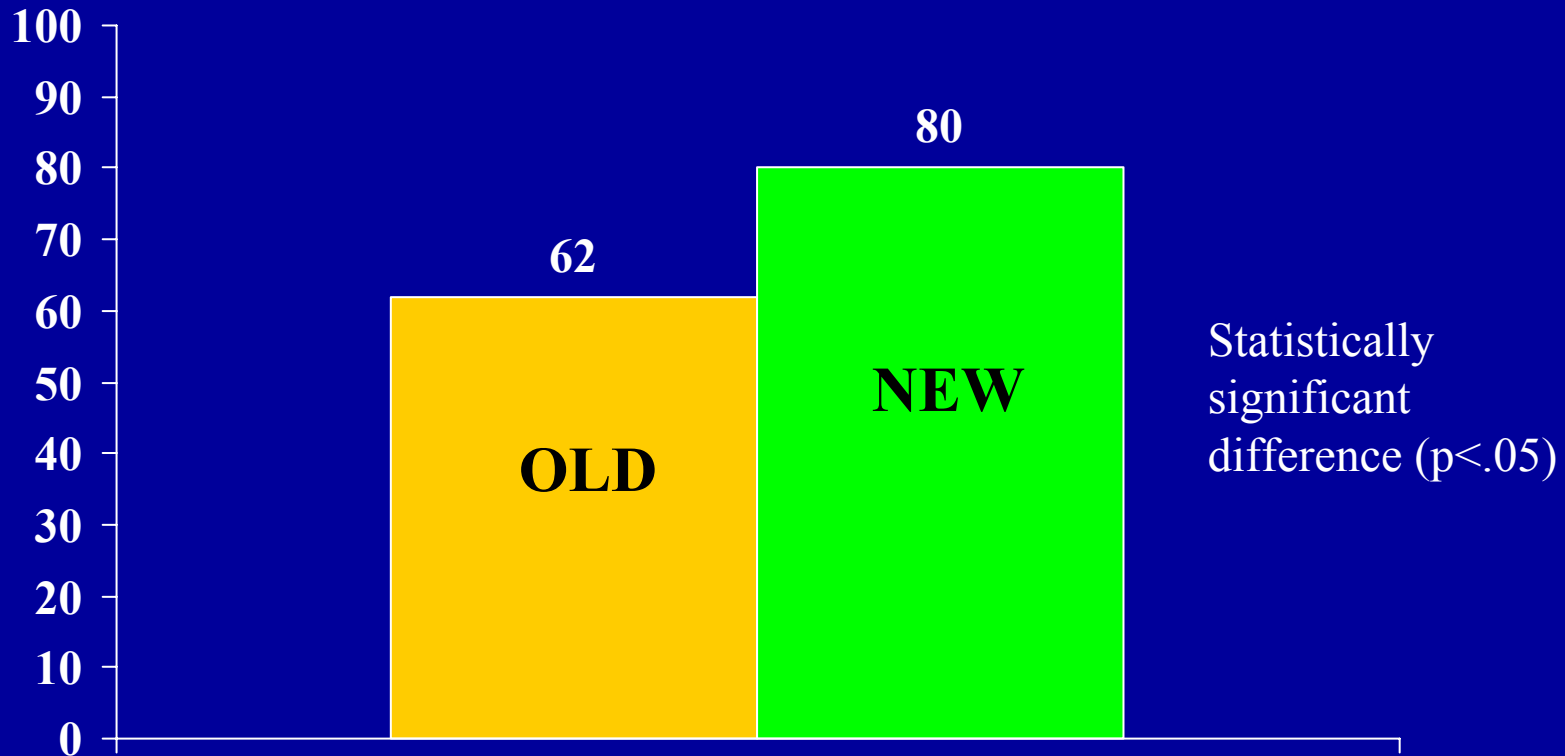


Percentage of students who marked “Extremely” or “Somewhat Important”

On the end-of-course survey, students rated how well the Natural Science course had helped them to fulfil each of the six major goals.

How well has this course in natural science helped you to..?

