# AN ONLINE INTERACTIVE PLATFORM FOR THE TEACHING OF THE LABORATORY SAFETY

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# Presentation Outline

- Study Background
- Study Design
- Results
- Discussion
- Conclusion

# The Lab Incidents

World Health Organization

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## Global Alert and Response (GAR)

### Severe acute respiratory syndrome (SARS) in Singapore - update 2

**SARS case in Singapore linked to accidental laboratory contamination**

**24 September 2003**

**Disease Outbreak Reported**

The Singapore Ministry of Health has released the full report of an international investigation of a recent SARS case. The investigation, which followed laboratory confirmation on 8 September of SARS in a 27-year-old researcher, concluded that the patient most likely acquired the infection in a laboratory as the result of accidental contamination. The investigation found no evidence of further transmission and no reason to regard this single isolated case as a concern for international public health.

The case in Singapore marked the first case of SARS to be confirmed since the last known case in the world was detected and isolated in Taiwan, China, on 15 June. In addition to positive results in the laboratory tests for the SARS coronavirus, the SARS agent, subsequently confirmed by the US Centers for Disease Control and Prevention, the Singapore patient showed clinical signs consistent with a diagnosis of SARS.

The patient was conducting research on the West Nile virus in a laboratory that was

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# The Lab Incidents

## Yale student dies after her hair 'is caught in a machine' at chemistry laboratory

By DAILY MAIL REPORTER
**UPDATED:** 11:52 GMT, 14 April 2011

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- **Victim died from accidental asphyxia**
- **A memorial will be held before the end of term**
- **'She was a brilliant student and extraordinary woman'**

A senior Yale University science student has been killed after her hair got caught in a machine in a freak accident at a campus laboratory.

Michele Dufault, 22, died while using a fast-spinning lathe in the student machine shop at Sterling Chemistry Laboratory in New Haven, Connecticut.

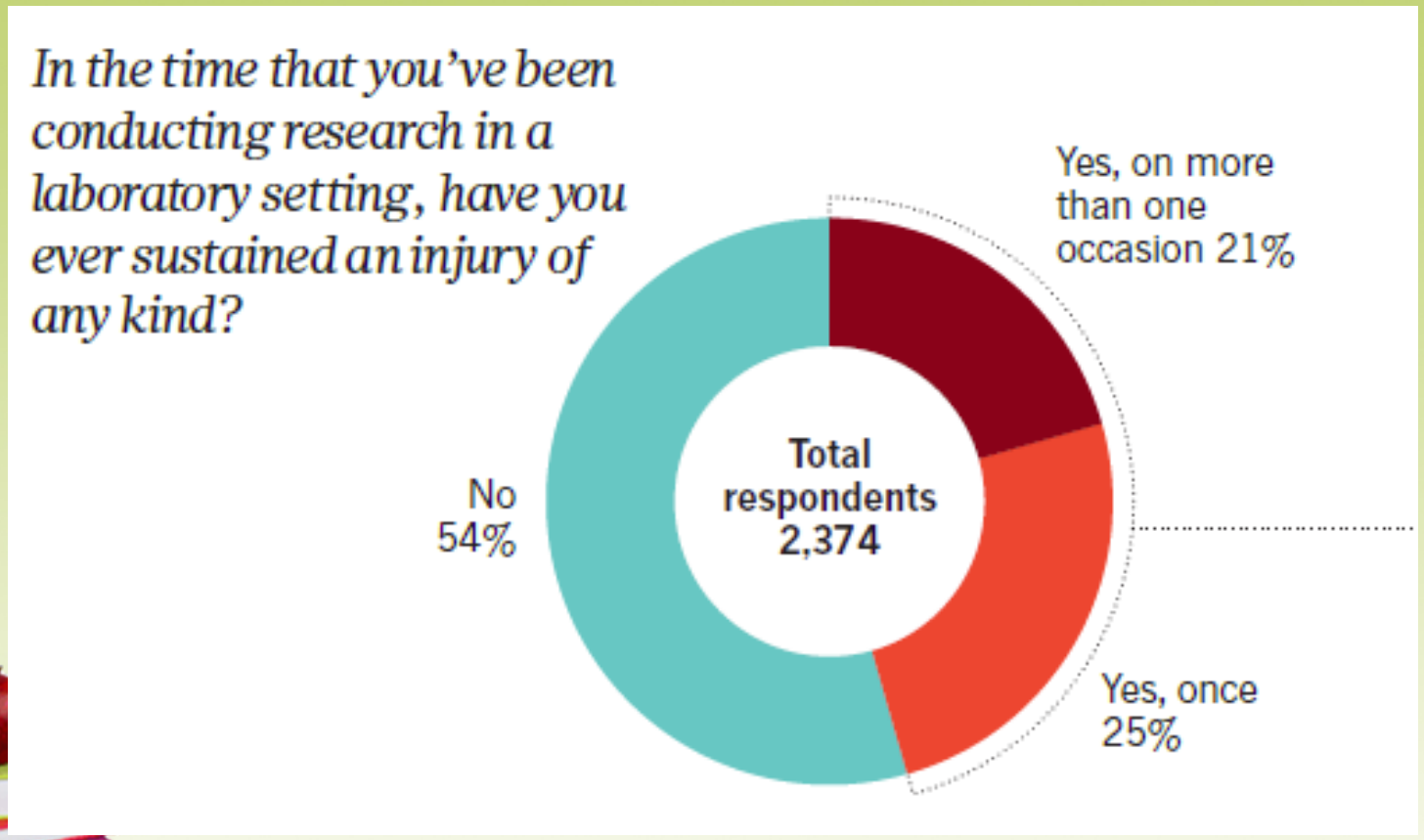
Dufault, described as a 'brilliant student,' was an astronomy and physics major from Massachusetts and a member of the Yale Precision Marching Band.

