South Carolina Oyster Restoration and Enhancement

Water Quality Monitoring: Evaluation of a Digital Training Product for South Carolina Oyster Restoration and Enhancement (SCORE) Volunteers

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Outline

- **Overview of SCORE Program**
- **Overview of Digital Training Product**
- **Evaluation of Digital Training Product**
  - Purpose
  - Methods
  - Results
  - Conclusions
- **Questions**

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Overview of SCORE Program

Purpose:

To restore and enhance oyster habitat by planting recycled oyster shells in the intertidal environment to form new, self-sustaining oyster reefs—all with the help of volunteers.

Lead organization:

South Carolina Department of Natural Resources (SCDNR)

Partners:

- Various school and community volunteer groups
- Numerous local, state, and federal funding partners

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Overview of SCORE Program

Program components:

- Oyster shell recycling

- Oyster reef building

- Oyster reef monitoring

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Overview of SCORE Program

NOAA Coastal Services Center Support:

- Funding
- Services
  - Outreach support
  - Web site development
  - Content development
  - Data management system development
  - Digital training product development

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Overview of Digital Training Product

The Product:

- Informs about water quality characteristics important to oyster health
- Interactively demonstrates how to measure those water quality characteristics

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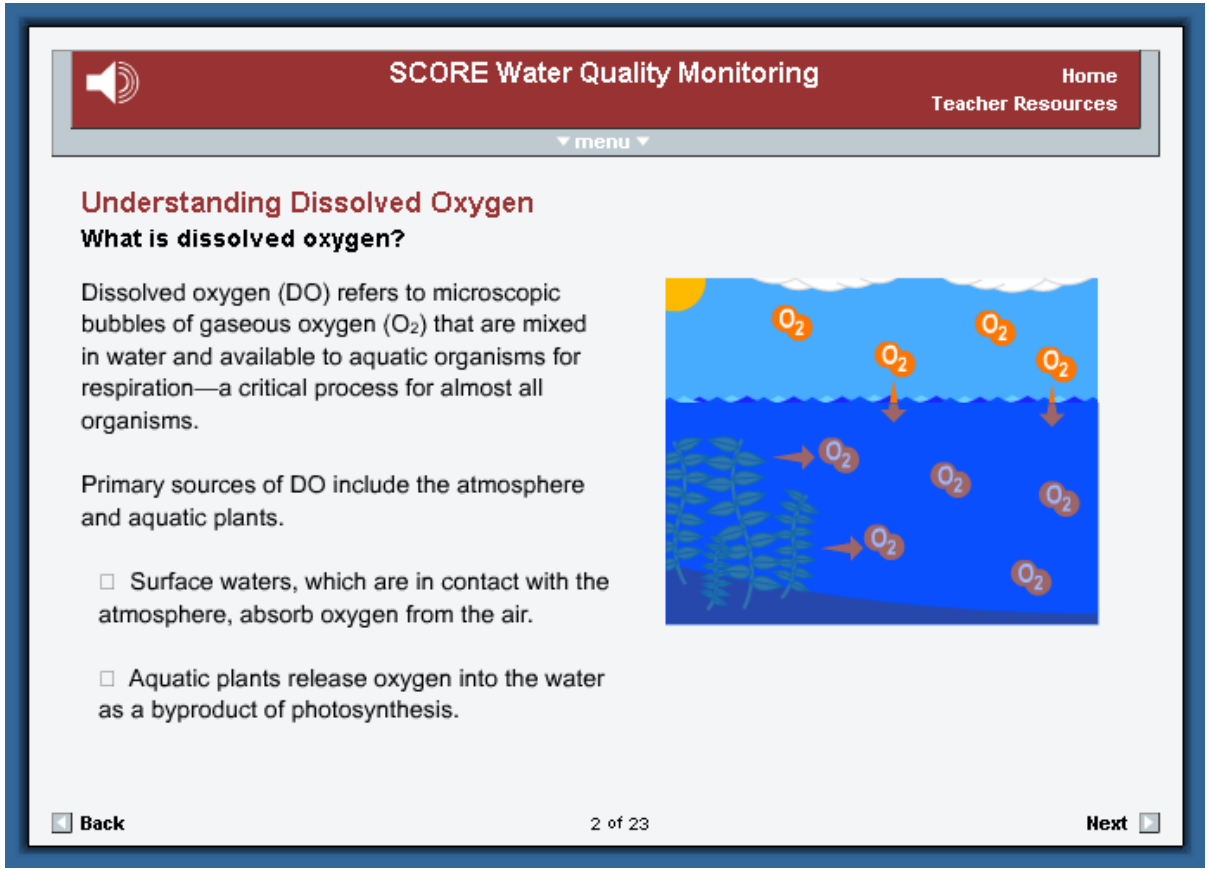
Overview of Digital Training Product

Defines water quality characteristics



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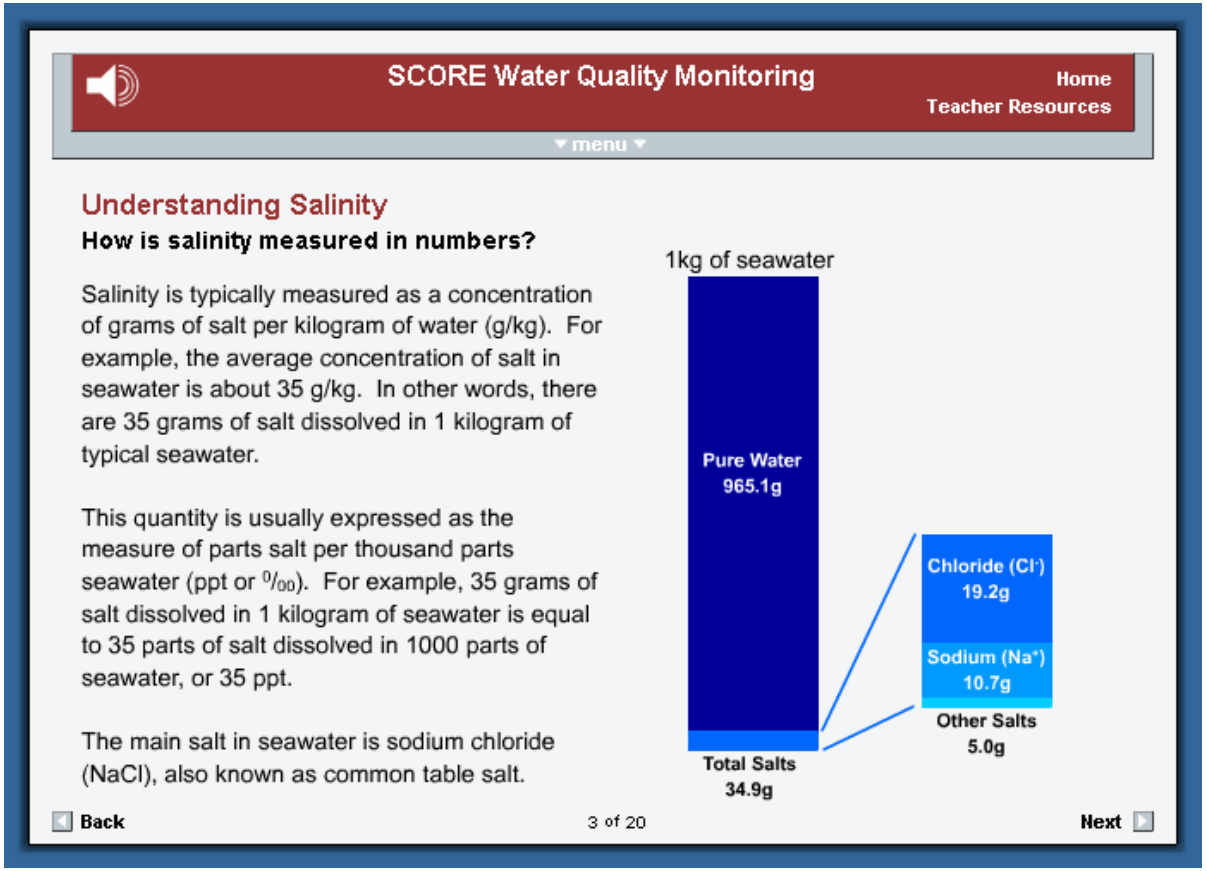
Overview of Digital Training Product

