

Teaching Natural Resource Economics  
with Digital Learning Objects:  
Evolution from Chalk to Digital Ink

# Digital Learning Object (DLO)

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- A learning object is defined by IEEE as “any entity, digital or non-digital, that may be used for learning, education or training”

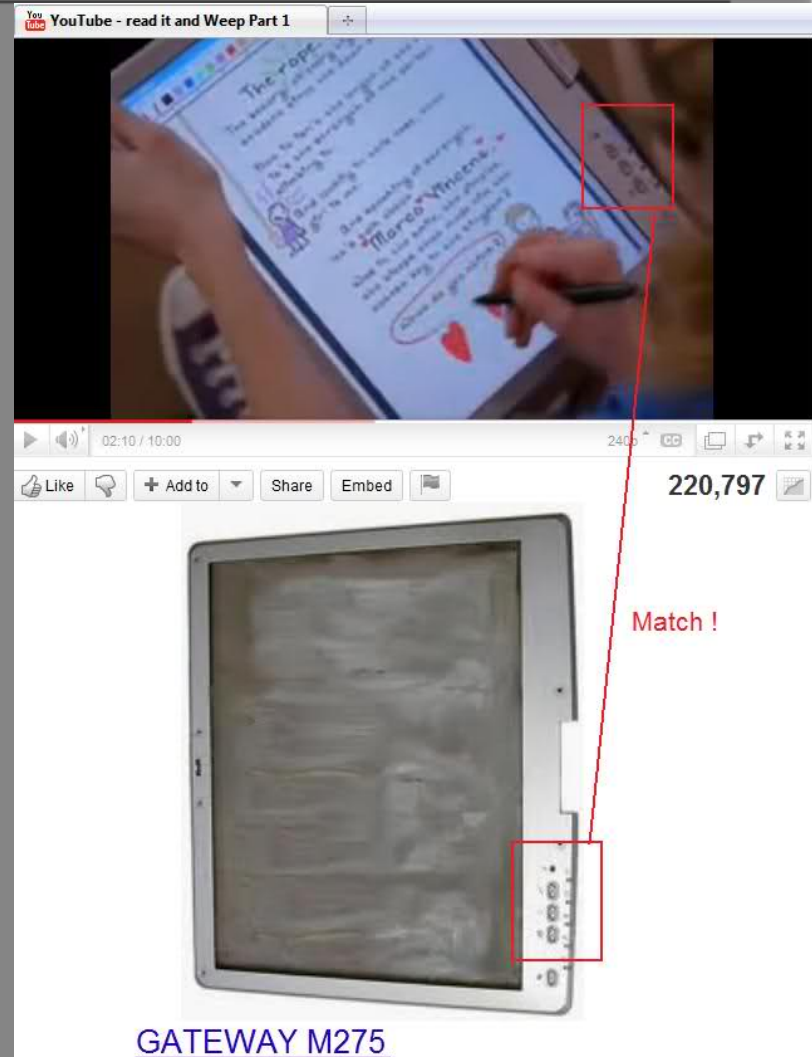
# History of Online Delivery at UTM

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- 8 year search for a “good” tool.
- Voice recording Solutions
  - Camtasia Studio
  - Adobe Presenter
  - Echo 360
- What is missing?
- Question: How can we develop a traditional chalkboard experience for students?

# Pen Solutions

- Tablet Technology
- Gateway Tablets (2004)
- Pro
  - Write and record step by step problems using Camtasia Studio.
  - Great for grading!
- Con
  - Expensive



YouTube - read it and Weep Part 1

02:10 / 10:00

2405

Like Add to Share Embed

220,797

Match !

GATEWAY M275

# Livescribe Smartpen

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- Familiar pen and paper format
- Digital handwritten ink and synchronous voice recording
- Uploaded to a website
- Assigned a URL

# Livescribe Desktop

Import Print
MyScript search all notebooks Search

**PAGES**  
 ▶ Imported Pencasts  
 ▼ Tim Echo  
 AGEC 784-785 New  
**AGET 720 - Schwab**  
 AGET 720 New  
 Lined Journal 2  
 Tutorial  
 ▶ Tim UTM  
 ▼ AUDIO  
 Sessions  
 ▼ APPLICATIONS  
 Smartpen Applications  
 ▼ CONNECT  
 Computer  
 Email  
 Evernote®  
 Facebook  
 Google™ Docs  
 MyLivescribe  
 Mobile  
 ▼ LIVESCRIBE ONLINE  
 My Livescribe  
 Livescribe Store

Problem 4.1  
 Present Location: NW Tern.