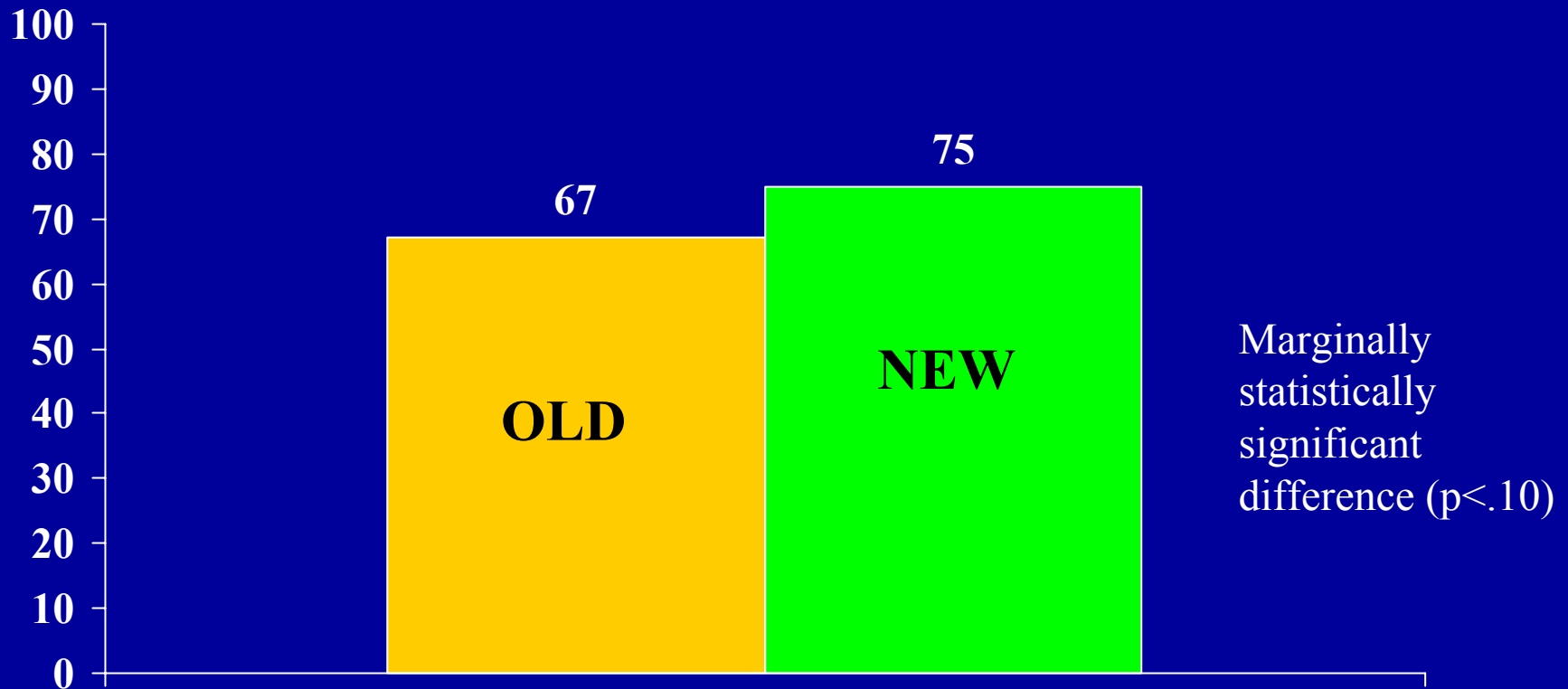
“Increase your general understanding of scientific knowledge.”



Percentage of students who marked “Extremely” or “Somewhat Well”

How well has this course in natural science helped you to.?.