Explains how water quality characteristics are measured



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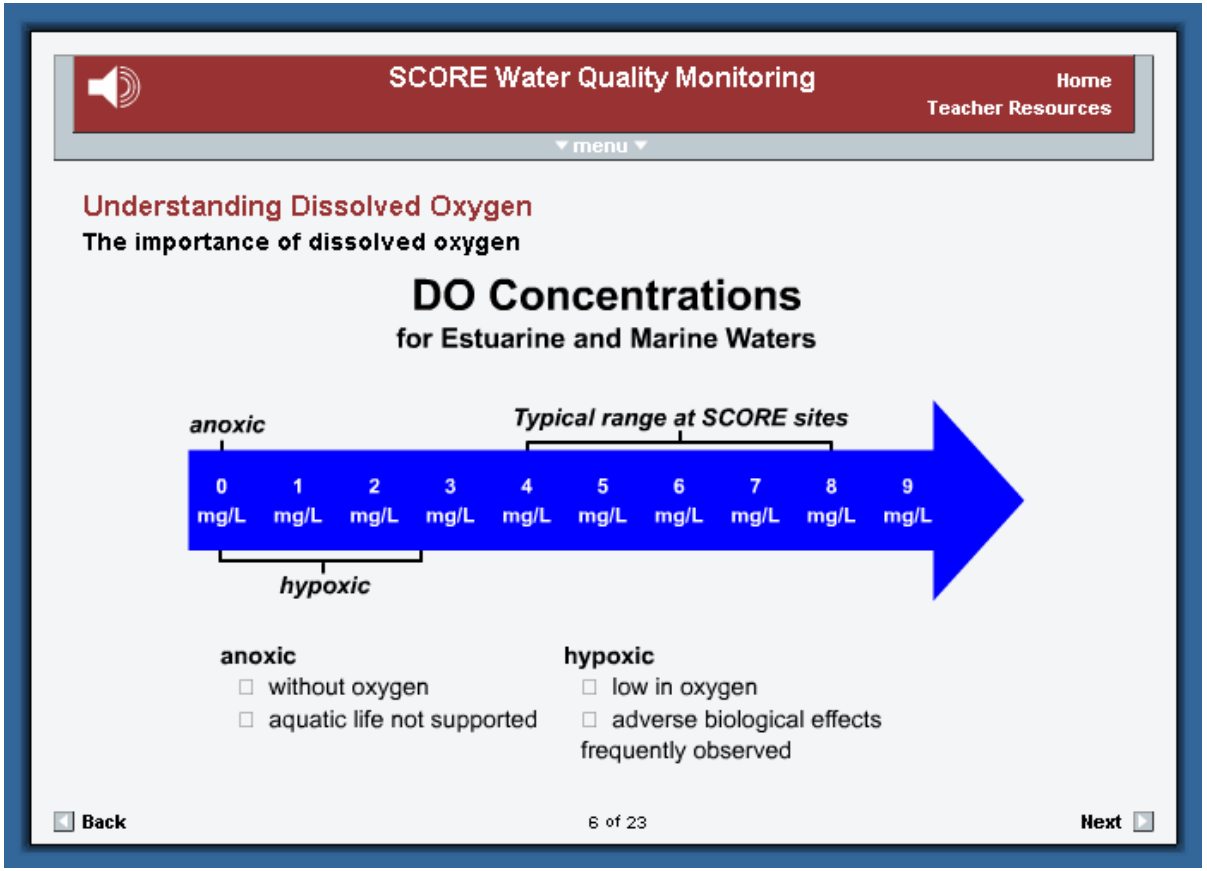
Overview of Digital Training Product

Explains importance of water quality to aquatic life



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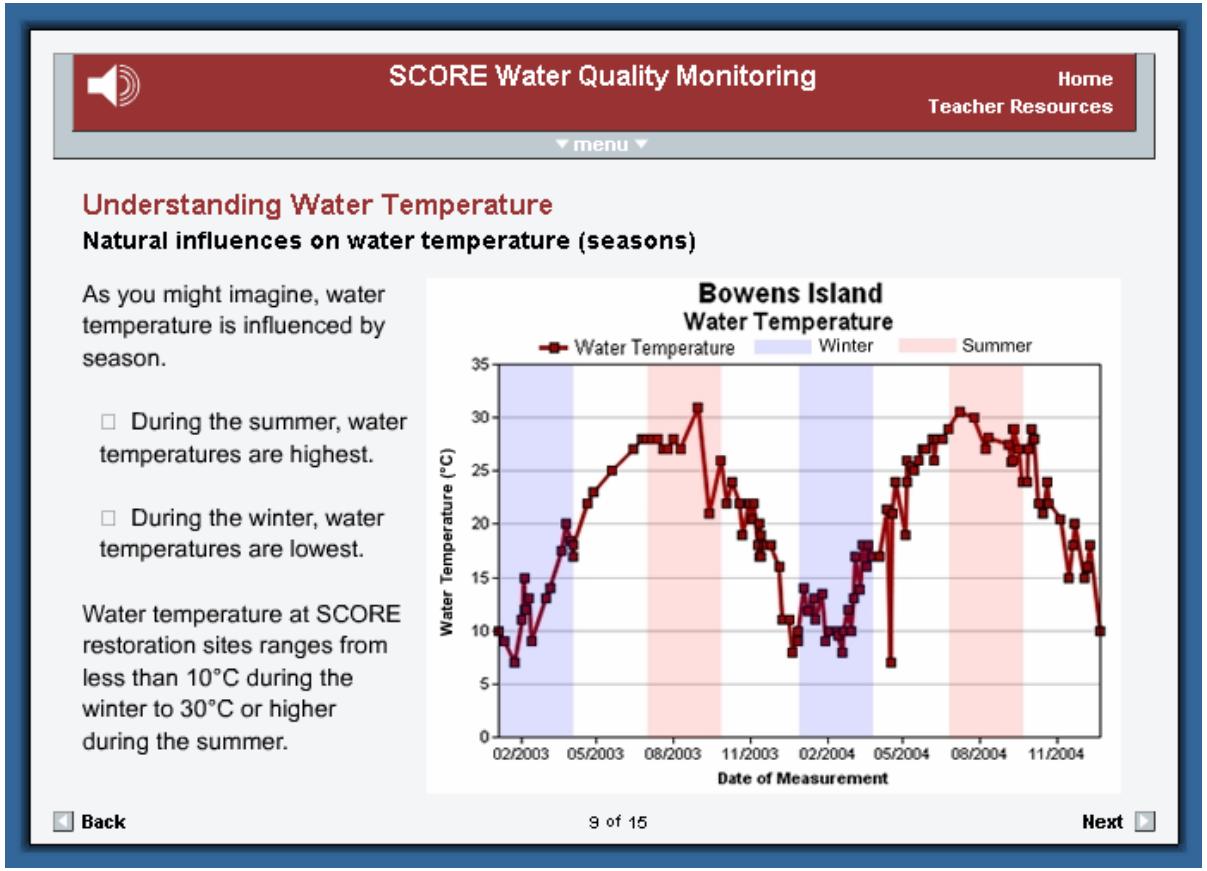
Overview of Digital Training Product