Eqn 4.1)  $q = 0.0028 C_i A^V$   
 Given:  $C = 0.4$ ,  $A = 80 \text{ ha}$ , Find  $i$ ?

Eqn 4.2)  $T_c = 0.0195 (L)^{0.77} (S_p)^{-0.385}$   
 $T_c = 0.0195 (610m)^{0.77} \left(\frac{\text{low}}{\text{width}}\right)^{-0.385} = 16.1 \text{ min}$

Find  $i$  Eqn 2.2 Find  $X, y$  (Table 2.1 & 2.2)  
 Find  $A, B, C, D$  for our location

$A = 1.6$   $B = 3.6$   $C = 3.1$   $D = 7.0$

Table 2.1 For 10 yrs Return  $X = 16.1$

Table 2.2 Min | (10) | Yr | (20)  
 $y$  | -37 | | -24  
 $\frac{y}{10} = \frac{X}{13}$   $X = 2.8$   $-37 + 7.8 = -29.2$   
 $y = -29.2$

$I = 0.0256 (3.1 - 1.6) [(6.1) + 0.000256 \{ (7.0 - 3.1) - (3.6 - 1.6) \}] [(6.1) + 29.2]$   
 $+ 0.01 (3.6 - 1.6) (-29.2) + 1.6$   
 $I = 1.14 \text{ inches} \times 25.4 \text{ mm} = 29.1 \text{ mm}$   
 $i = \frac{29.1 \text{ mm}}{0.2667 \text{ hr}} = 109.38 \text{ mm/hr}$

Eqn (4.1)  $q = 0.0028 (0.4) \left(\frac{173.8 \text{ mm}}{\text{hr}}\right) (80 \text{ ha}) = 11.99 \frac{\text{m}^3}{\text{sec}}$   
 $q = 12 \text{ m}^3/\text{sec}$

# Desktop Software

The screenshot displays the Livescribe Desktop application window. At the top, there is a title bar with the text "Livescribe Desktop" and standard window controls. Below the title bar is a toolbar with icons for Import, Pencast, Community, Evernote, PDF, AAC, and Print. To the right of the toolbar is a search bar labeled "search all notebooks" and a "MyScript" logo.

The main area of the application is a grid of 12 thumbnails, each representing a page of handwritten notes. The thumbnails are numbered 14 through 25. The notes are written in blue ink on a white background and contain mathematical derivations and equations. For example, page 14 shows the derivation of the area of a circle, and page 25 shows a derivation of the area of a triangle.

On the left side of the application, there is a sidebar with a "PAGES" section. This section is divided into "Imported Pencasts" and "Tim's SmartPen". Under "Tim's SmartPen", there are several items listed: "AGET 720 S&W", "AGET-AGEC 784", "Tim's Notebook #A", "TNB Journal 2009-10", "TNB Journal 2010-11", and "Tutorial". Below the "PAGES" section, there are sections for "AUDIO" (Sessions), "APPLICATIONS" (Smartpen Applications), and "LIVESCRIBE ONLINE" (My Livescribe, Livescribe Store).

At the bottom of the application window, there is a taskbar with several icons, including a network icon, a volume icon, and a system clock showing the time 1:00.

# Livescribe Link Page

Livescribe Desktop

Import Print

MyScript search all notebooks Search

STORE COMMUNITY UNITED STATES

home > my livescribe

Sharing Preferences

- Email a Friend!
- Download as PDF
- Get a link to this file
- Share on Facebook
- Embed this file
- Share on our Community

Make this File Private Edit Access List

APP STORE BETA

This page belongs to You

**This file is currently public**  
Visitors will not be required to log in to view this file.

**AGET 720 Problem 7.2**

Posted by: You on: Mar 14, 2011

File Size: 1.7MB  
Category: Unspecified  
Views: 2  
Rating: ★★★★★  
Description: click to edit...

