

# Teaching-as-Research: A Case Study

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An Initiative of the Center for the Integration of  
Research, Teaching, and Learning (CIRTL)

# What Is Teaching-as-Research?

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- Teaching and learning are intertwined and should be dynamic processes.
    - Faculty go into the classroom with a deliberate and conscious set of outcomes, create a conducive learning environment, assess students' progress, and modify teaching and learning practice accordingly.
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# Why Should Faculty Engage in TAR?

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- Traditional lecture/recitation method results in poor grades for too many students.
    - 32.3% Failure (D, F, W)
  - Many students withdraw from program.
  - Longer time-to-degree for many students.
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# How Can Faculty Engage in TAR?

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# The CIRTL NETWORK

Center for the Integration of Research, Teaching, and Learning (CIRTL)

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- ❑ Howard University
- ❑ Michigan State University
- ❑ Texas A&M University
- ❑ The Pennsylvania State University
- ❑ University of Colorado at Boulder
- ❑ University of Wisconsin-Madison
- ❑ Vanderbilt University

## Mission:

To enhance the Professional Development of Graduate Students and develop a national STEM faculty committed to advancing effective teaching practices for diverse student audiences

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# The CIRTL Vision

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- Develop a cadre of faculty and graduate students committed to implementing and advancing **effective teaching practices** for diverse student audiences in addition to being **excellent researchers**.
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# THE CIRTL PILLARS

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- ❑ Teaching-as-Research (a dynamic process)
    - ❑ Teaching-through-Diversity
    - ❑ Teaching-through-Learning Community
    - ❑ Teaching-through-Proactive Assessments
  - ❑ Learning-through-Diversity
  - ❑ Learning Communities
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# CIRTL-at-Howard: THE GOAL

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- To incorporate the 3 pillars of CIRTL across the curriculum in STEM Disciplines
    - Teaching-as-Research (a dynamic process)
      - Teaching-through-Diversity
      - Teaching-through-Learning Community
      - Teaching-through-Proactive Assessments
    - Learning-through-Diversity
    - Learning Communities
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# Peer-Led Team Learning (PLTL) in Chemistry for Health Sciences

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## □ PLTL?

### □ Teaching-as-Research

- Active Learning

- Formative assessments

- Reiterations

- Education Expert, Instructor, Student Leader

### □ Learning Communities

- Groups of 6-8 students

- 2-Hour Weekly Session guided by P/Leader

### □ Learning-through-diversity

Gosser, David K.; Cracolice, M.K.; Kampmeier, J.A.; Roth, V.; Strozak V.S.; Varma-Nelson, P. Peer-Led Team Learning: A Guidebook, 2001, 121

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Varma-Nelson, Pratibha, Cracolice, Mark S. Peer-Led Team Learning: General, Organic and Biological chemistry: The Workshop Project. NJ: Prentice Hall, 2001

# COURSE STRUCTURE

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- ❑ Fall Semester
    - ❑ Chem Hlth Sci I
      - ❑ 3 hours lecture
      - ❑ 1 hour Recitation
  
  - ❑ Spring Semester
    - ❑ Chem Hlth Sci II
      - ❑ 3 hours lecture
      - ❑ 1 hour Recitation
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# For PLTL Students

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- ❑ Fall Semester

- ❑ Chem Hlth Sci I

- ❑ 3 hours lecture

- ❑ 2-hour learning community

- ❑ Spring Semester

- ❑ Chem Hlth Sci II

- ❑ 3 hours lecture

- ❑ 2-hour learning community

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# Guidelines for PLTL

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- ❑ The PLTL model is not for remedial instruction.
  - ❑ The PLTL model is not tutoring.
    - Peer Leaders are trained to avoid teaching, tutoring or providing answer
    - Peer Leaders are facilitators who ask good questions, not answer givers who have “the right answers.”
  - ❑ The PLTL model preserves the lecture and introduces a new structure:
    - Weekly 2-hour learning community session in place of recitation – guided by a S/Leader
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# Preparation of Peer Leaders

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- Students who did well in the course in a recent class are trained weekly by the faculty and an educational specialist, in
    - course content
    - leadership and learning theories
  - During each weekly training session, the faculty models practical ways to solve conceptual problems through asking appropriate questions.
  - The Leaders replicate what the faculty does at their Learning community sessions
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# Preparing Peer Leaders, cont.