Explains natural influences on water quality



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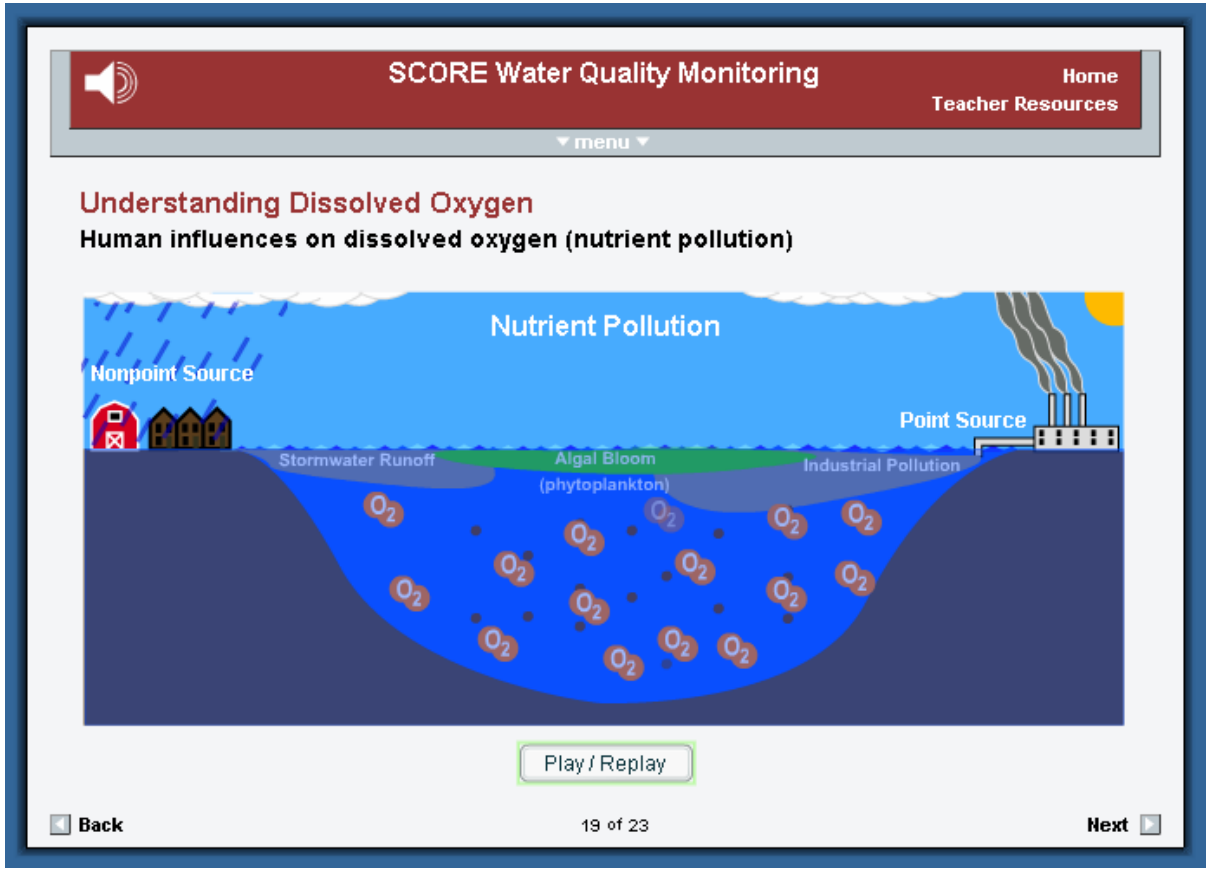
Overview of Digital Training Product

Explains how human actions influence water quality



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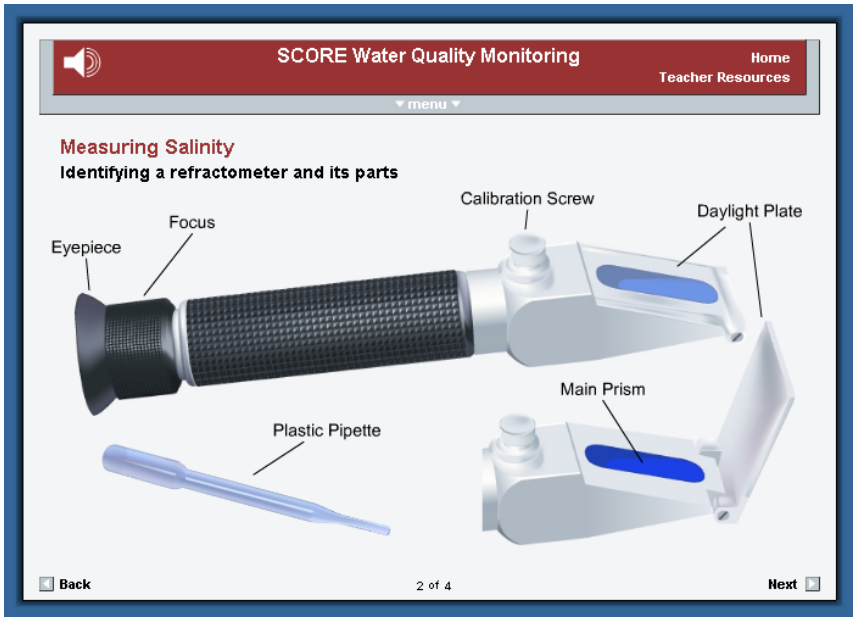
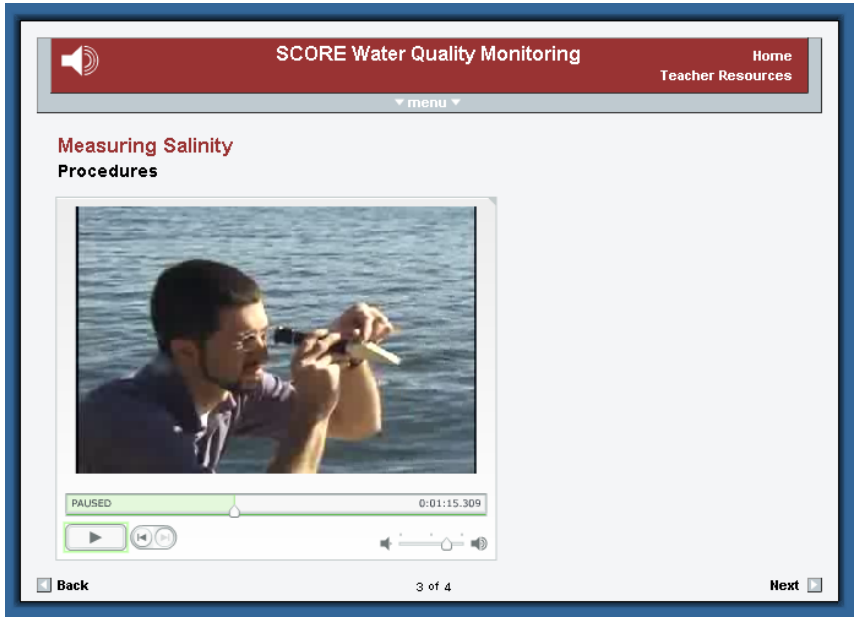
Overview of Digital Training Product

Illustrates measuring tools and demonstrates their use





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Overview of Digital Training Product

Interactively simulates procedural steps and requires user input

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Product Evaluation: Purpose

The purpose of the evaluation was to gauge how effective the product has been with:

- Helping SCDNR staff members train and prepare SCORE volunteers to measure water quality.

- Educating SCORE volunteers and the public on water quality characteristics that are important to understanding oyster habitat.

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Product Evaluation: Methods

Product success examined on five levels:

1. Product usage – Is the product being used?
2. User reaction – Is the product well received and considered useful?
3. Learning results – Are product users gaining knowledge?
4. Behavior in the field – Are behaviors in the field changing?
5. Business impacts – Are day-to-day volunteer program operations improving?

Evaluation methods included:

- Web log analyses
- Surveys
- Pre-test / post-test assessments
- Field observations

Time period of data analysis:

- October 2005 - February 2006 (5 months)

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Product Evaluation: Level 1 Results

Level 1 – Product usage

- **Web log (usage) analysis:** (excludes NOAA and SCDNR URL's)
  - Unique visitors (IP Addresses): 951
  - Loyalty (repeat visitors): 178
  - Pages visited: 3,620
  - Unique files downloaded: 42
  - Total files downloads: 2,737
  - Time on-line: 60+ minute sessions accounted for 75 percent of total pages visited

- **On-line surveys:**
  - User survey (no responses)
  - Teacher survey (two high school and one middle school science teachers)

- **Volunteer survey:**
  - Four out of 18 adult volunteers surveyed had completed the tutorial
  - Five out of five volunteer school groups had completed the tutorial

- **Product evaluation participants:**
  - 118 students
  - Four teachers

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Product Evaluation: Level 2 Results

Level 2 – User reaction

- **On-line teacher survey:**
  - All three teachers/respondents “agreed” or “strongly agreed” that the tutorial:
    - Covers topics adequately
    - Contains information at the appropriate scientific level
    - Makes appropriate use of Web technology
    - Is easy to use
    - Should be recommended to others
  - “Absolutely amazing program—copyright it now and sell it in a textbook/pamphlet form.”

- **Teacher e-mail responses:**
  - “…all i can say over and over again is...WOW!!!!!!!!!”
  - “Any teacher or citizen volunteer who has privilege to this module should be very grateful for all the time and work put into the program. It is so clear and flows so logically from one point to another, we just can't say enough about how much we are impressed and how much we like it.”

- **Unsolicited student responses:**
  - Most found the material interesting, easy-to-understand, and useful.