Viewer Comments  
Be the first to add a comment!

Add a Comment

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6

**Problem 7.2**  
Table 7.2 (p. 158)  $s = 4\%$   
 $v_p = 1.5v_{sp}$   $q = 1.5v_{sp}$   
 $q = v_{sp}$   
 $v_{sp} = 1.5v_{sp}$   
 $v_{sp} = 1.5v_{sp}$   
**Fig 7.1**  $a = \frac{v_{sp}}{t}$   
 $R = \frac{v_{sp}}{t}$   
Reference class P  
 $v_{sp} = 1.5v_{sp}$  From Fig 7.7  $v_{sp} = 1.5v_{sp}$   
 $R = 0.2$   $R = \frac{v_{sp}}{t}$   $\therefore t = 0.3$   
 $a = \frac{v_{sp}}{t}$   
 $0.13 = \frac{v_{sp}}{0.3}$   
 $\therefore t = 4.15$   
 $D = 0.3 + 0.1 = 0.4$   
 $T = 4.15(1.5) = 6.225$

**AGET 720 Problem 7.2**  
Views: 2  
★★★★★

**AGET 720 Problem 7.4**  
Views: 3  
★★★★★

**AGET 720 Problem 9...**  
Views: 5  
★★★★★

**AGET 720 Problem 9...**  
Views: 5  
★★★★★

**AGET 720 Problem 1...**  
Views: 7  
★★★★★

**AGET 720 Problem 1...**

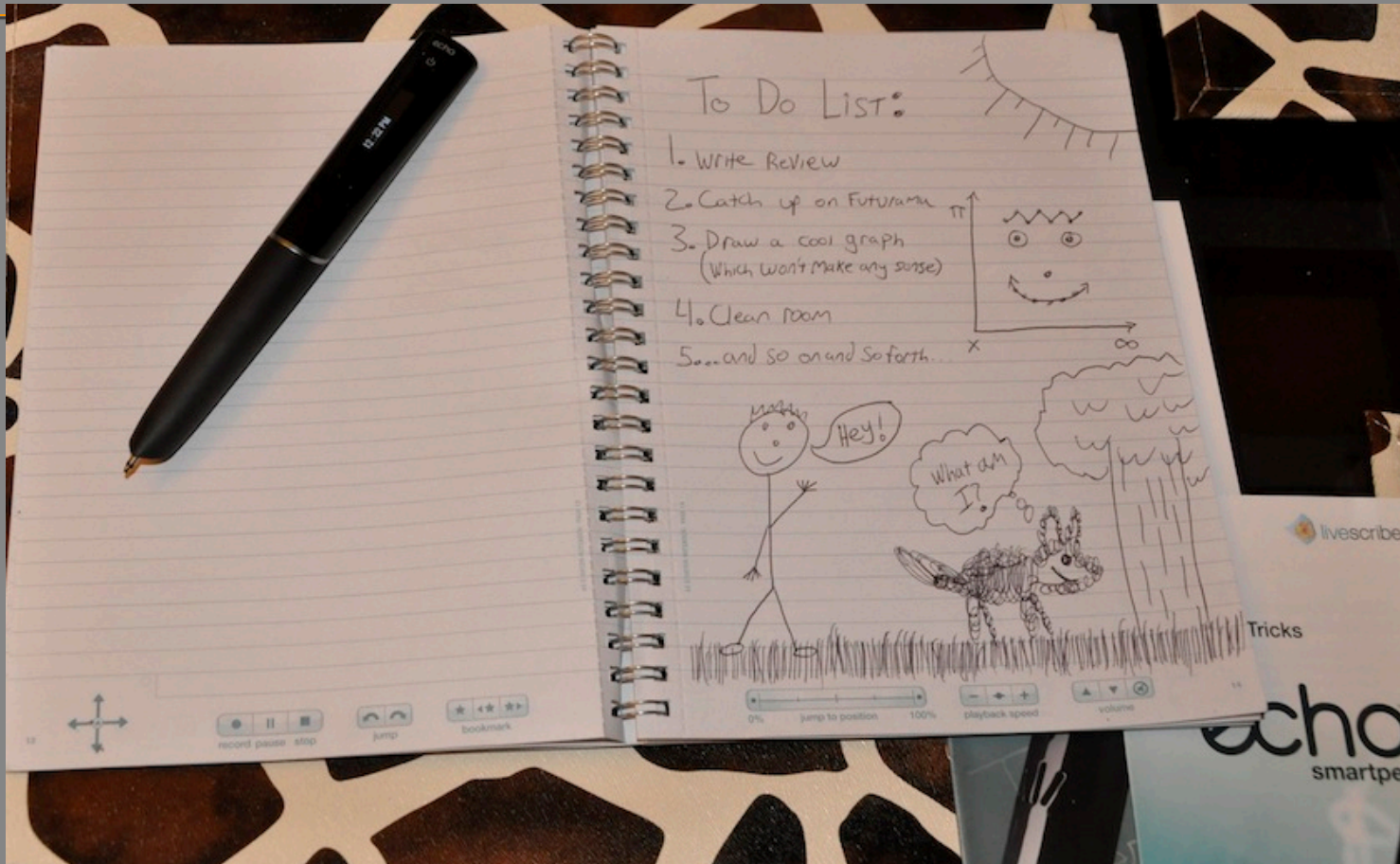


# SmartPen Design

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- Livescribe Pulse & Echo Smartpens looks like a somewhat large pen. They are a bit thicker than a regular pen, but they don't feel abnormally large or heavy.
- The ink pen is simply an INK PEN. The specially encoded paper is still just PAPER!
- So how does it write? – Just like pen and paper!

# What Can I Write?



**Anything You Want!**

# Echo Smartpen Overview



# Echo - What's in the Box

4 Gb \$169 & 8 Gb \$199

## Contents of the Echo Smartpen Package



**Starter Dot Paper Notebook**

**Interactive Getting Started Guide**

**Smartpen Tips and Tricks**

**2 Smartpen Caps**

**Echo Smartpen and Included Apps**

**2 Ink Cartridges**

**Standard Micro USB Cable**

**Livescribe™ Desktop Software (Download)**

**500MB of Online Pencast Storage**

# Using the Livescribe Smartpen

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- Turn It On!