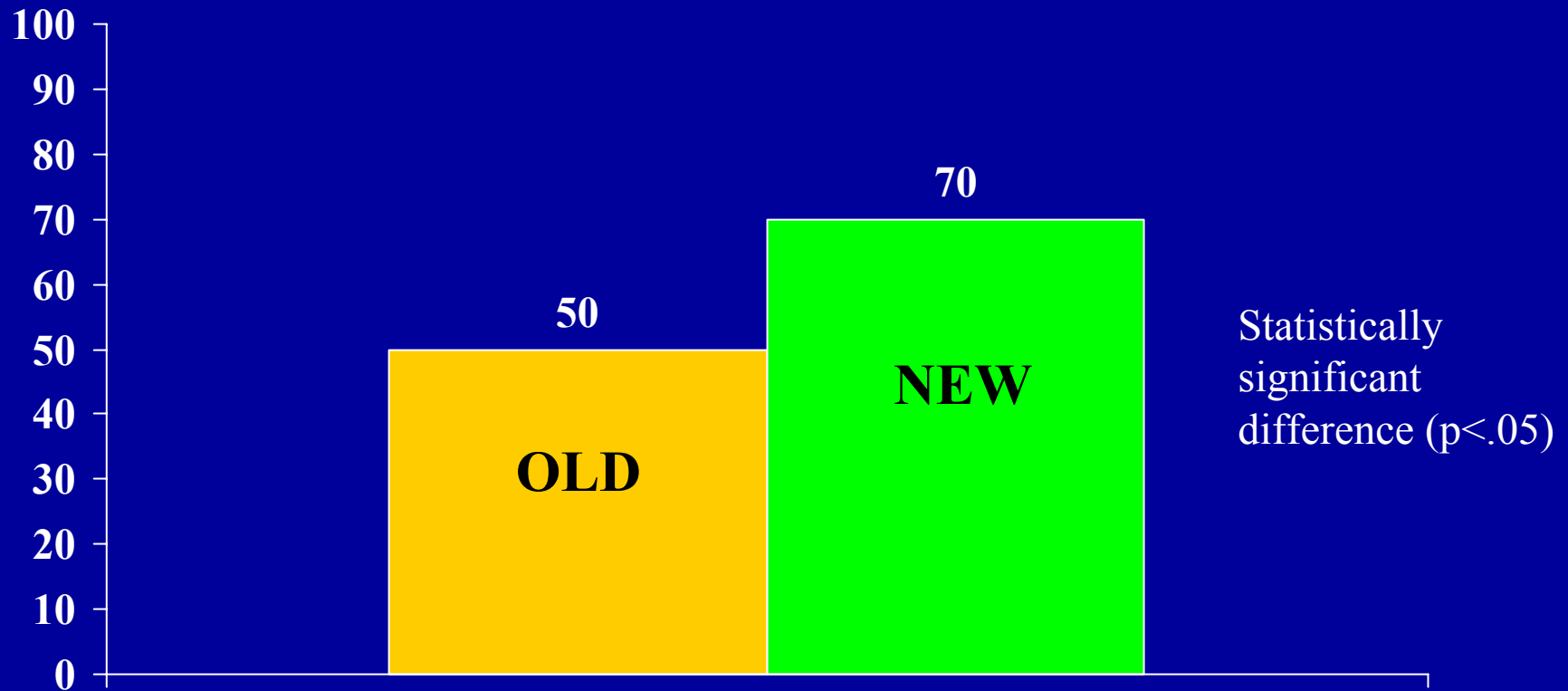
“Increase your general understanding of the development of science over time.”



Percentage of students who marked “Extremely” or “Somewhat Well”

How well has this course in natural science helped you to..?

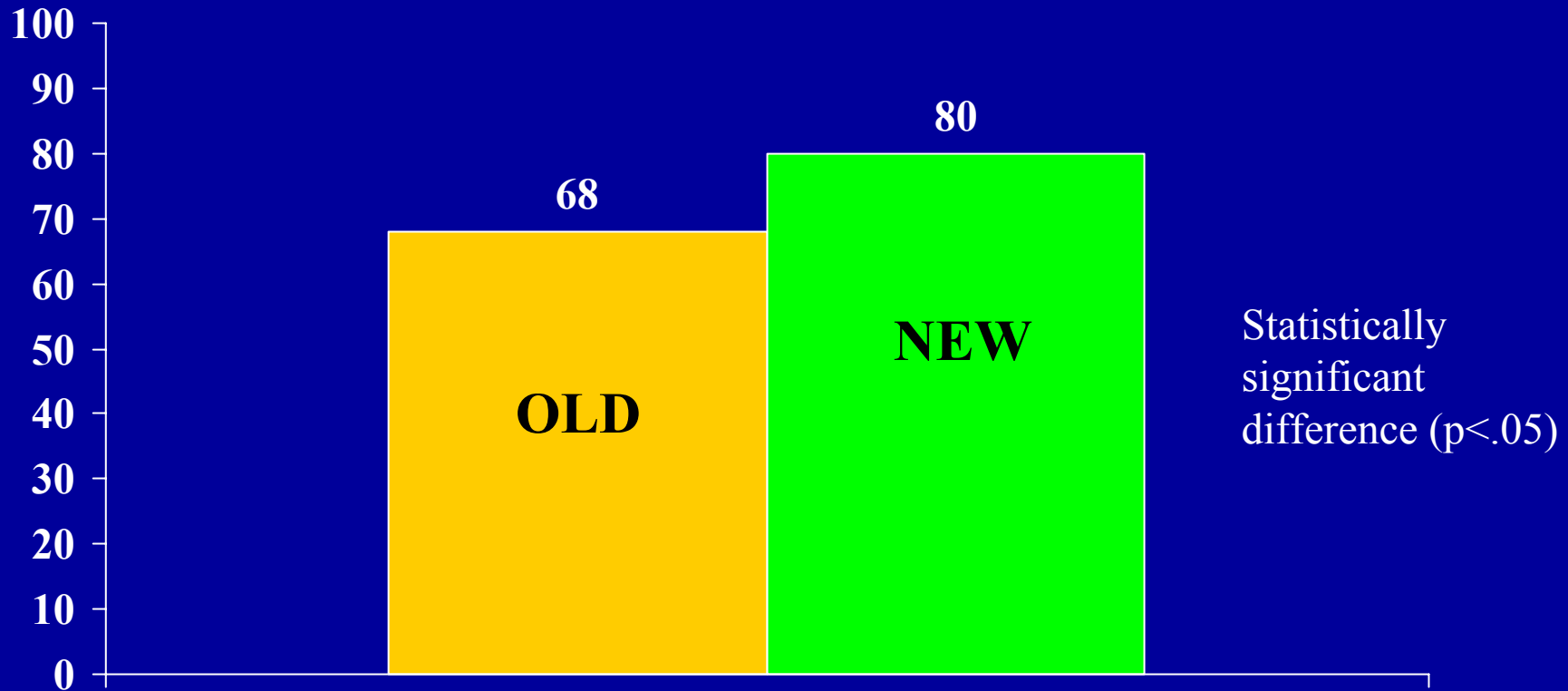
“Increase your general understanding of the methods scientists use.”