She was working on a project in the basement of the laboratory where students and staff build or modify research instruments when the tragedy happened.

Her hair is thought to have been caught in the machine's rotating drive and dragged her onto it.

She died from accidental asphyxia by neck compression, according to the Connecticut medical examiner's office.

# The Figures




**Bonamy Finch**

*suggests researchers not as safe as they feel', Nature 493, 9-10.*

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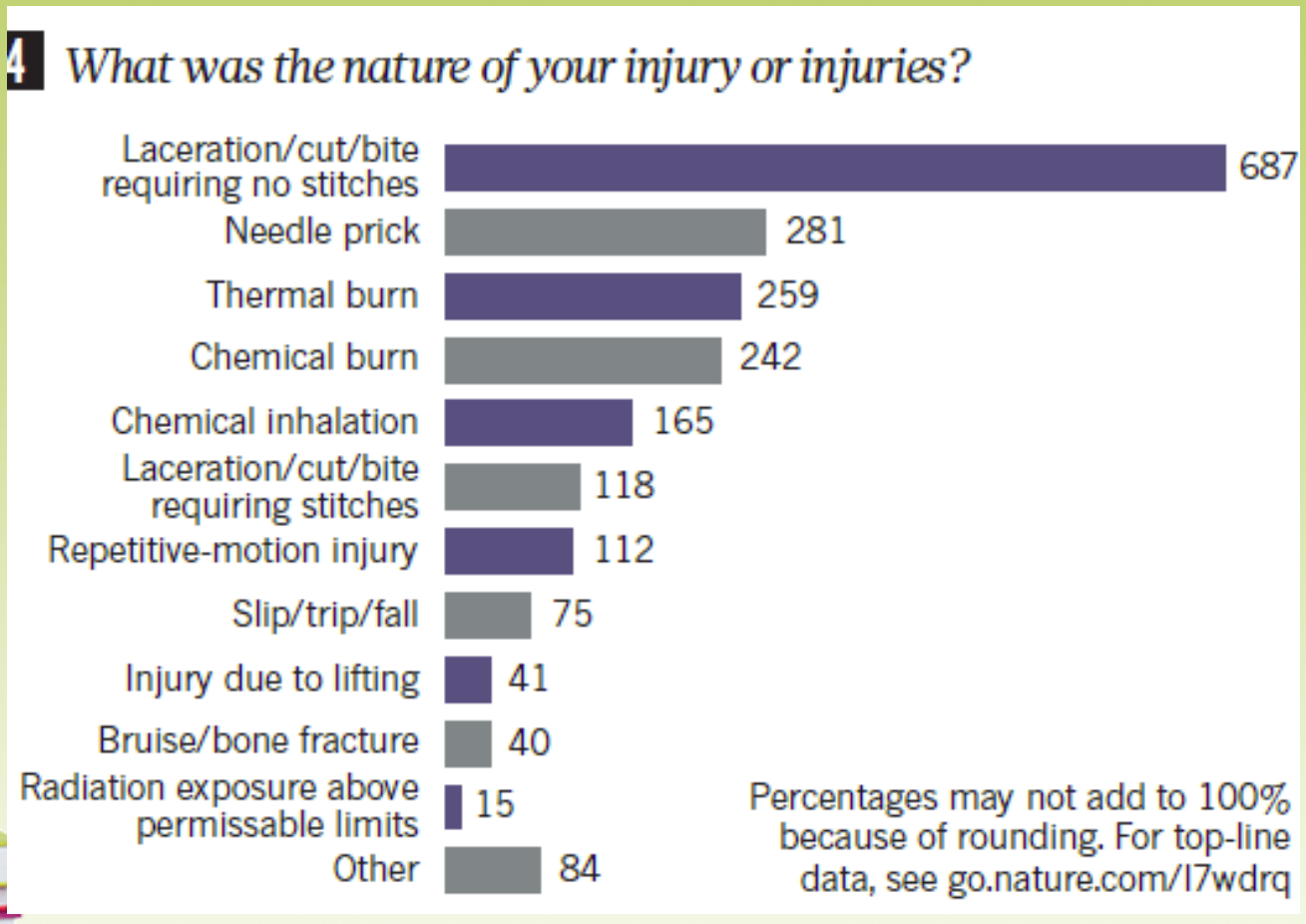
# The Figures