- Write on the Special Livescribe dot-encoded paper.
- If you want it to record your voice, simply Click the “Record Button” and Click the Stop Button when you want to Stop recording audio.
- You can “Tap” anywhere on the notes you have written, and it will play back the audio that occurred at that time.

# Previous Experiences: Undergraduate Students

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Undergraduate Survey at UTM

# Measure of Effectiveness

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- Three semesters of class data for AGET 110
  - Class A - Spring 2010-traditional lecture based teaching methods (**Control**)
  - Class B - Fall 2010 - traditional lecture based teaching methods and DLOs created with the Smartpen
  - Class C - Spring 2011 - traditional lecture based teaching methods and DLOs created with the Smartpen
- Student Survey

# Student Survey Outcomes

Class B responses (n=30)

<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>Somewhat</b>
Did you access the DLOs when completing your homework?	23	7	
Did you access the DLOs when studying for your exam?	23	7	
Did you find them helpful?	21	4	5

Class C responses (n=49)

<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>Somewhat</b>
Did you access the DLOs when completing your homework?	41	8	
Did you access the DLOs when studying for your exam?	30	19	
Did you find them helpful?	32	7	10



# Statistical Analysis

## Average Exam Scores

<b>Class</b>	<b>Exam 1</b>	<b>Exam 2</b>	<b>Exam 3</b>	<b>Final Ex</b>
A (n=28)	83.4	62.0	73.3	71.9
B (n=30)	83.8	64.8	77.7	79.9*
C (n=48)	74.7*	74.8*	77.4	74.9

\*Significant at the 0.01 level

Class A (**Control**) had no DLOs available.