Percentage of students who marked “Extremely” or “Somewhat Well”

How well has this course in natural science helped you to.?.

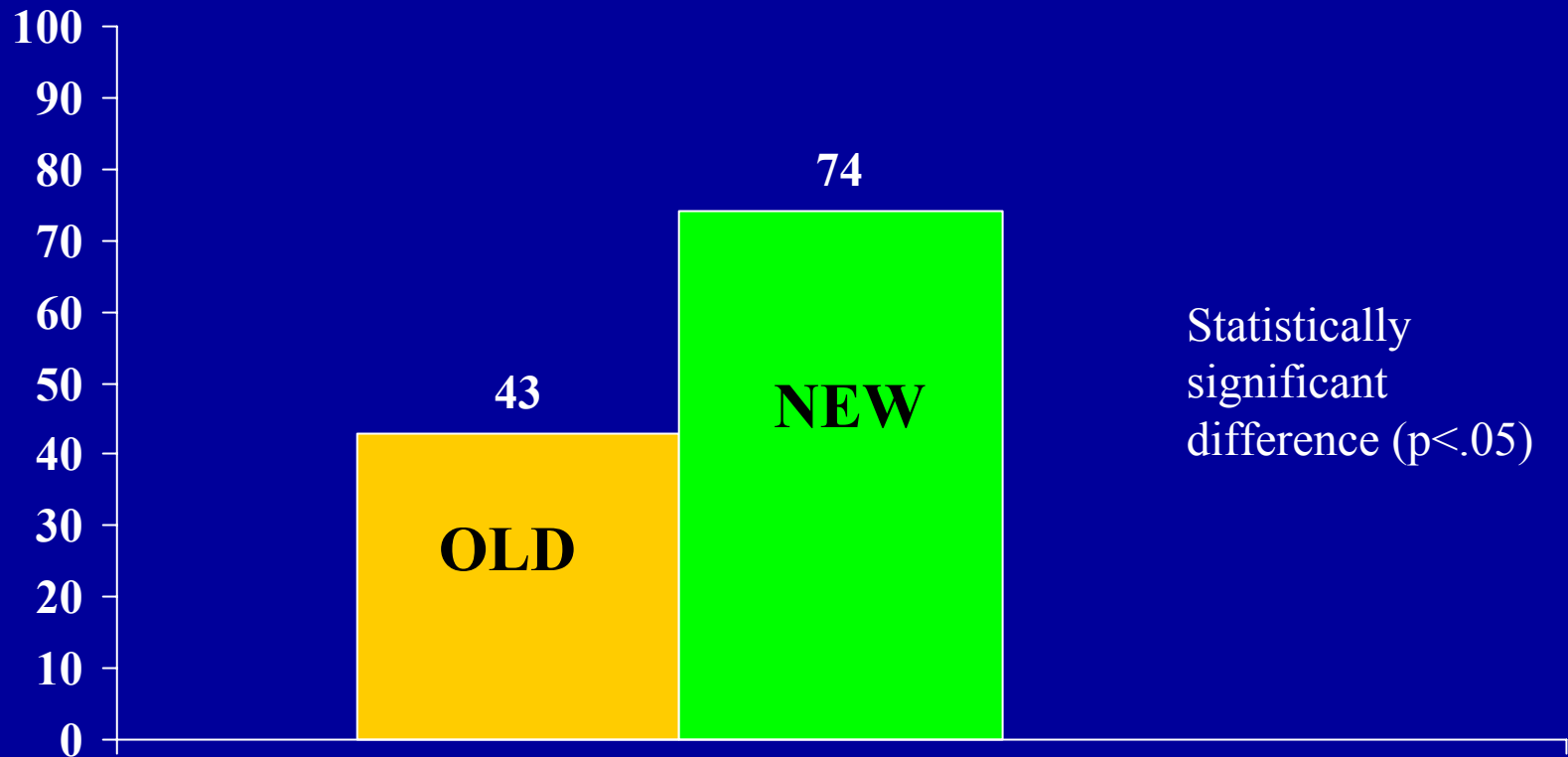
“Know more about particular topics
in science.”