**SOURCE: Center for Laboratory Safety, UCLA/NPG/Bonamy Finch**

V N Richard (2013),'*Safety survey reveals lab risks Questionnaire suggests researchers not as safe as they feel', Nature 493, 9-10*

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# The Figures

Science Careers From the journal *Science*

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Credit: Kelly Krause, AAAS

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Taken for Granted

## Study to Examine Academic Lab-Safety Culture

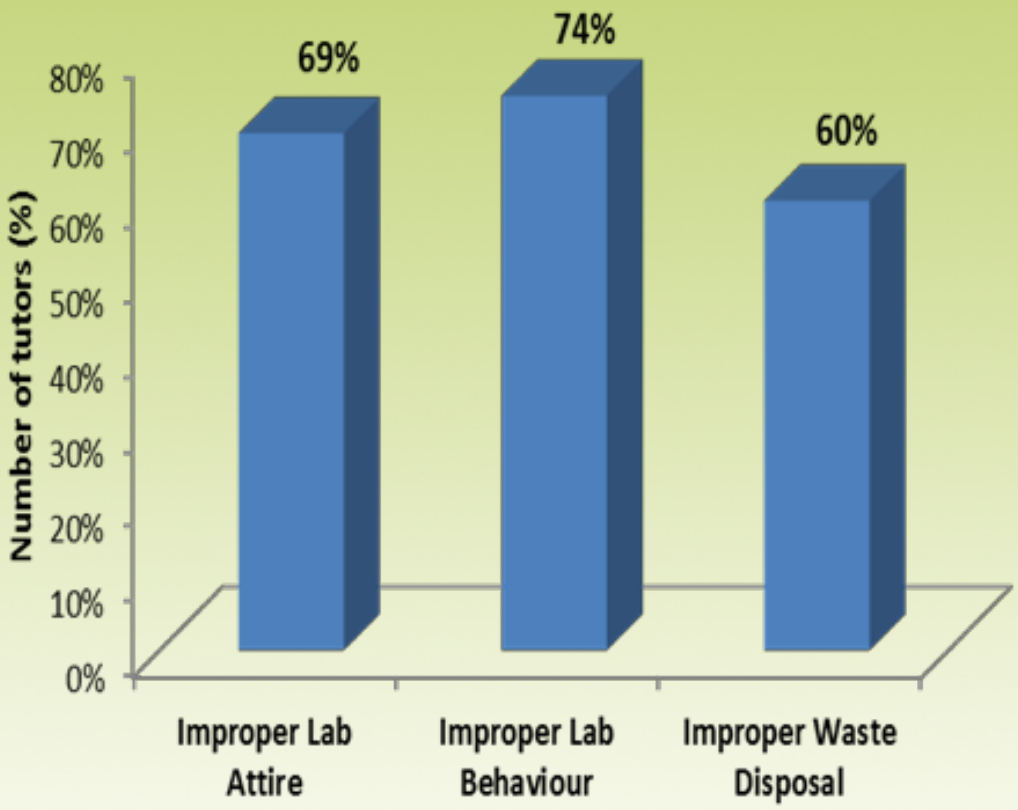
By Beryl Lieff Benderly
June 05, 2013

Recent weeks have seen a pair of developments that could focus and intensify the national discussion of academic lab safety. On 9 May, after many delays, University of California, Los Angeles, professor Patrick Harran was arraigned on felony charges arising from the 2009 death of lab assistant Sheri Sangji. A judge entered four not guilty pleas on Harran's behalf, setting the stage for the first-ever trial of a university lab chief on criminal safety charges. The judge is expected to decide in late June when the trial will begin.

*Only 46% of those who say their work requires a lab coat report wearing one at all times.*

Then, in a step that could have even broader ramifications than the unprecedented trial, on 15 May the National Academies held a public fact-finding meeting in Washington, D.C., kicking off a yearlong study of lab safety in nonindustrial institutions. Together, these events could transform the academic community's understanding of faculty and institutional responsibility for safety and provide high-profile proposals for improving universities' safety