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- ❑ The Learning Specialist
    - ❑ Levels of critical thinking
    - ❑ Different learning styles
    - ❑ Time management
    - ❑ Group management
    - ❑ Conflict resolution
    - ❑ Ways of presenting information
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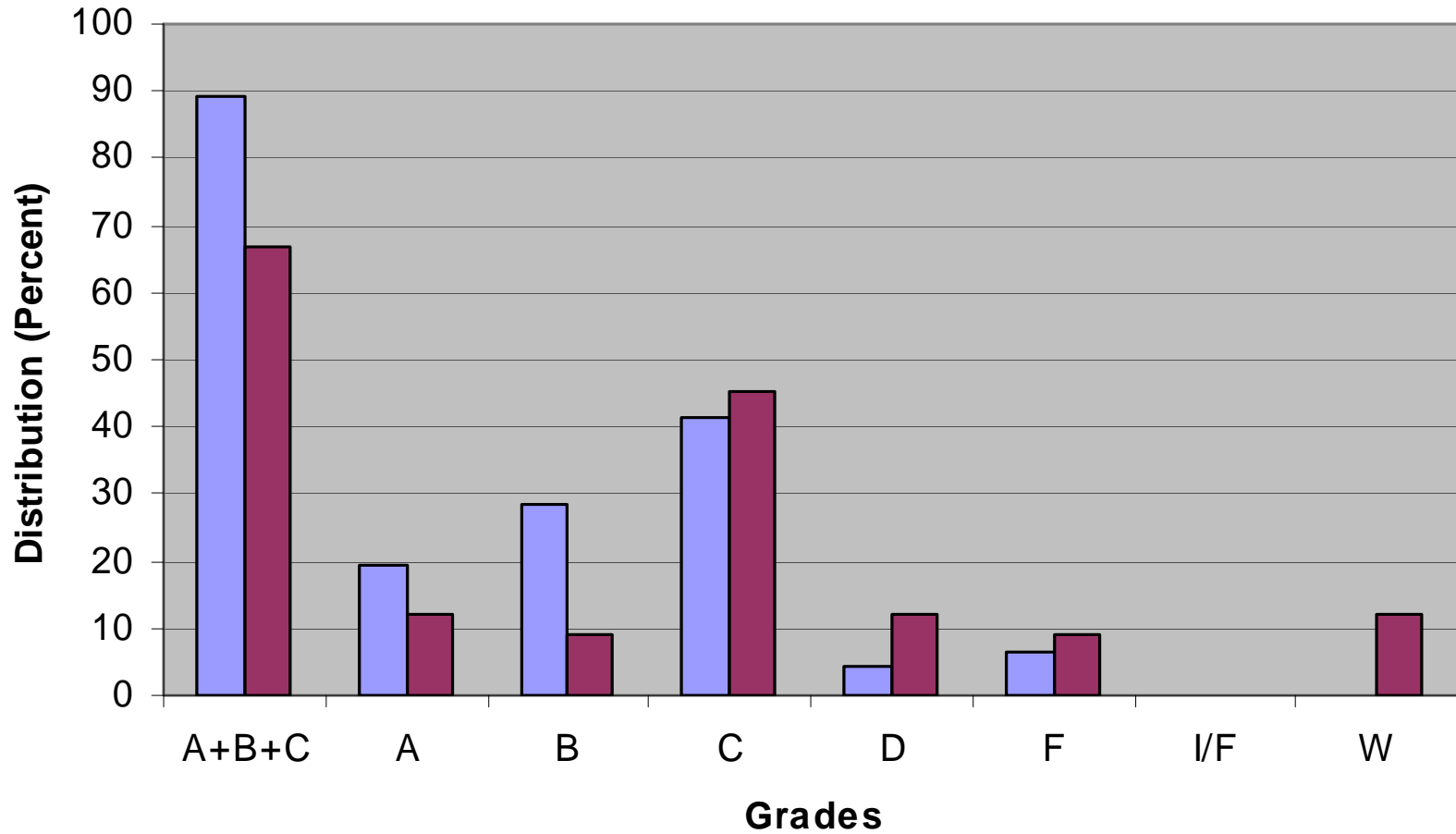
# Formative Assessment

