The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The text is centered on the slide.

# That's Beautiful!

## Aesthetics and Science Education

Yore Kedem  
Assistant Professor of Hebrew  
Dept. of Linguistics & Germanic, Slavic,  
Asian and African Languages  
Michigan State University



# What For?

What are the goals of science education?

How do students grow?

What is experiential learning, and what is its role in science education?

What can we learn from aesthetics to teaching and learning design in science education?





# Things Every Student Should Know

Standards of knowledge

Skills

Measurement and Evaluation





# Conservative Teaching

Knowledge exists

Possessed by the teacher

Transferred to students

Measurement of knowledge / understanding / skills



# But...

The things of the spirit do not lend themselves easily to that kind of external inspection which goes by the name of examination. They do not lend themselves easily to exact quantitative measurement. Technical proficiency, acquisition of skill and information, present much less difficulty” (Dewey, 1901, p. 271).



# Creative Teaching

What do teachers create?

Can we teach teachers to be creative?



# Aesthetic Experience

[Beethoven Symphony no. 7 2<sup>nd</sup> movement](#)

Performed by Vienna Philharmonic, conducted by Leonard Bernstein (1978)

What happened here?

Temporal and complete

Unified by emotion and reaches culmination

Immersive

Can be understood only upon reflection

# Understanding an Experience

## Reflection

What happened?

How did I feel?

Why does it feel important?

## Perspective

An experience changes the understanding of prior experiences

Used to understand future experiences

Can bring deep conceptual change

Nuanced conceptual change



# Conservation and Creativity in Music Performance

## Conservative Interpretation

Truth originates from the composer

Traditions

Knowledge and skills

## Creative Interpretation

Understanding text itself

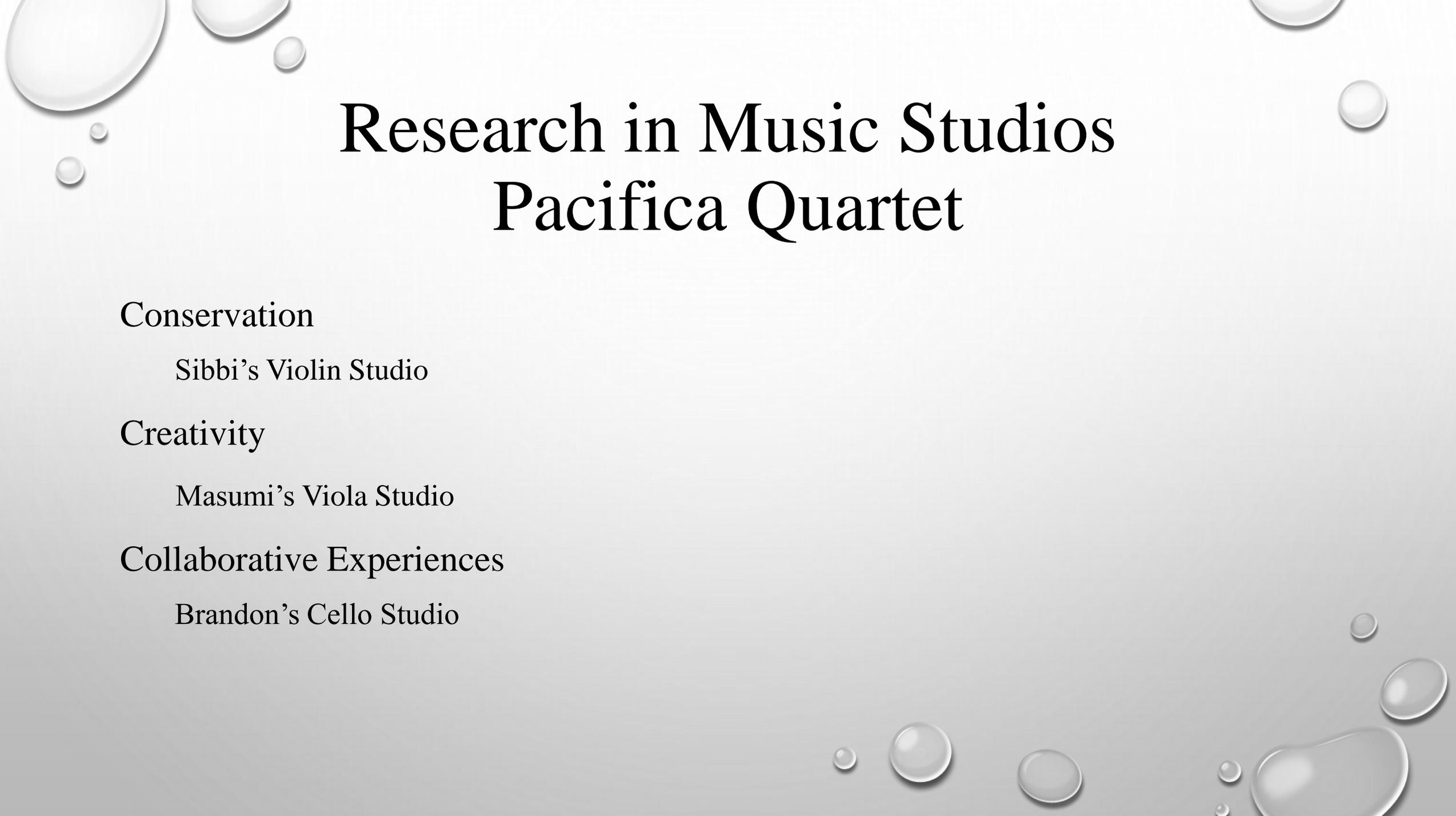
Understanding text through performance

Creating experiences



# Erlebniskunst (the Art of Experience) (Gadamer, 1988)

Erlebniskunst obviously meant originally that art comes from experience and is an expression of experience. But in a derived sense the concept of Erlebniskunst is then used for art that is intended for the aesthetic experience. Both are obviously connected. The significance of that, the being of which is to be the expression of an experience, cannot be grasped except through an experience (p. 63).