# The Lab Safety Status of Y1 Life Sciences Students




# Objective

**To develop an effective pedagogy for teaching of the laboratory safety among the students.**

# The Study Design

Pre-implementation Assessment

Implementation of Online Interactive Platform

Post-implementation Assessment

# The Study Design

## What To Implement?

- Videos
- Game
- Animations
- Online Assessment

## How To Implement?

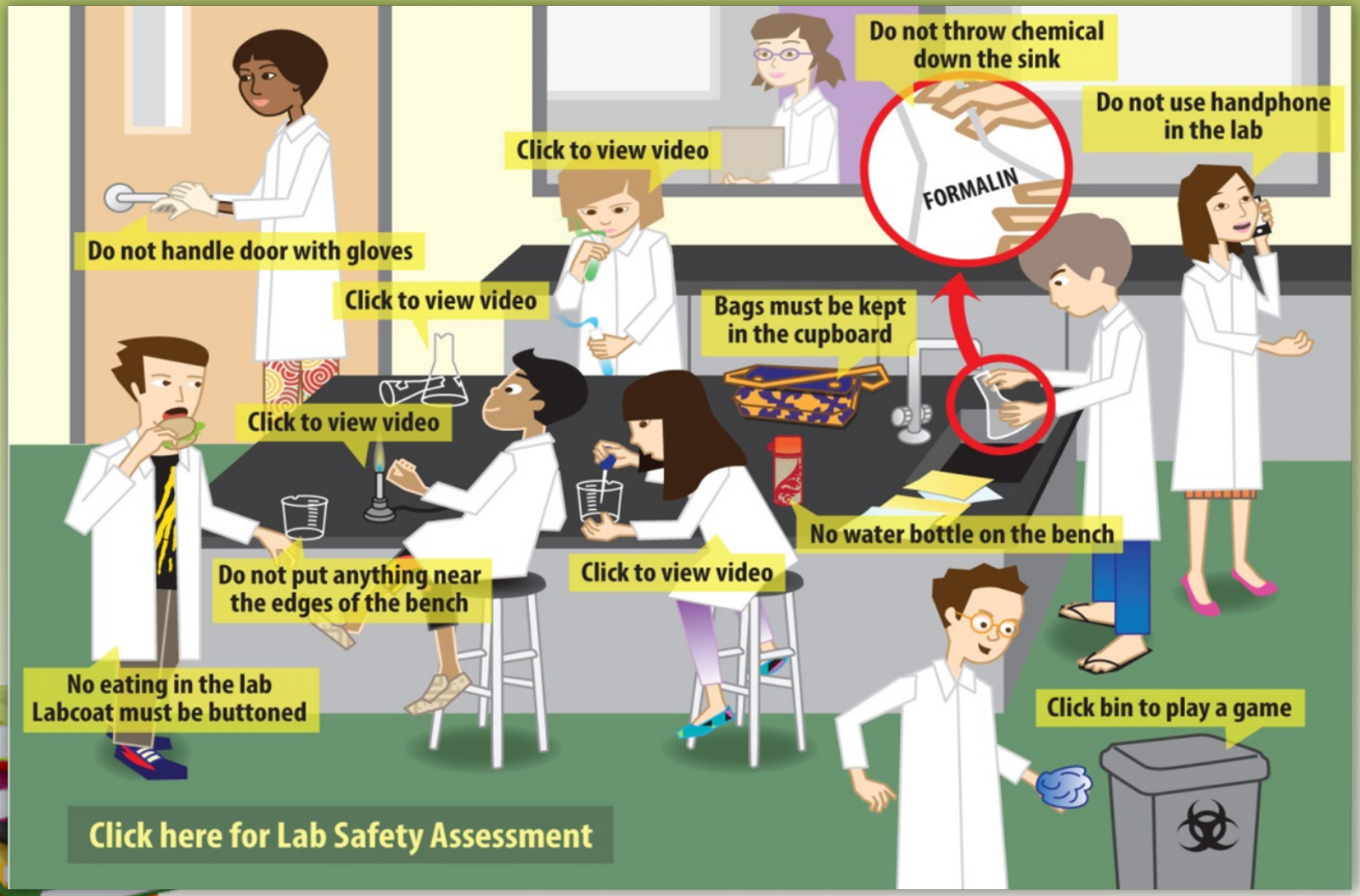
- Create an interactive platform for a lab based scenario
- Incorporates the videos, game and animations to the scenario
- Include a link for the online assessment

Blackboard

## Where To Implement?

- Upload the interactive platform for the lab based scenario onto Blackboard Learning System

# The Interactive Platform

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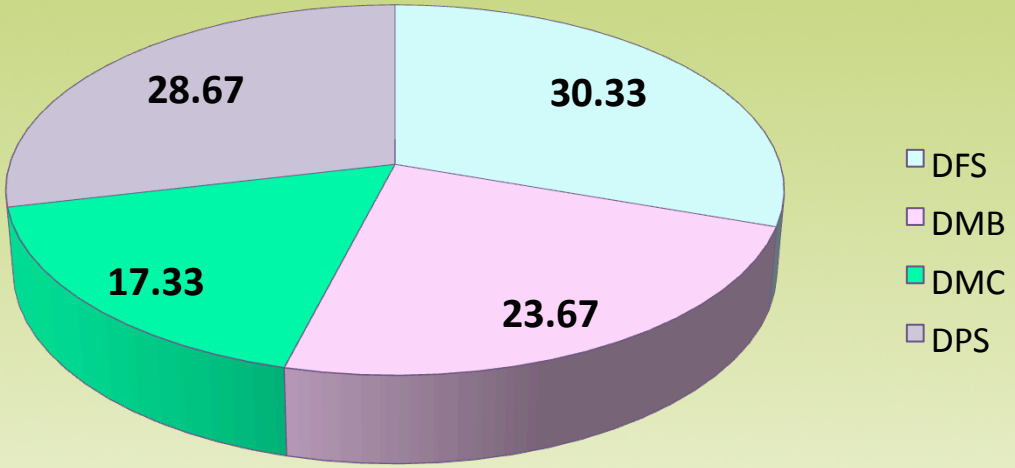
# Student's Demographic