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- ❑ In the weekly Faculty-led Peer Leader Training sessions
    - ❑ Peer leaders present feedback from learning community sessions
    - ❑ Faculty presents feedback from the students
    - ❑ Each feedback was discussed and decisions were made on appropriate actions to be taken.
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## Spring 2005 PLTL and Non-PLTL Student Performance

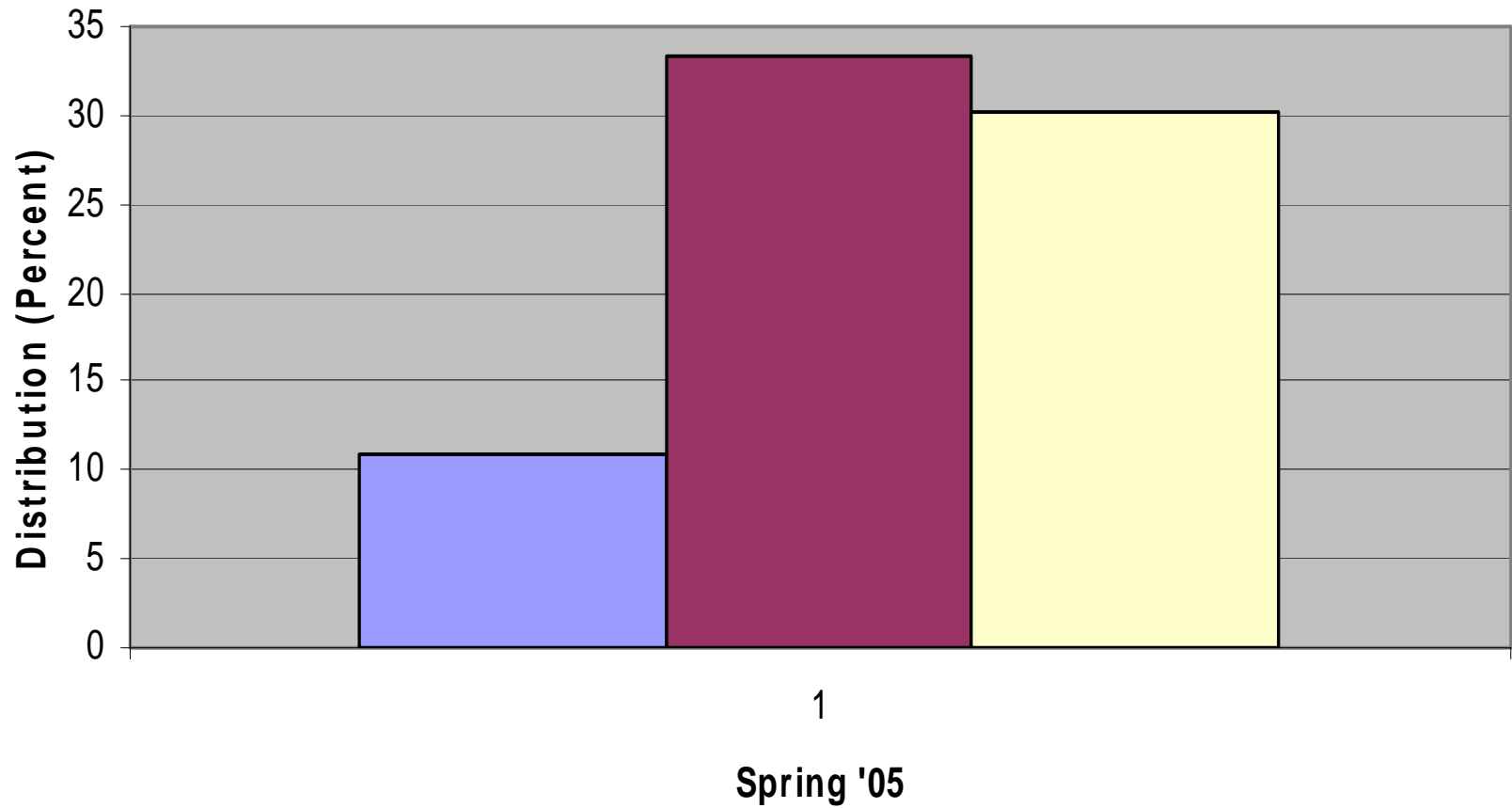
■ PLTL (n = 46) ■ Non-PLTL (n = 33)