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Product Evaluation: Level 3 Results

Level 3 – Learning results

- **Self-assessments**
  - On-line survey (no responses)
- **Pre-test vs. post-test evaluations**
  - 118 Participants

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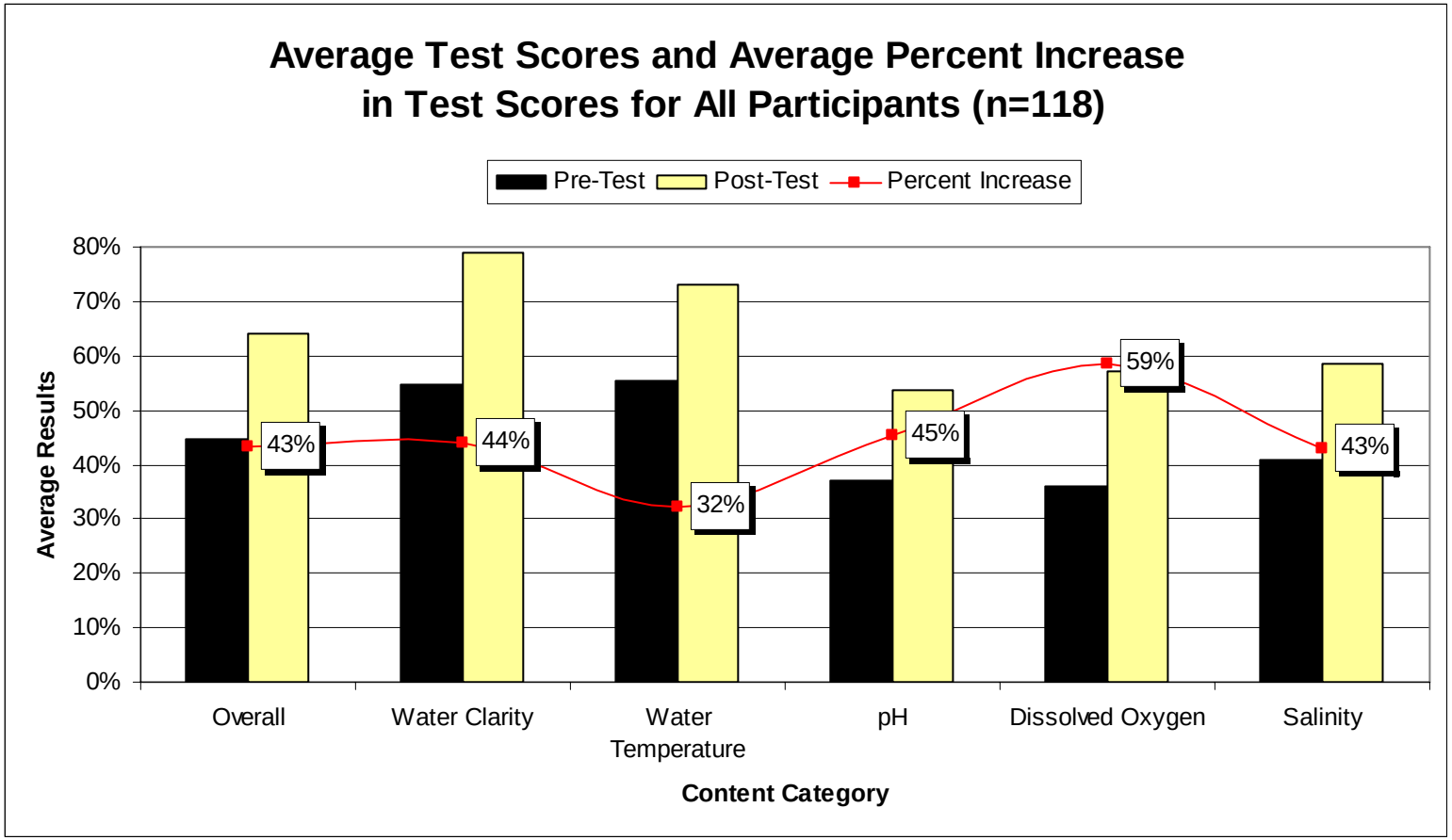
Product Evaluation: Level 3 Results

Level 3 – Learning results (pre-test / post-test results)



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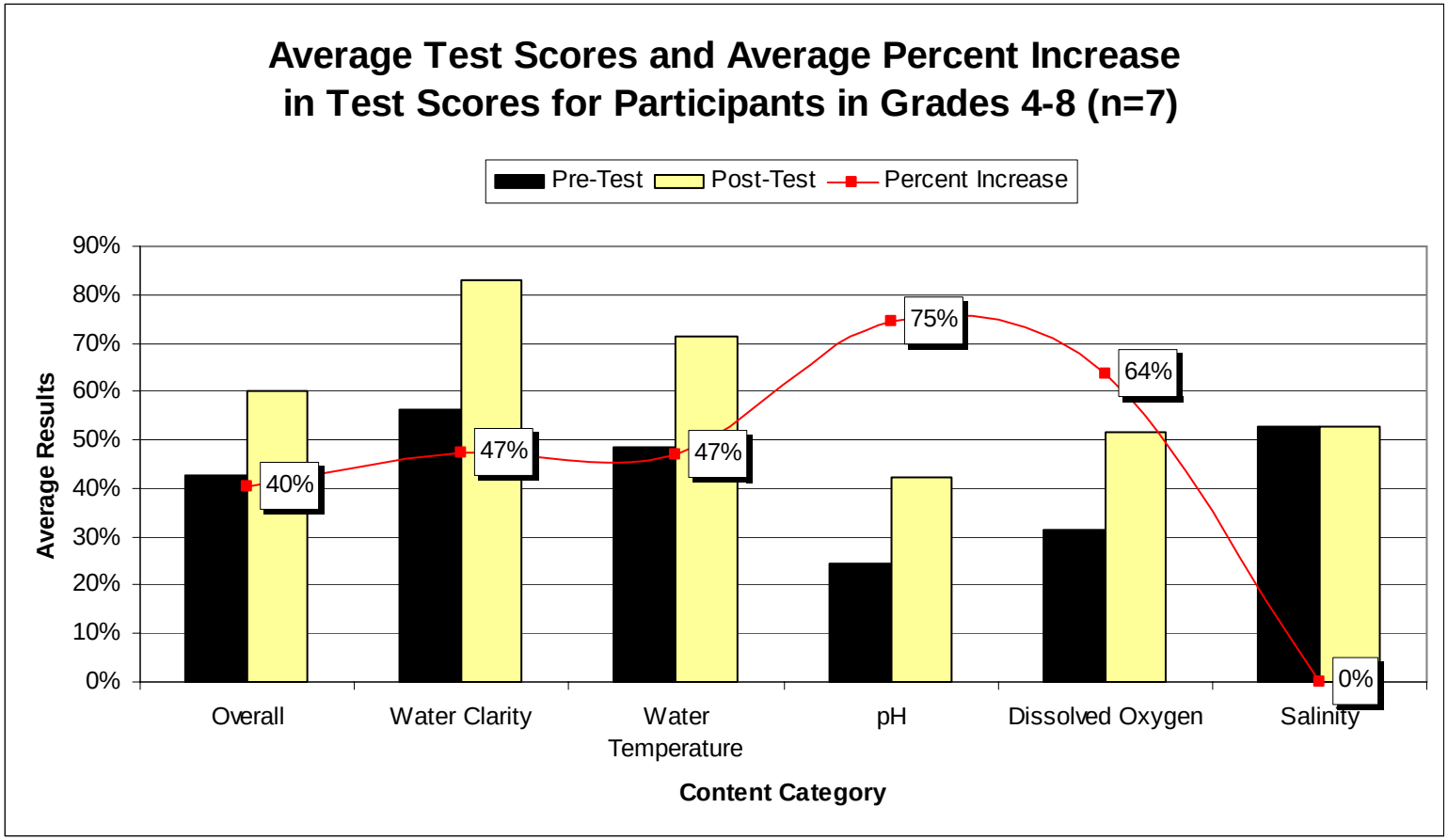
Product Evaluation: Level 3 Results

Level 3 – Learning results (pre-test / post-test results)



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Product Evaluation: Level 3 Results