**DFS: Diploma in Food Science & Nutrition**

**DMB: Diploma in Molecular Biotechnology**

**DMC: Diploma in Medicinal Chemistry**

**DPS: Diploma in Pharmaceutical Sciences**

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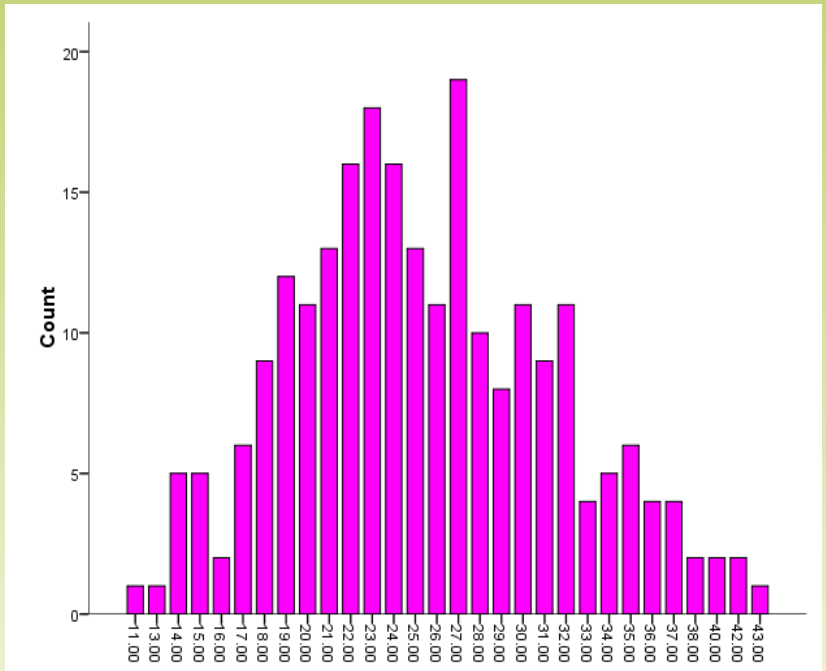
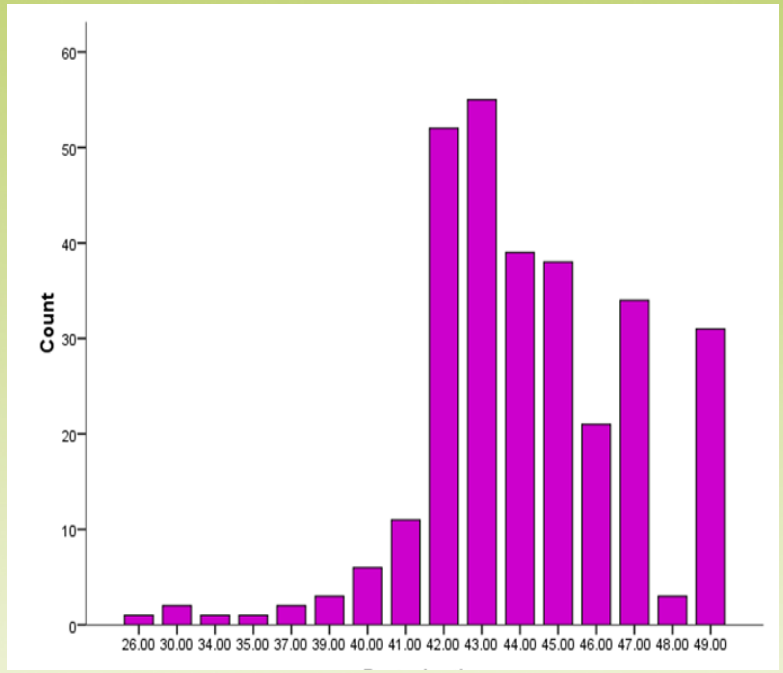
# Distribution of Marks