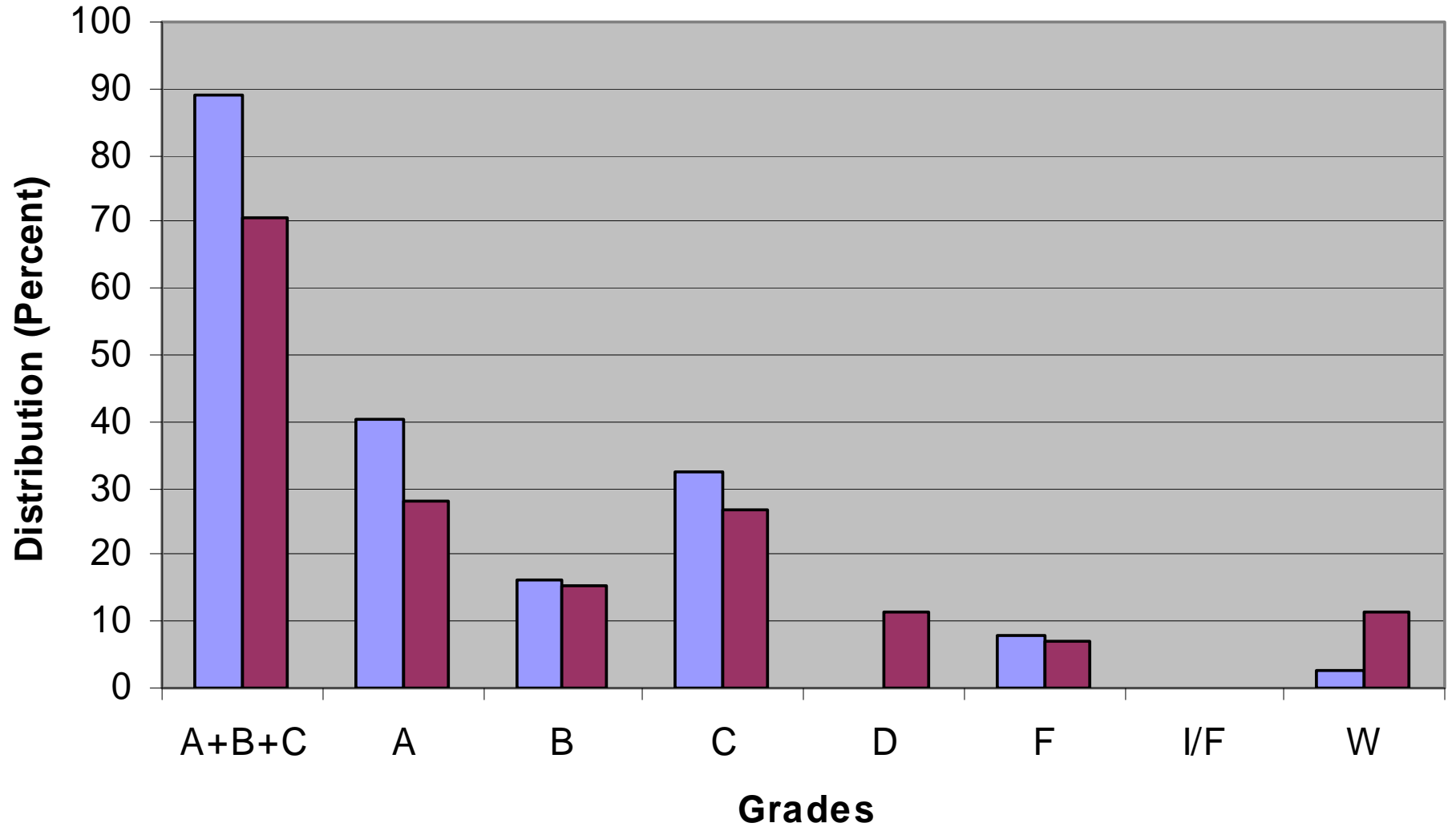
## Comparison of Percentage of Students Earning D, F, W Grades