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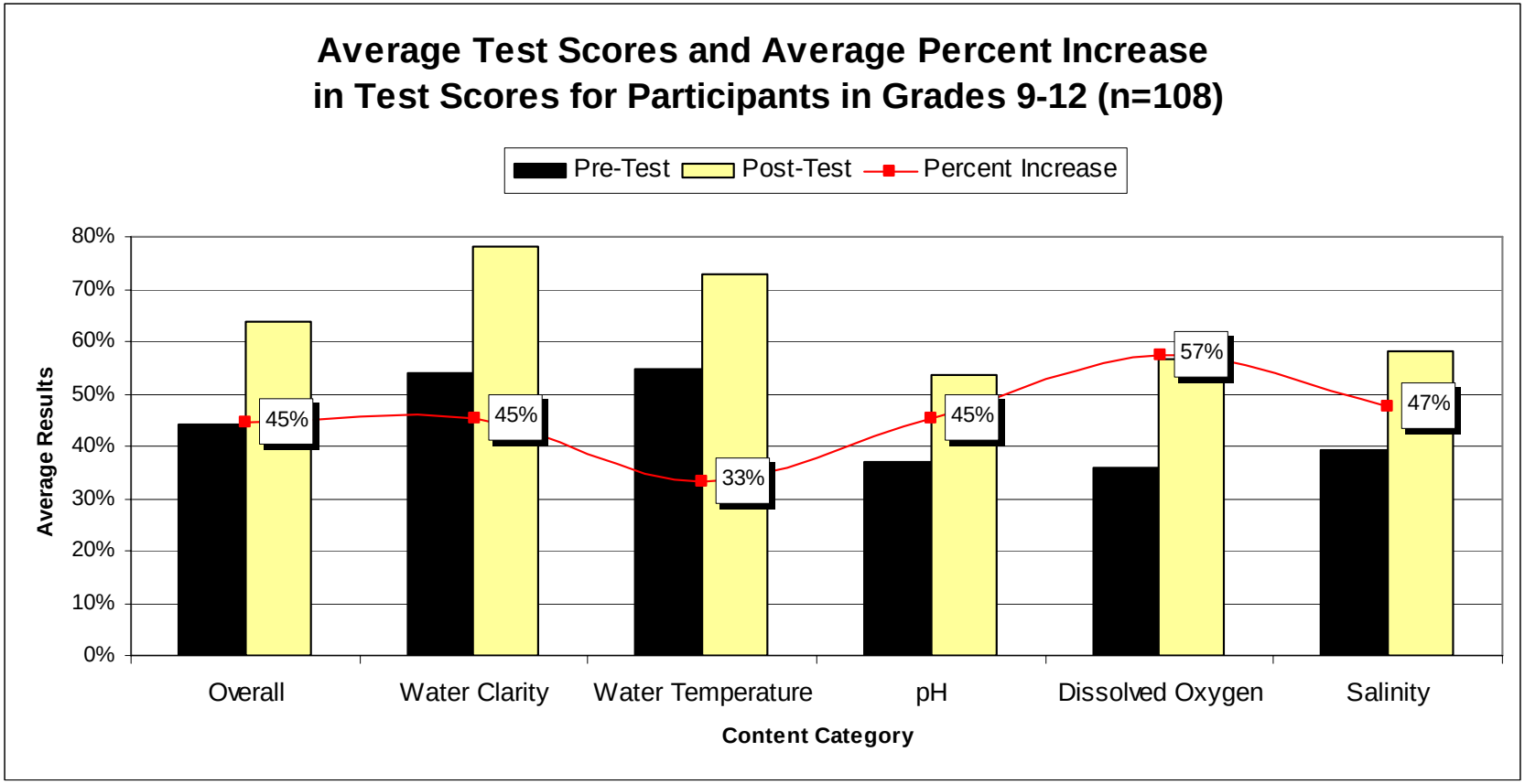

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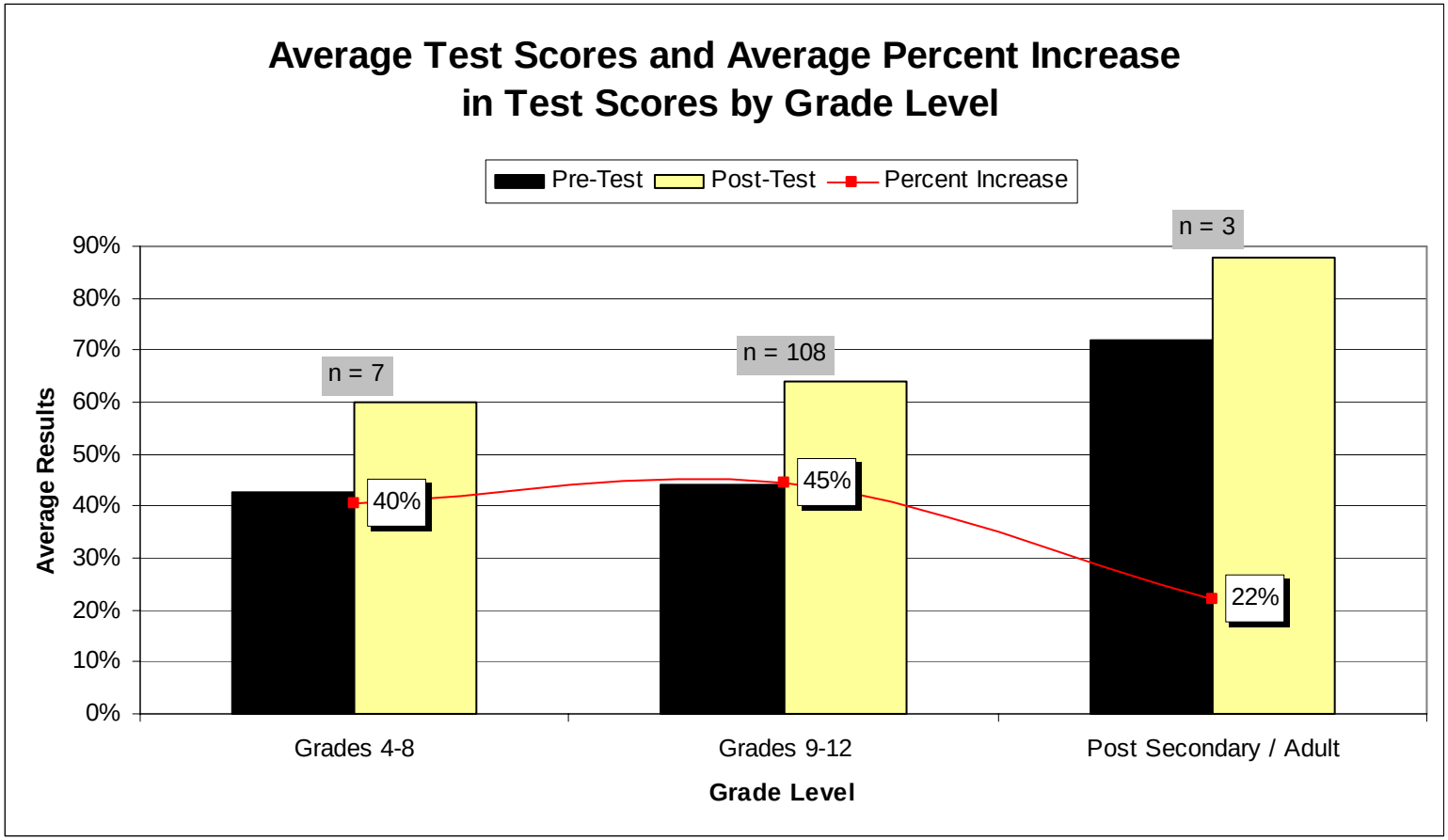