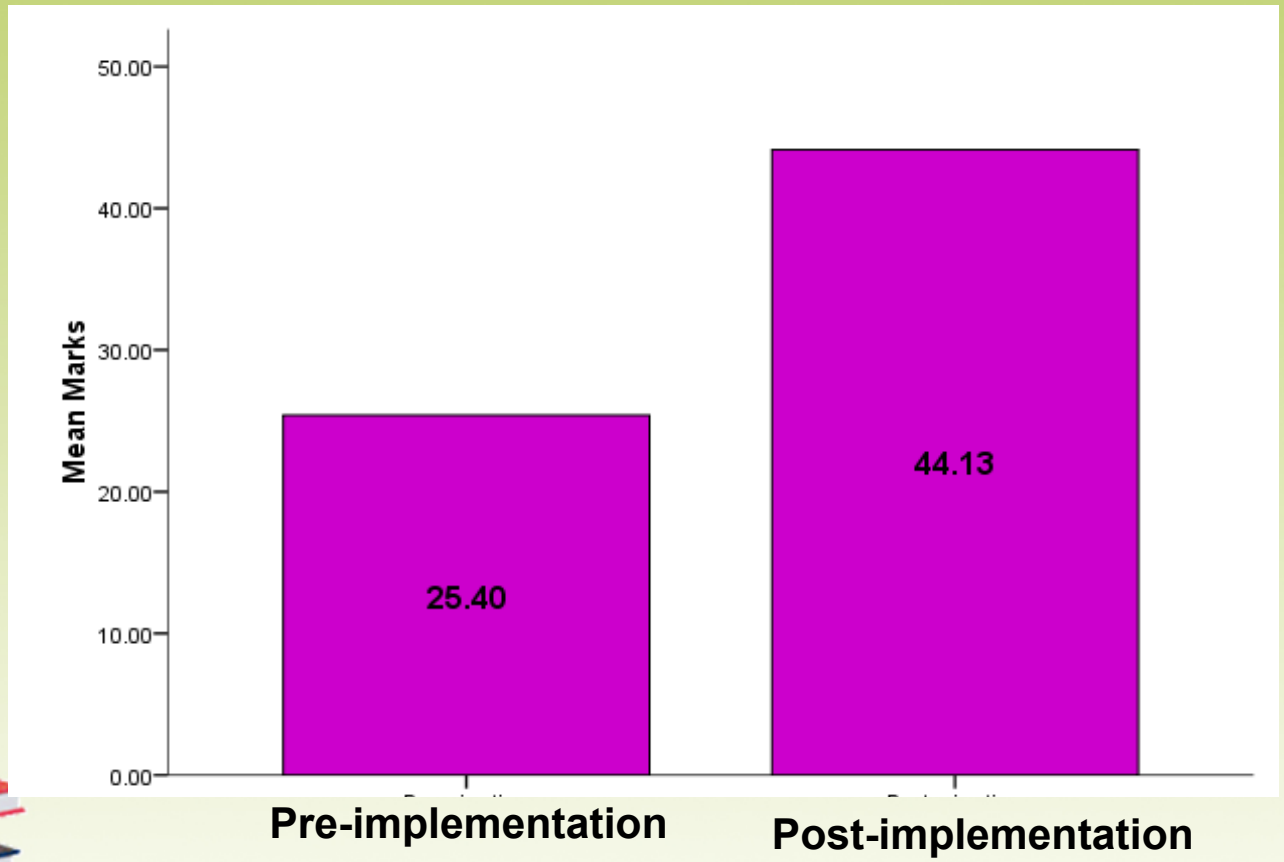



**Pre-implementation**

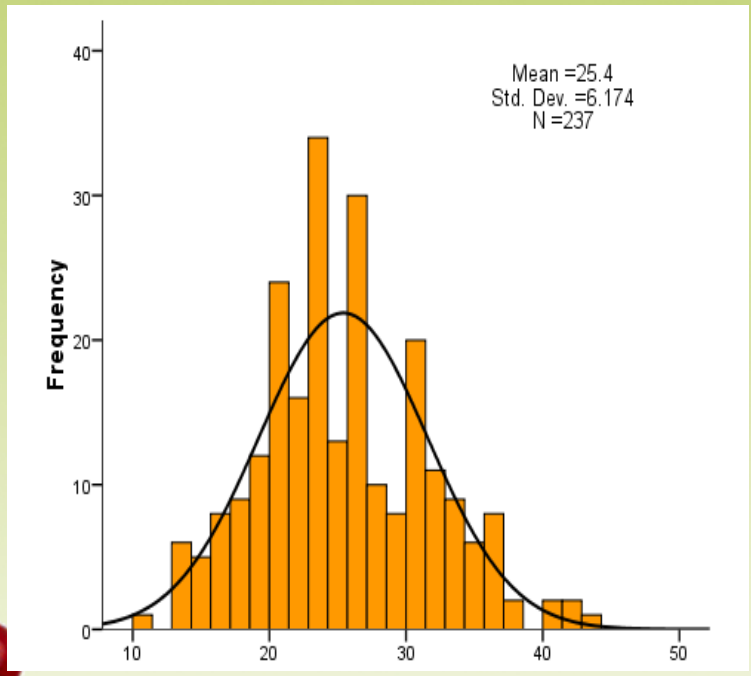



**Post-implementation**

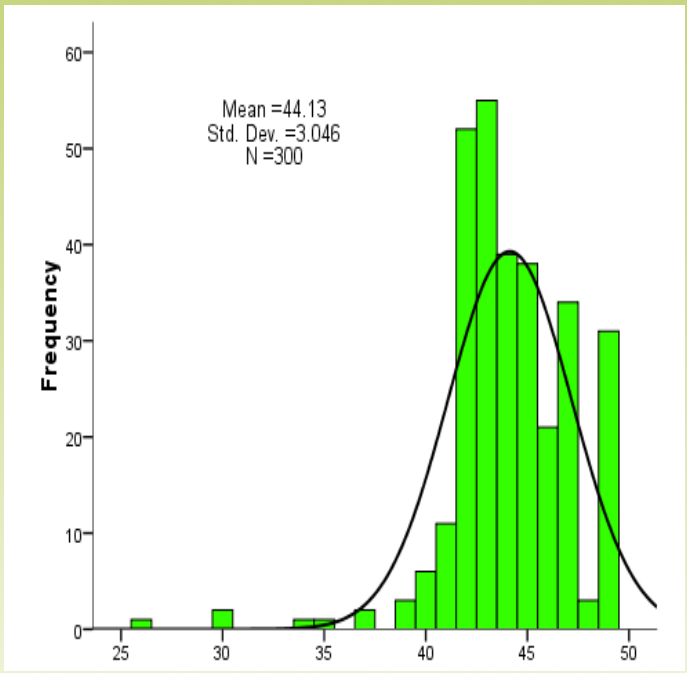
# Mean Marks Comparison




# Mean Marks Distribution

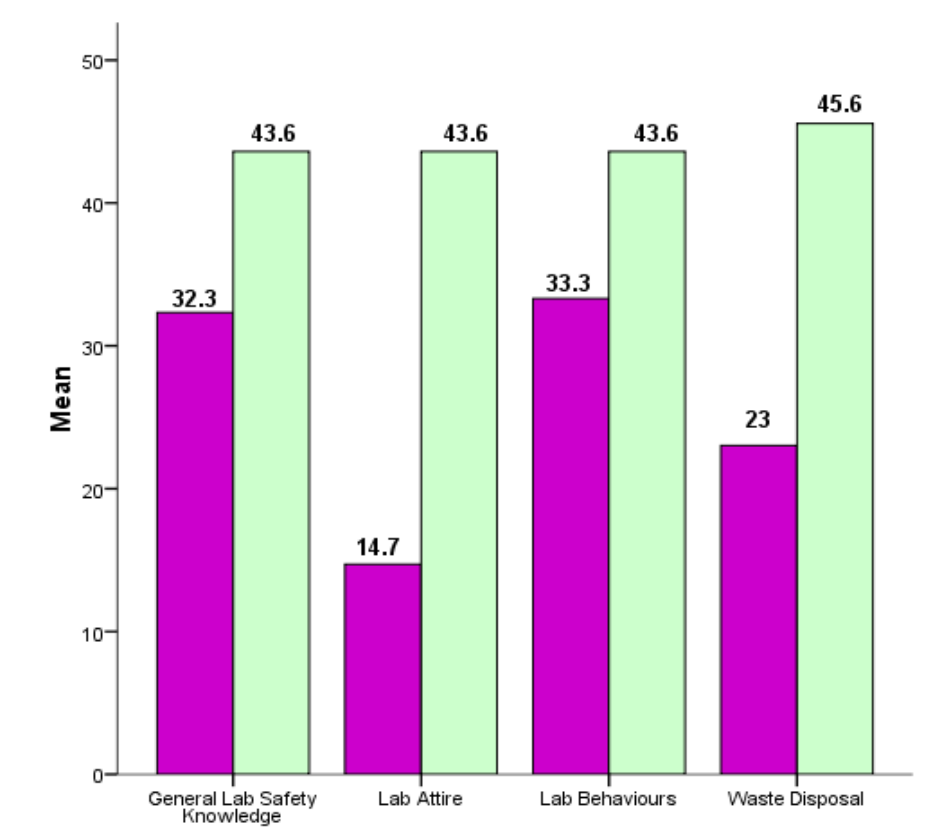