■ PLTL (n = 46) ■ Non-PLTL (n = 33) ■ n = 475



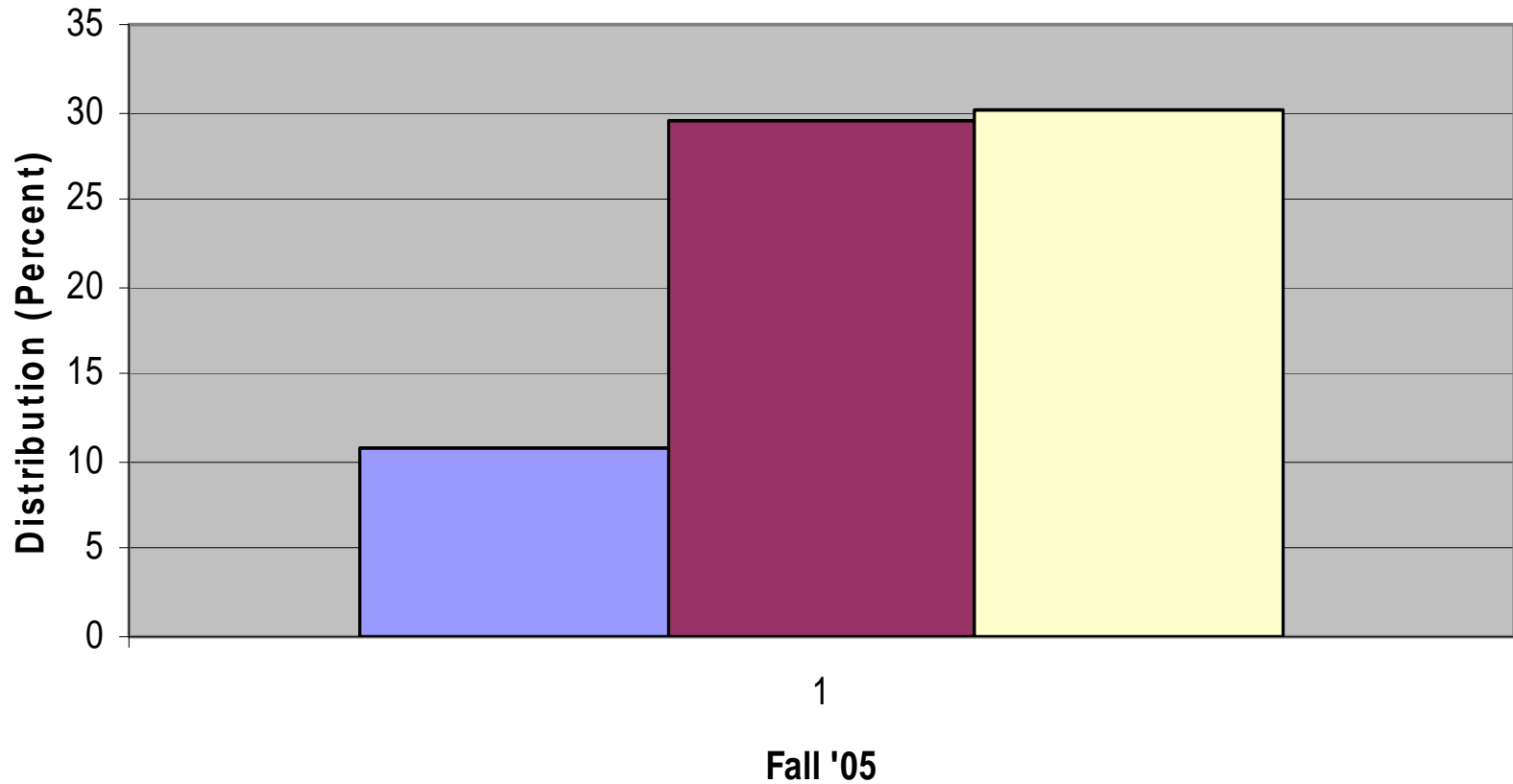
# Fall 2005 PLTL and Non-PLTL Student Performance