Percentage of students who marked “Extremely” or “Somewhat Well”

How well has this course in natural science helped you to..?

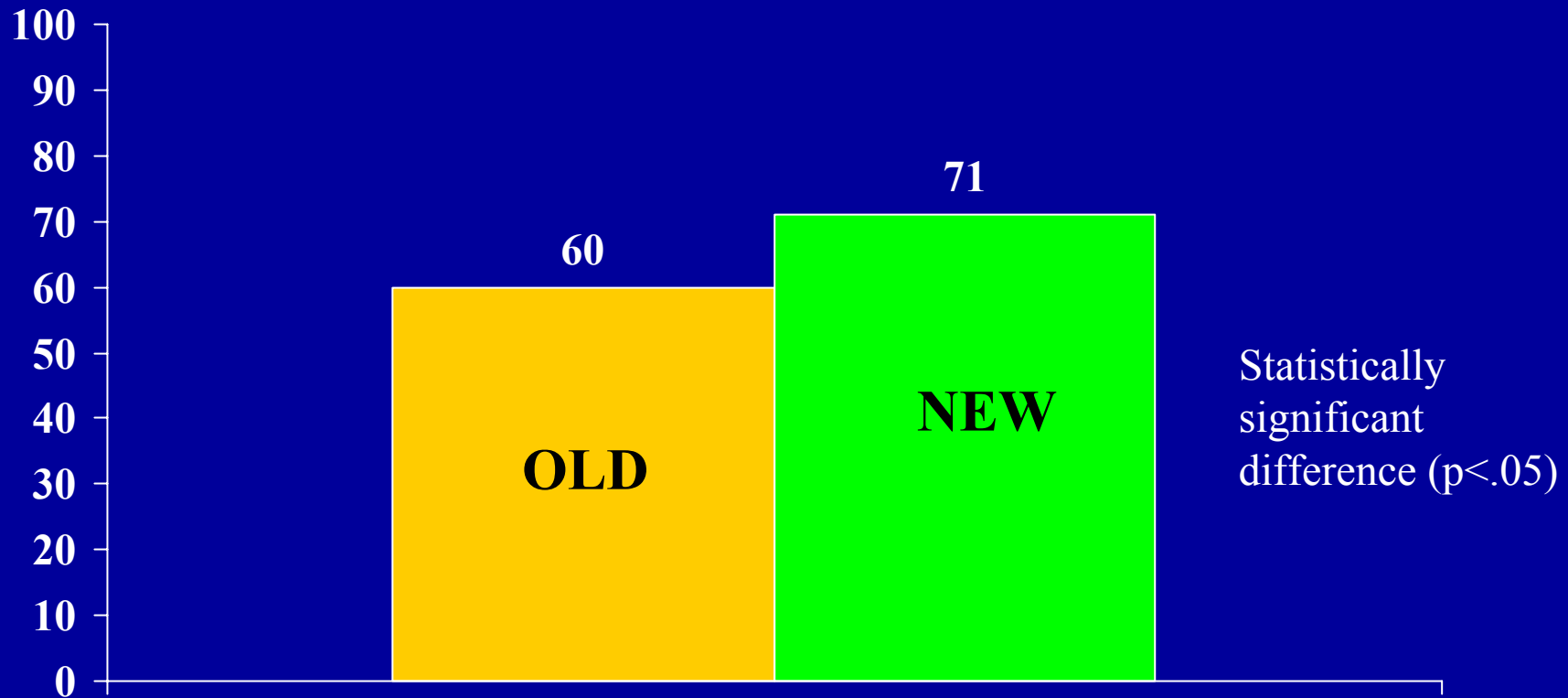
“Increase your general understanding and appreciation of natural phenomena.”