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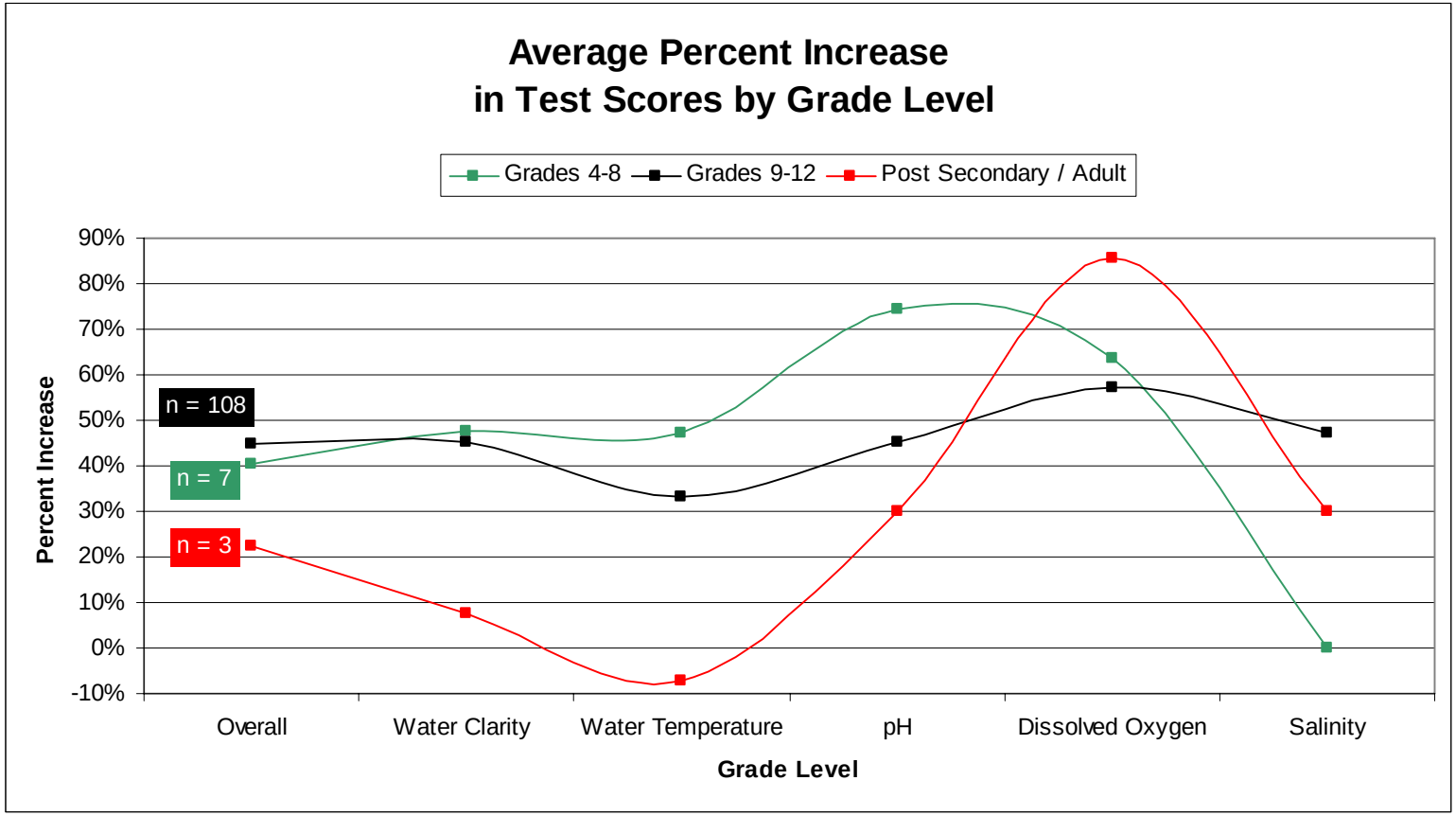

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Product Evaluation: Level 4 Results

Level 4 – Behavior in the field

- **Before and after field comparisons**
  - Data collection (protocols and technique)
  - Data accuracy
- **Field participant survey**
  - Self perception of change
- **SCDNR staff member survey**
  - Staff member perception of change in volunteers

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Product Evaluation: Level 4 Results

Level 4 – Behavior in the field (before and after field comparisons)

Procedure

- **Who:**
  - Four groups of ninth grade students (two to three per group)
- **Month 1:**
  - Completed background portion of training product
  - Received on-site, instructional field training
- **Month 3:**
  - Students measure water quality (first time – “before”)
  - Completed instructional portion of training product
- **Month 4:**
  - Students measure water quality (second time – “after”)

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Product Evaluation: Level 4 Results

Level 4 – Behavior in the field (before and after field comparisons)

- **Results**
  - Data collection: some things improved, some things got worse
  - Data accuracy: some things improved, some things got worse
- **Notes**
  - Three out of four groups did not use written protocols
  - No practice between “before” and “after” period
  - Initial field training seemed significantly improved
- **Outcomes**
  - Laminated, abbreviated protocols should be included with the field equipment
  - Teachers and trainers should stress importance of reading protocols

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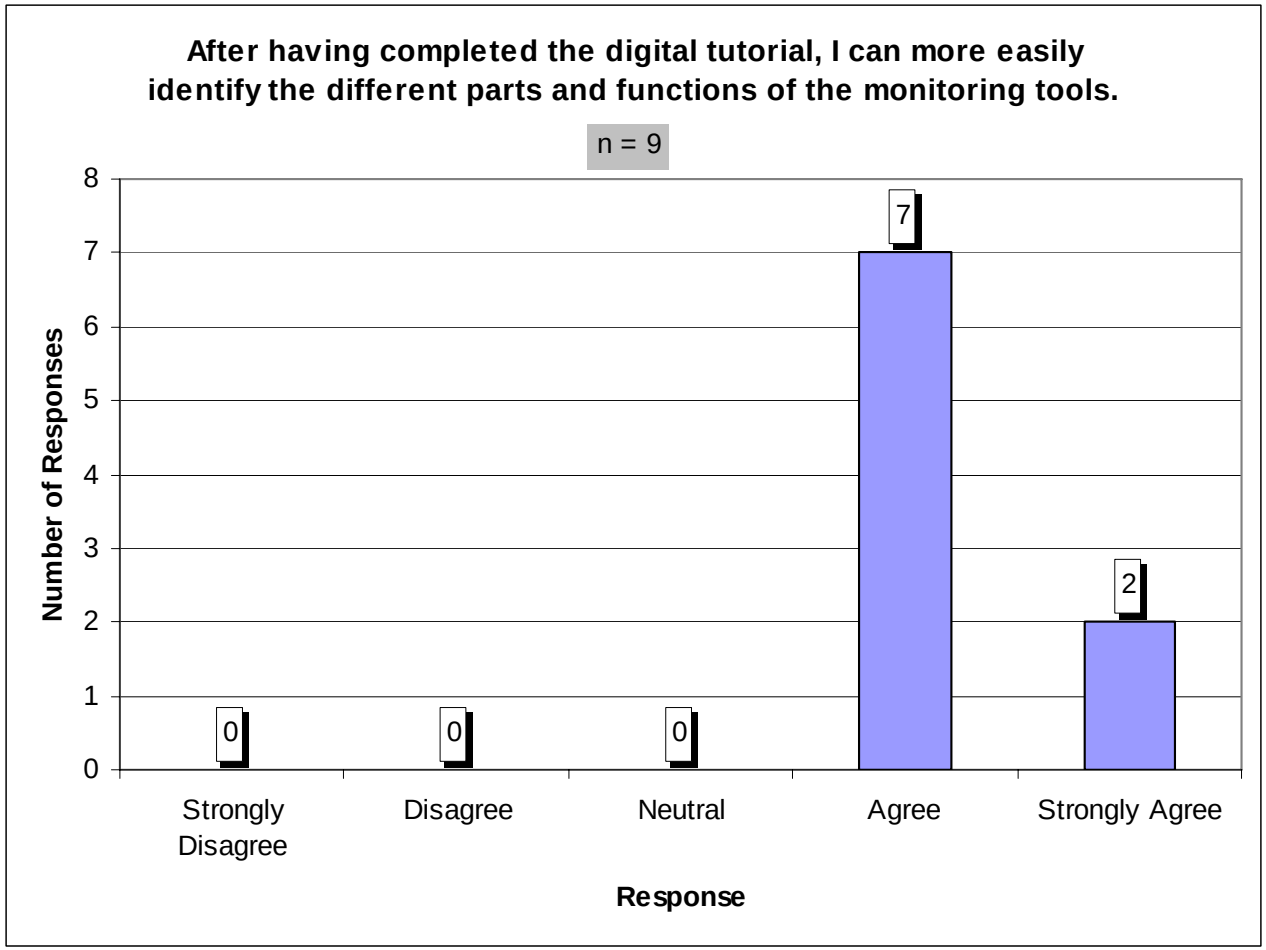
Product Evaluation: Level 4 Results

Level 4 – Behavior in the field (field participant survey)



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Product Evaluation: Level 4 Results