■ PLTL (n = 37) ■ Non-PLTL (n = 71)



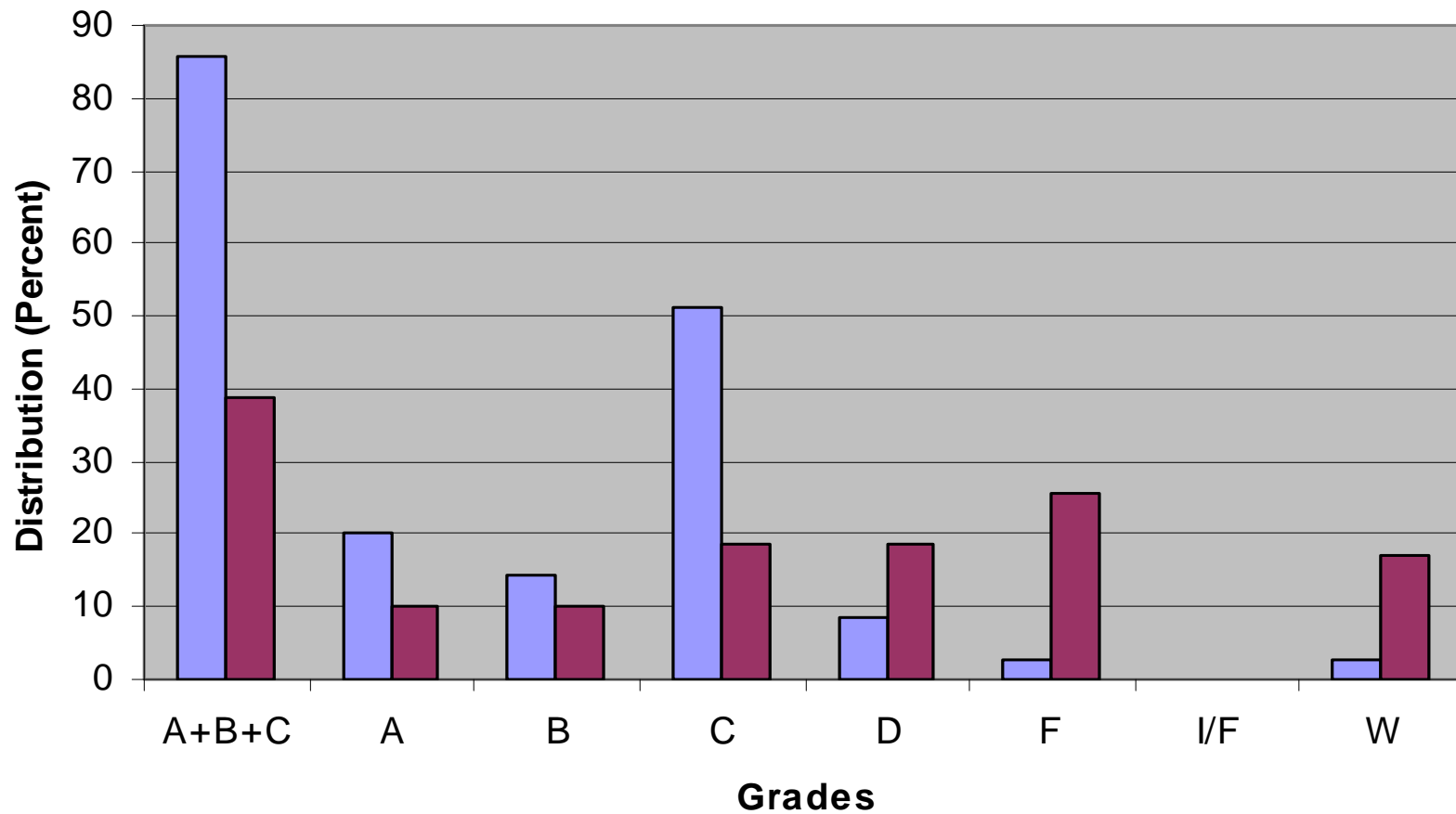
## Comparison of Percentage of Students Earning D, F, W Grades