Pre-implementation




Post-implementation

# Mean Marks for Each Category




Before implementation

After implementation

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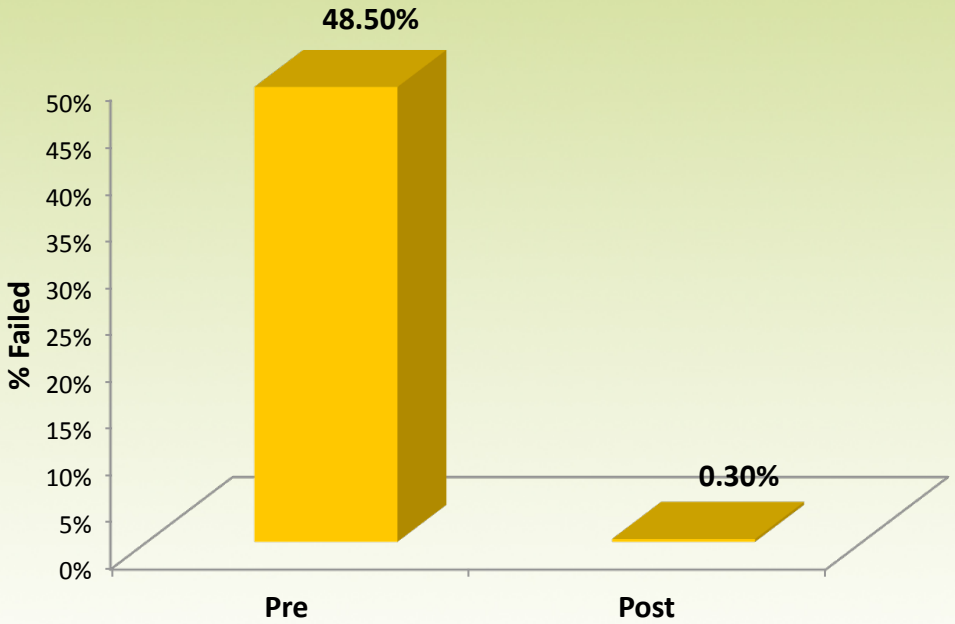
# Paired Samples T-Test