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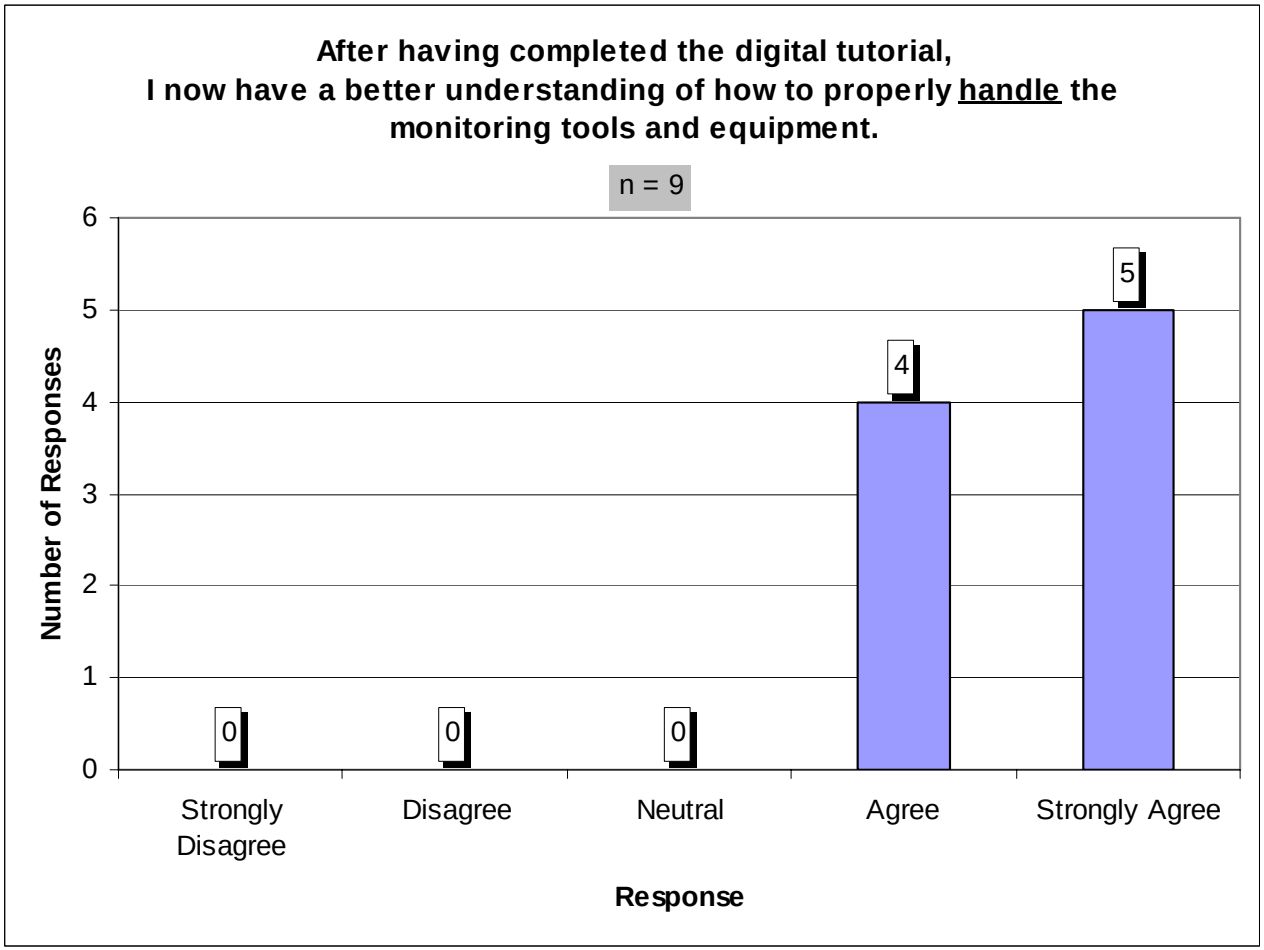

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Product Evaluation: Level 4 Results

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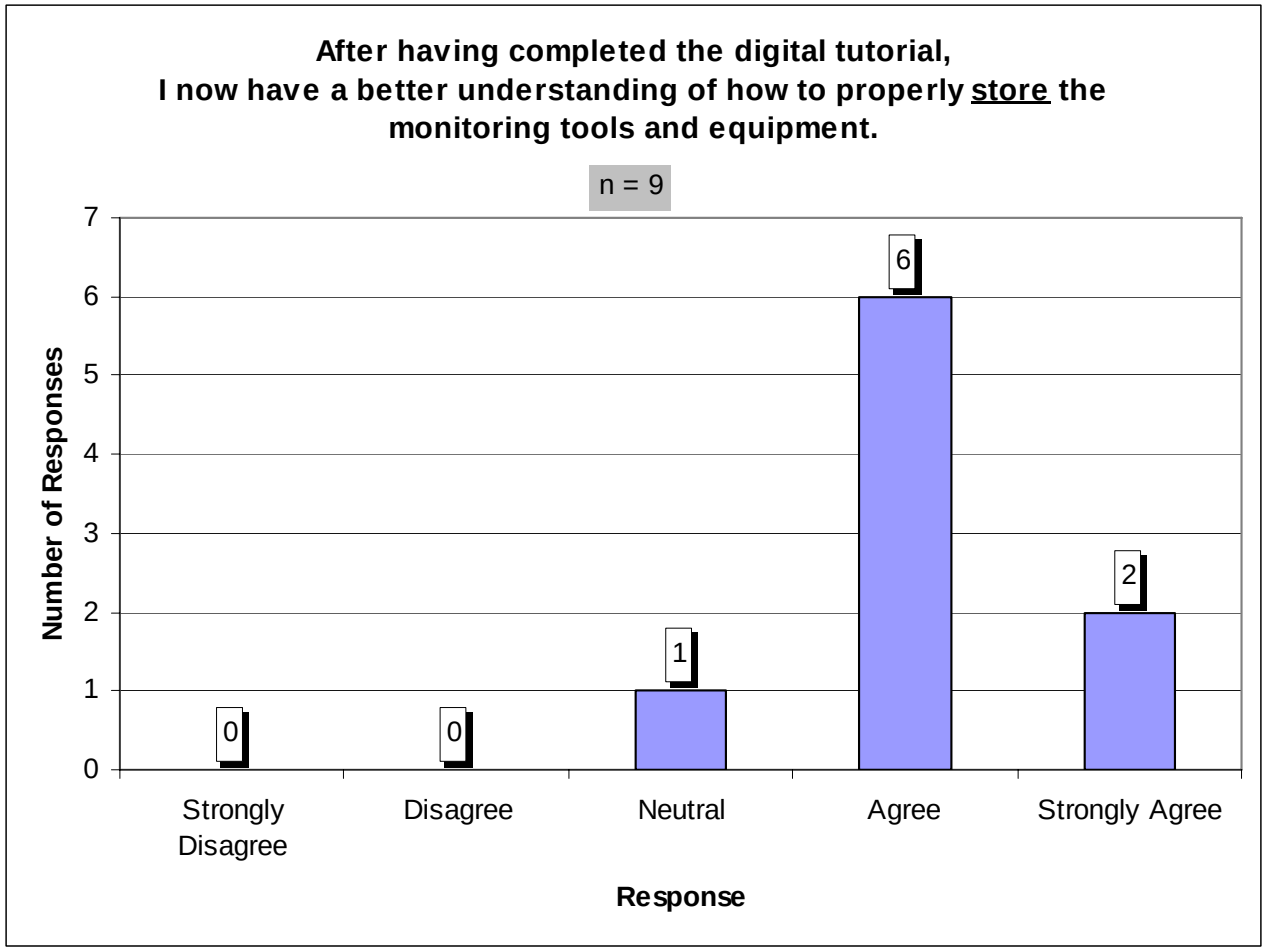