# Research in Music Studios Pacifica Quartet

Conservation

Sibbi's Violin Studio

Creativity

Masumi's Viola Studio

Collaborative Experiences

Brandon's Cello Studio



# Study Abroad in Israel

Inquiry-based courses

Creating connections between readings and students' experiences

Structured written and in-class reflections

Courses designed as an arch uniting experiences





# Change and Growth

## For Students

Significant understanding of central course topics

Dealing with emotion and conflict

Deeper understanding of course topics in personal, local, and global perspectives

## For Me

Continuous growth in understanding course topics

Understanding grows through interactions with students

Strengthening of educational identity







# Teachers as Crafts People

Teachers know and understand the material

Structure the material for the students

Demonstrate scientific notions

Develop scientific skills in students

Are able to assess students' knowledge and skill level based on standards



# Teaching as Art

## Teachers as Creators of Experiences

What experiences were meaningful for them?

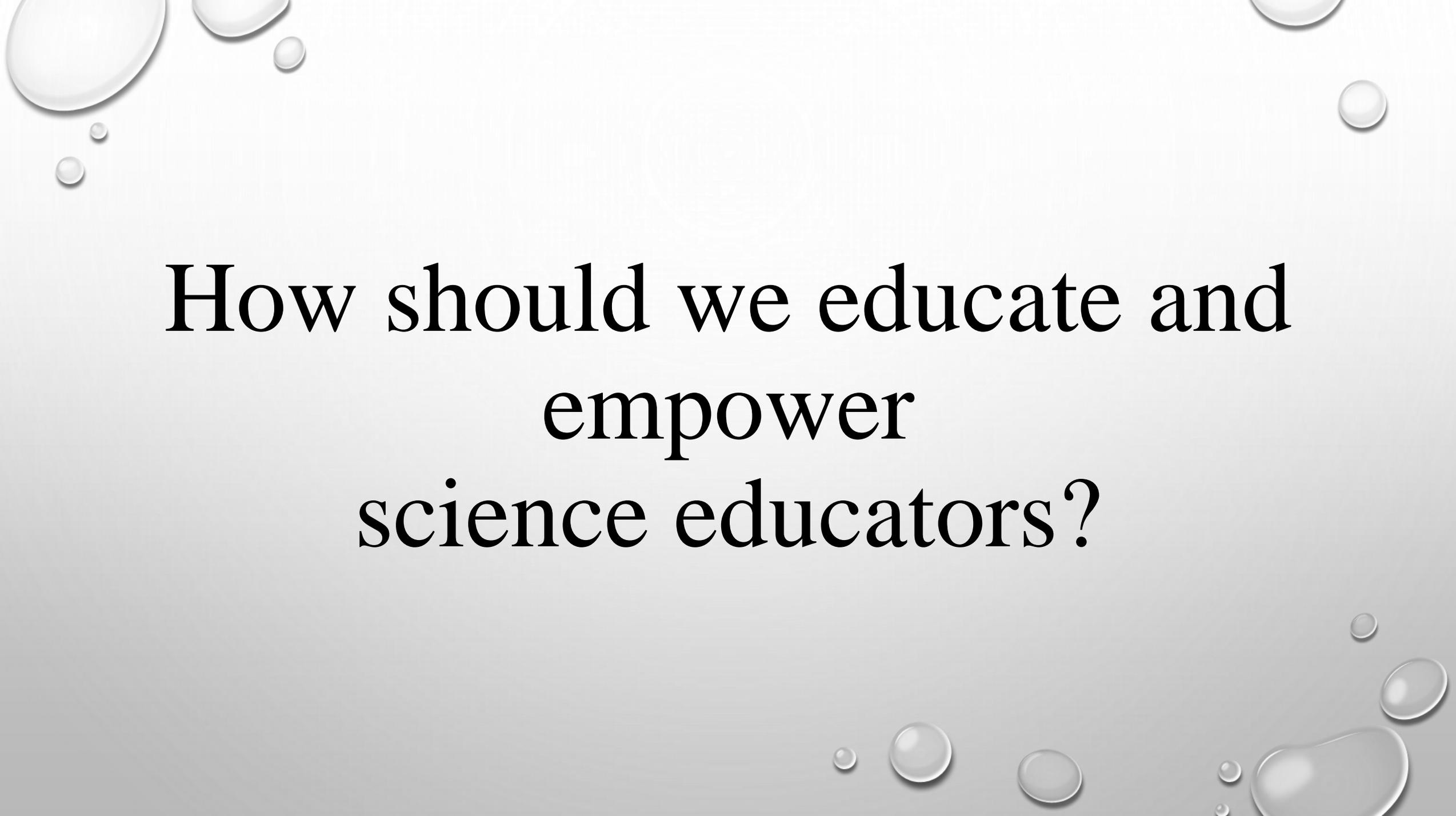
How has their understanding of the material changed?

How can they take scientific activities and use them to create meaningful experiences?

How are activities connected to material?

What reflective activities can be created?

How can this kind of learning be evaluated?

The background features a light gray gradient with several realistic water droplets of various sizes scattered in the corners. The droplets have highlights and shadows, giving them a three-dimensional appearance.

How should we educate and  
empower  
science educators?

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**Yore Kedem**  
**ykedem@msu.edu**