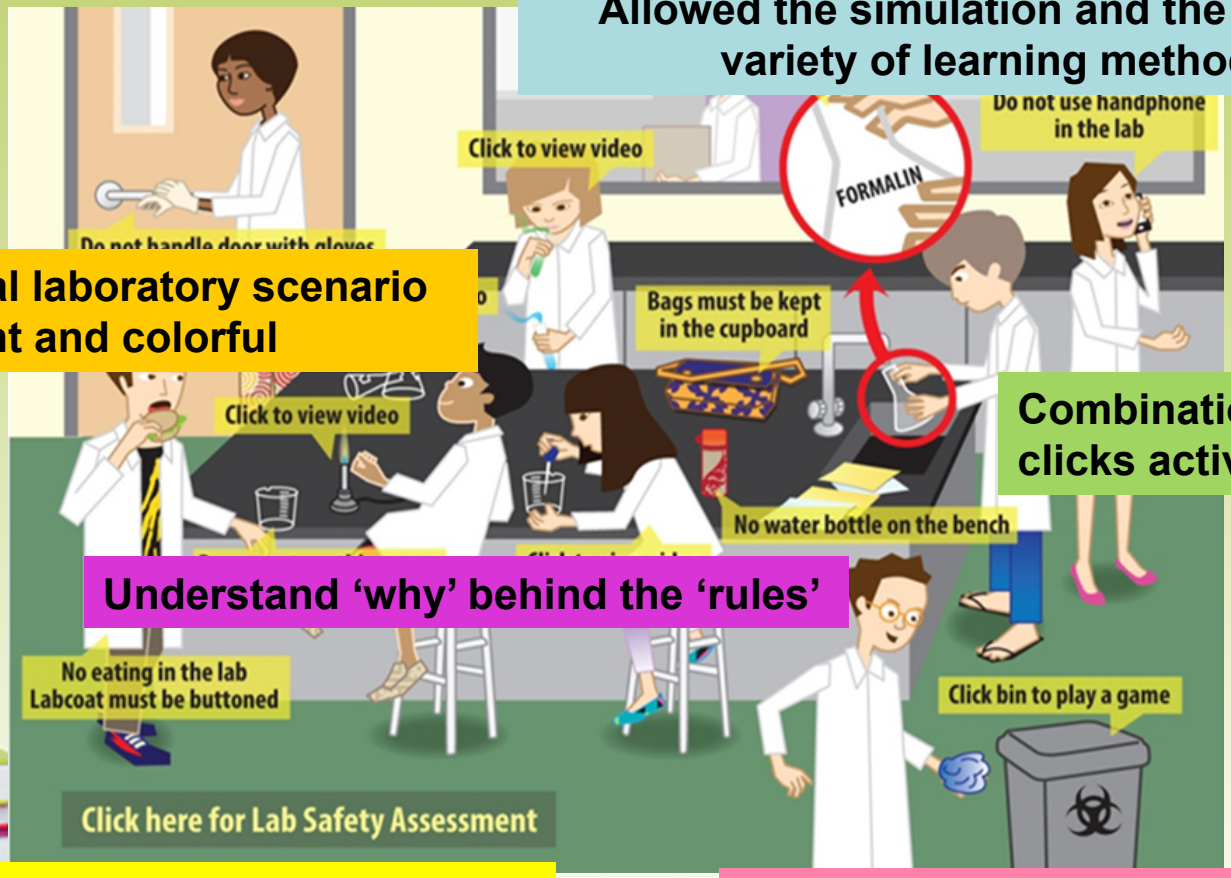
**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference Lower | Upper | | | |
| Pair 1 | Postanimation - Preanimation | 18.928 | 6.455 | .419 | 18.102 | 19.754 | 45.142 | 236 | .000 |




# Discussion

Allowed the simulation and the use of a variety of learning methods




Typical laboratory scenario
Vibrant and colorful

Combination of read and clicks activities

Understand ‘why’ behind the ‘rules’

Combining multiple forms of media together

Games with a direct purpose of teaching

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# Discussion

Our laboratory based interactive platform providing an active participation of the students through the interactive features certainly offers an approach for students to learn and to construct their laboratory safety attitudes more efficiently

# Conclusion

**We must redefine our role in teaching and learning of the laboratory safety**

**We have to address the changing pattern of the needs of the students for the learning**

# Our Team

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