■ PLTL (n = 37) ■ Non-PLTL (n = 71) ■ n = 475



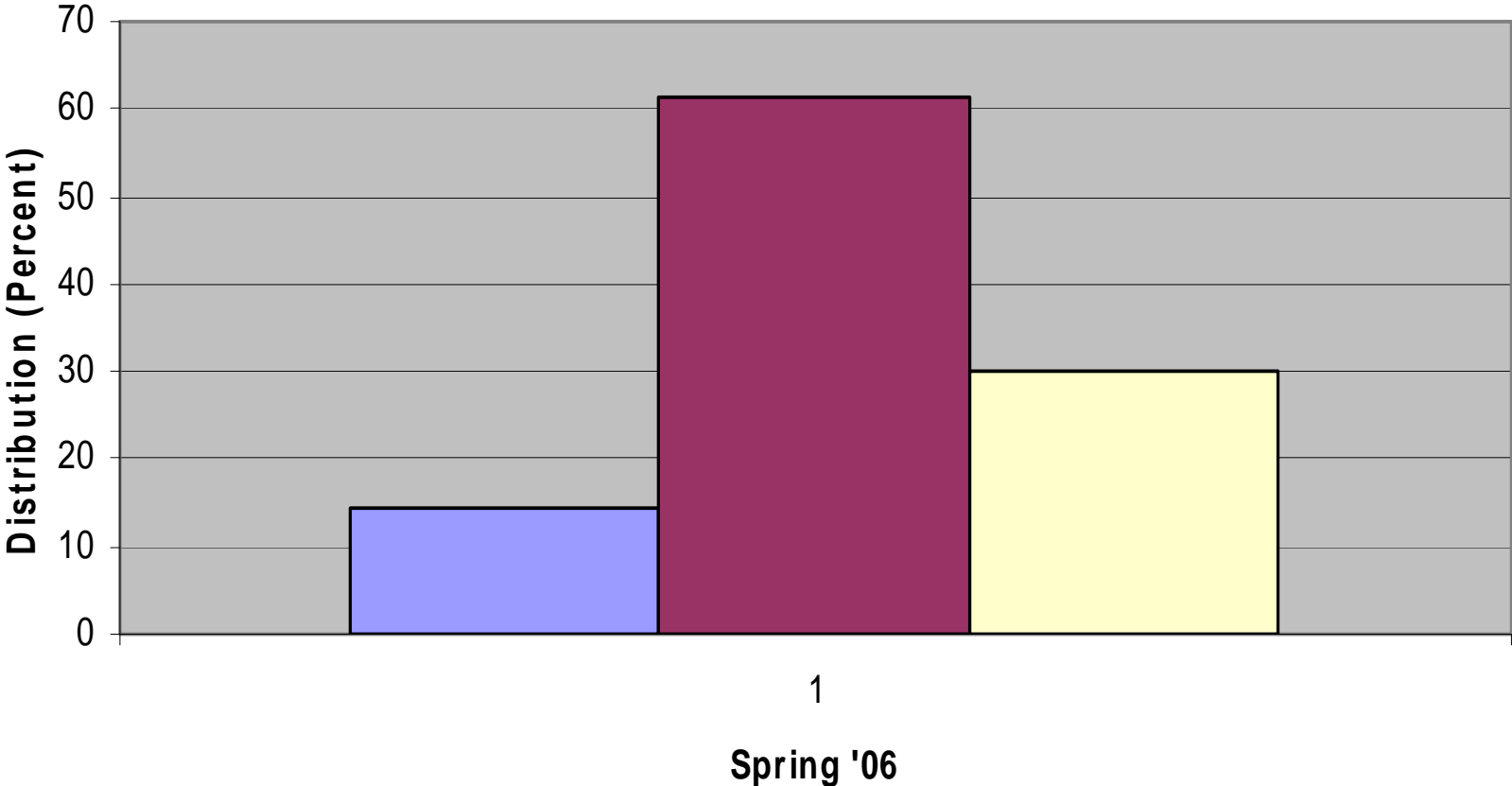
## Spring 2006 PLTL and Non-PLTL Student Performance