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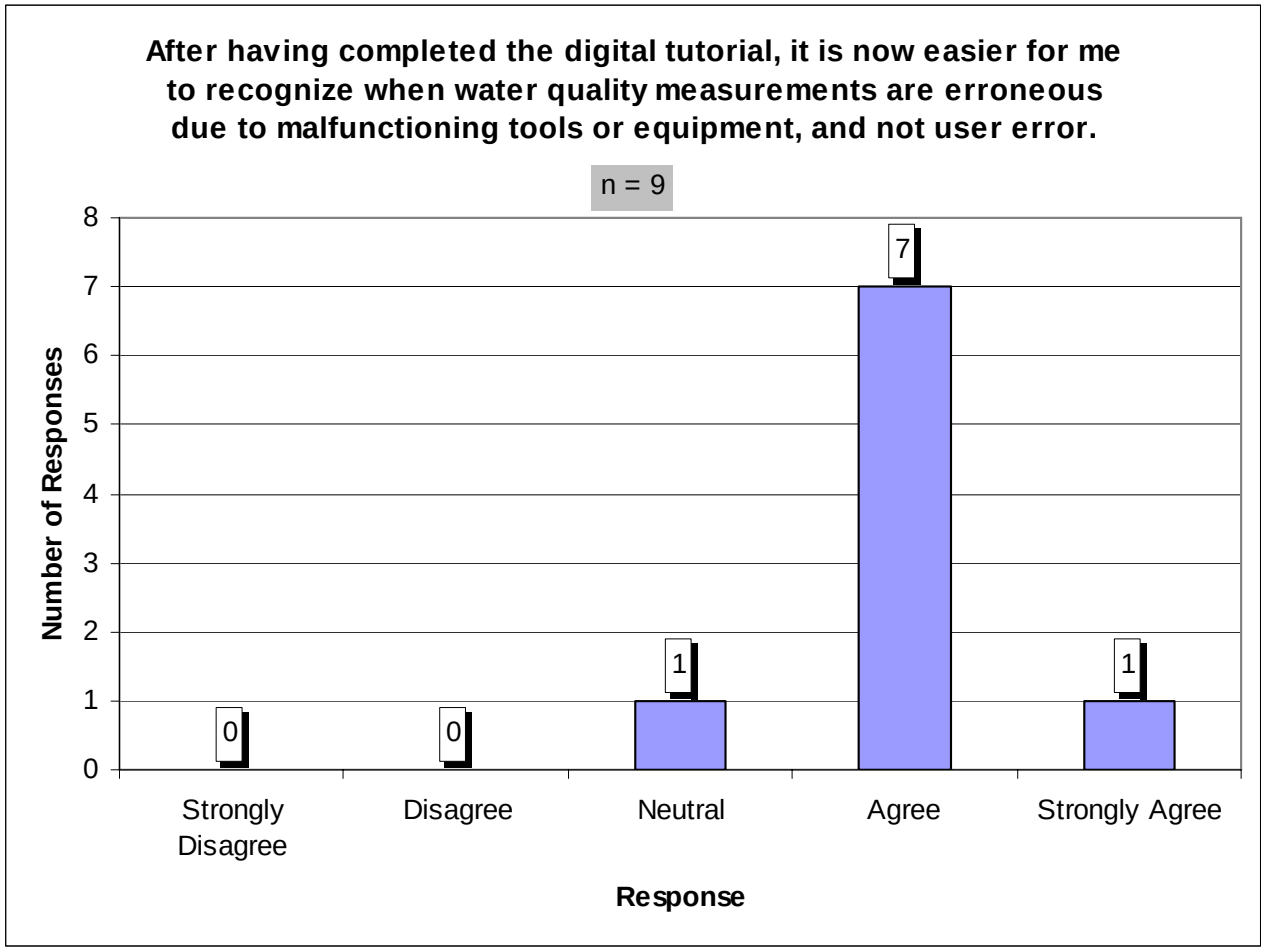

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Product Evaluation: Level 4 Results

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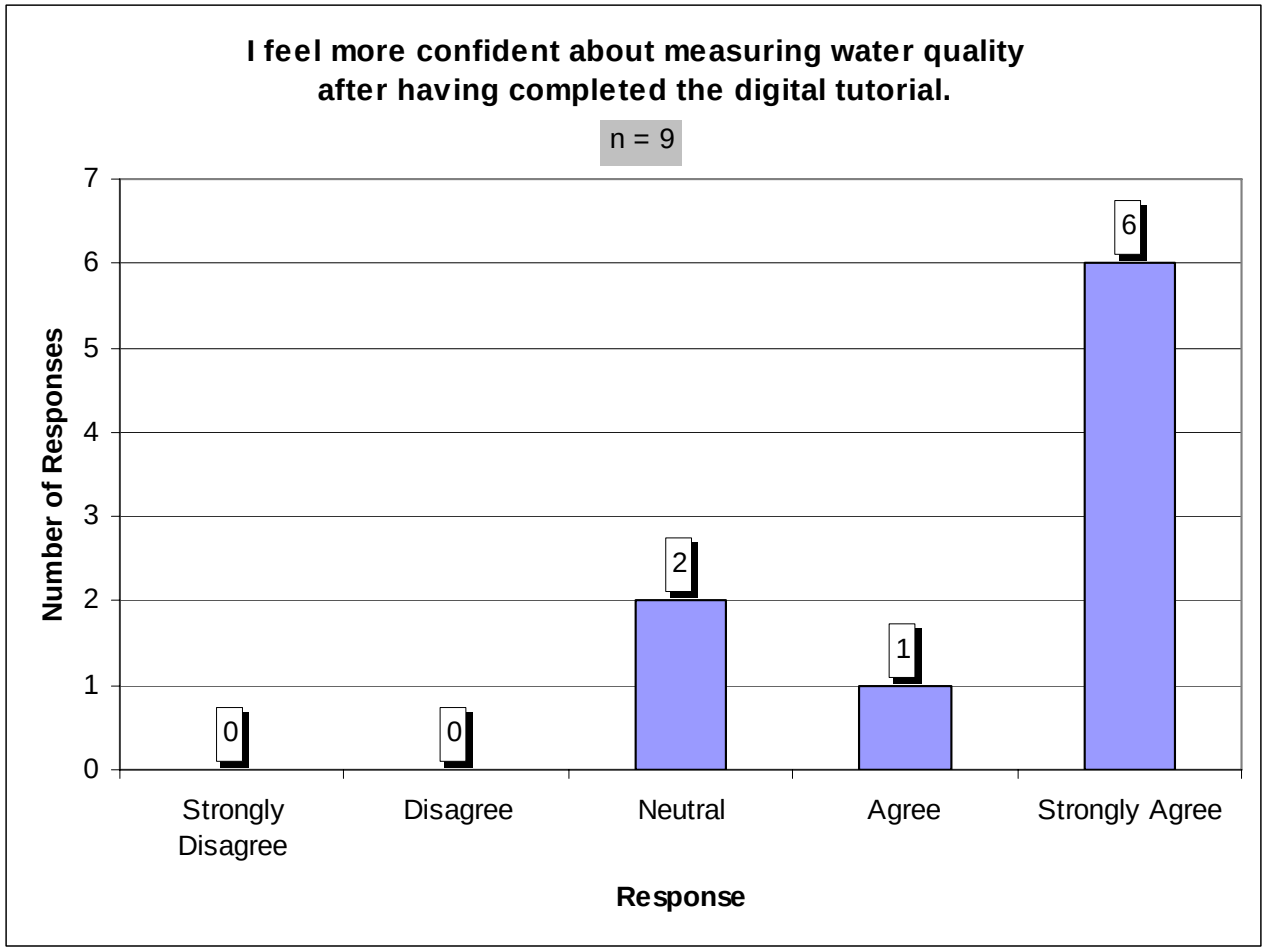

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Product Evaluation: Level 4 Results

Level 4 – Behavior in the field (SCDNR staff member survey)

- **Have there been fewer errors found in volunteer collected data?**
  - 2002 and 2003 (pre-tutorial) = ~10 percent error rate
  - 2004 and September 2005 (pre-tutorial) = ~5.5 percent error rate
  - October 2005 to March 2006 (post-tutorial) = ~2 percent error rate***

  ***Only 11 percent (or 31 records) of "post-tutorial" data was entered by those who had completed the tutorial. No errors were found in that 11 percent.

- **Have there been fewer problems with improper care and storage of monitoring equipment?**
  - No noticeable difference

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Product Evaluation: Level 5 Results

Level 5 – Business impacts (SCDNR staff member survey)

- **Has the number of volunteer requests for technical assistance decreased?**
  - About the same, very few to begin with
- **Has the average time required to conduct field training decreased?**
  - Yes, generally quicker and more productive training sessions
- **Any other observations?**
  - Volunteers seem to have a better understanding of why we are concerned with monitoring water quality.

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Product Evaluation: Conclusions

Levels 1 to 5 – Product success:

1. Product usage – Is the product being used?
   Yes, by volunteers and school groups

2. User reaction – Is the product well received and considered useful?
   Yes, particularly by teachers (limited student/volunteer feedback)

3. Learning results – Are product users gaining knowledge?
   Yes, all ages and backgrounds

4. Behavior in the field – Are behaviors in the field changing?
   Yes / No (subjective vs. objective)

5. Business impacts – Are day-to-day volunteer program operations improving?
   Yes, generally quicker and more productive training sessions