Percentage of students who marked “Extremely” or “Somewhat Well”

How well has this course in natural science helped you to..?

“Course helped to broaden your world view.”



Percentage of students who marked “Extremely” or “Somewhat Well”

How well has this course in natural science helped you to:

OLD FORMAT

NEW FORMAT

1) Course helped to know more about particular topics in science.		SAME	
2) Course helped to increase your general understanding of the development of science over time.	6		<i>Highest to lowest ranked</i>
3) Course helped to increase your general understanding of scientific knowledge.		SAME	
4) Broaden your world view.	2		
5) Course helped to increase your general understanding of the methods scientists use.	4		
6) Course helped to increase your understanding and appreciation of natural phenomena.	5		

Student Comments on Attitudinal Surveys

Old Format versus New Format

Old Format:

*Most common focused
on the amount of material and the
shortage of time to absorb material*

New Format:

*Generally more positive (stimulated my
interest, liked instructor, etc.) but still mixed
(too easy, too hard)*

Instructor Evaluation Questionnaire (IEQ) Findings

Statistically significant more positive ratings for the new format classes on five items:

- How much do you think you learned from this course?
- The instructor was well prepared for class.
- The instructor's assignments were helpful to my learning.
- The instructor encouraged students to ask questions an/or express their ideas.
- How would you rate this course overall?

Faculty Feedback/Perspectives

Positive Outcomes of New Format:

- Smaller class size allowed faculty to know the students better.
- Individual control over the pace made it easier to engage the students and know their needs.
- Adopting a style more in tune with individual instructors led to greater creativity and flexibility.
- Teaching outside one's discipline forced the instructor to pay closer attention to topics and where students were having difficulties.

Negative Outcomes of New Format

- Teaching with other faculty members with expertise was very informative in old format.
- Access to demonstration materials and expertise was easy under the old format.
- Student exposure to the details of a subject has been sacrificed in favor of faculty autonomy.
- The teaching of each of the subject areas with the Nat. Science course would be served better by having an expert in the field teaching the subject.

Neutral Outcomes of New Format

- Although the relative proportion of the subjects has been shifted, the total amount of the material covered remains the same.

RECOMMENDATIONS FOR CONSIDERATION

Recommendation Aimed at the Overall Course Format

The course should continue to be taught in individual sections rather than in a large lecture format.

Recommendations Aimed at Course Improvement

Regardless of the course's format, the following suggestions are offered for course improvement.

STRATEGIES FOR COURSE COHESION

(enhancing communication, sharing resources and expertise)

- Continue regular meetings of the Natural Science faculty and those interested in teaching the course.
- Catalog and share equipment resources, films, etc.
- Create a website of syllabi, assignments, demonstrations, etc. that faculty can see what others are doing in order to improve communication and faculty development related to the course.
- Continue to offer workshops on various pedagogical strategies (e.g., facilitating the development of critical thinking and/or quantitative reasoning science, strengthening students' understanding of the methods scientists use and the broadening of worldviews through the study of science)

STRATEGIES FOR ASSESSMENT

- Encourage and communicate the results of classroom assessment activities.
- Devise course-embedded assessments of cognitive skills, knowledge gains, quantitative reasoning, etc. and share across sections to diagnose student strengths and weaknesses.
- Continue assessing periodically attitudinal measures for students (use the existing instrument or develop new ones).
- Re-administer the existing attitudinal survey to see if the more positive attitudes found in the “new” format have persisted.
- Monitor course summary IEQ data.

STRATEGIES FOR RECRUITING FACULTY

- Gather feedback from faculty on what would help orient them to the class; assess the needs of those considering teaching the course.