■ PLTL (n = 35) ■ Non-PLTL (n = 70)



# Comparison of Percentage of Students Earning D, F, W Grades

■ PLTL (n = 35) ■ Non-PLTL (n = 70) □ n = 475



## Learning Gains:

The average rating (on a 5 point scale) for SALG Survey questions was 3.80 (standard deviation 1.01). 38.2% (n=45) of the students surveyed stated that the PLTL workshops helped a great deal in the gains they made in:

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- understanding the main concepts.
  - understanding the relationships between concepts.
  - feeling comfortable with complex ideas.
  - their ability to:
    - solve problems.
    - think through a problem or argument.
    - work effectively with others.
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# Other Outcomes

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- For PLTL students, Failure Rate was about 12% compared to about 32% for Non-PLTL students
  
  - 100% (n = 9) of the peer leaders surveyed stated that the experience of serving as Peer leaders positively affected their subject learning.
    - “It built my ability to think critically and solve chemistry related course work.”
  
  - 78% (n = 9) of the Peer Leaders surveyed stated that the experience of being Peer leaders positively affected their ability to communicate ideas to others.
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## Support for TAR?: Proposed Graduate Teaching Fellow (GTF) Course

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- ❑ 3 credit-hour Graduate School course
  - ❑ Targeting Teaching Assistants
  - ❑ Students in each discipline will enroll under a faculty in that discipline
  - ❑ Will create a learning community for students and faculty
  - ❑ Upon completion, student will be given supplemental stipend to assume greater role in teaching service courses
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# Adaptation of PLTL into Student-Led TL (SLTL)

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- Use Graduate Students instead of Peer Leaders
  - Use GTF course instead of Education Specialist
  - Potential Courses to use
    - General Chemistry, Organic Chemistry
    - Introductory Biology
    - Calculus, Introductory Physics, etc.
  - Everything else stays the same
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# Pilot SLTL Project – Fall '07 G-Chem

## Responsibilities of Graduate Assistants

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- Designate 2 recitation sections for SLTL
- GA's to attend course lectures
- Create learning communities of 8-10 students/group
- Weekly 2-hour session with each group led by graduate assistant (GA) using PLTL model
- GA's meet with Instructor to obtain conceptual questions, and give feedback
- CIRTTL leader, GA's, education specialist to meet 1 hour per week
- GA's to collect data on student performance
- Data Analysis

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Similar model for Introductory Biology/Physics, and Calculus

# Thank You

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Your Views, Comments, and  
Suggestions are WELCOME

# Resources

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[www.pltl.org](http://www.pltl.org)

The logo for CIRTL (Center for the Integration of Research, Teaching, and Learning) features five vertical bars in yellow, green, red, blue, and purple. Each bar contains a white icon: a leaf, a gear, a pi symbol, a sine wave, and a gear. Below the bars, the letters "CIRTL" are written in a white, sans-serif font.

The Center for the Integration of Research, Teaching, and Learning (CIRTL) invites you to...

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Engineering, and Mathematics (STEM)  
Education Scholars Program**

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UNIVERSITY**

<http://www.cirtl.net/STEMES/>

<http://www.cirtl.net/>

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