# Student Perceptions

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- Students perceived the DLOs were advantageous to them
- DLOs were accessed for exam preparation an average of 60%
- Final Survey
  - Overall opinion of the DLOs for the course

# Student Perceptions

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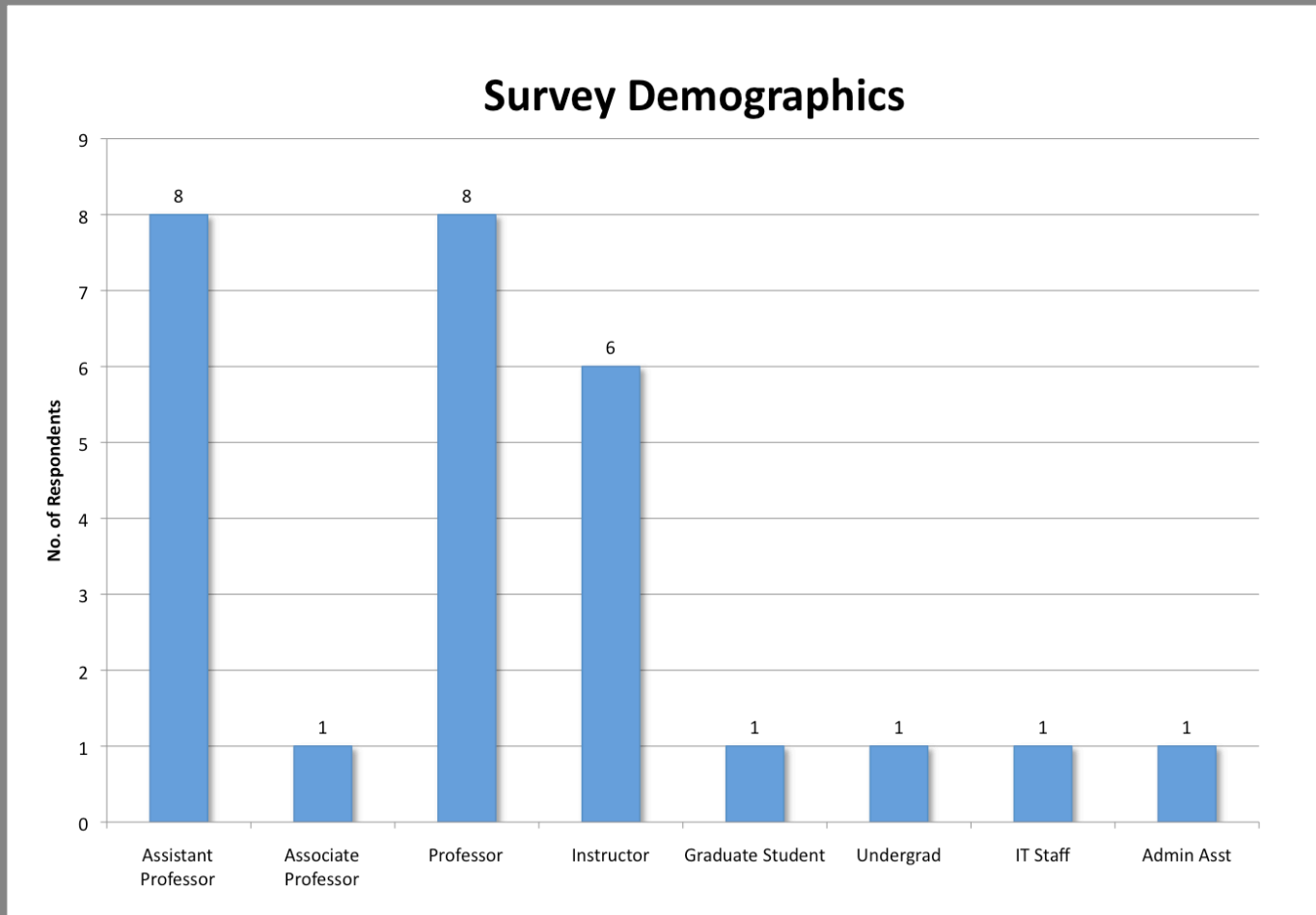
- ◎ “Did you find them helpful?”
  - ◎ Class B – 87% found DLOs helpful or somewhat helpful
  - ◎ Class C – 86 % found DLOs helpful or somewhat helpful
- ◎ “Please rate your overall opinion of the availability of the DLOs and their helpfulness for this course.”
  - ◎ Class B (86%)
    - ◎ Very positive – 33%
    - ◎ Positive – 53%
  - ◎ Class C (89%)
    - ◎ Very positive – 56%
    - ◎ Positive – 33%

# Previous Experiences: Faculty

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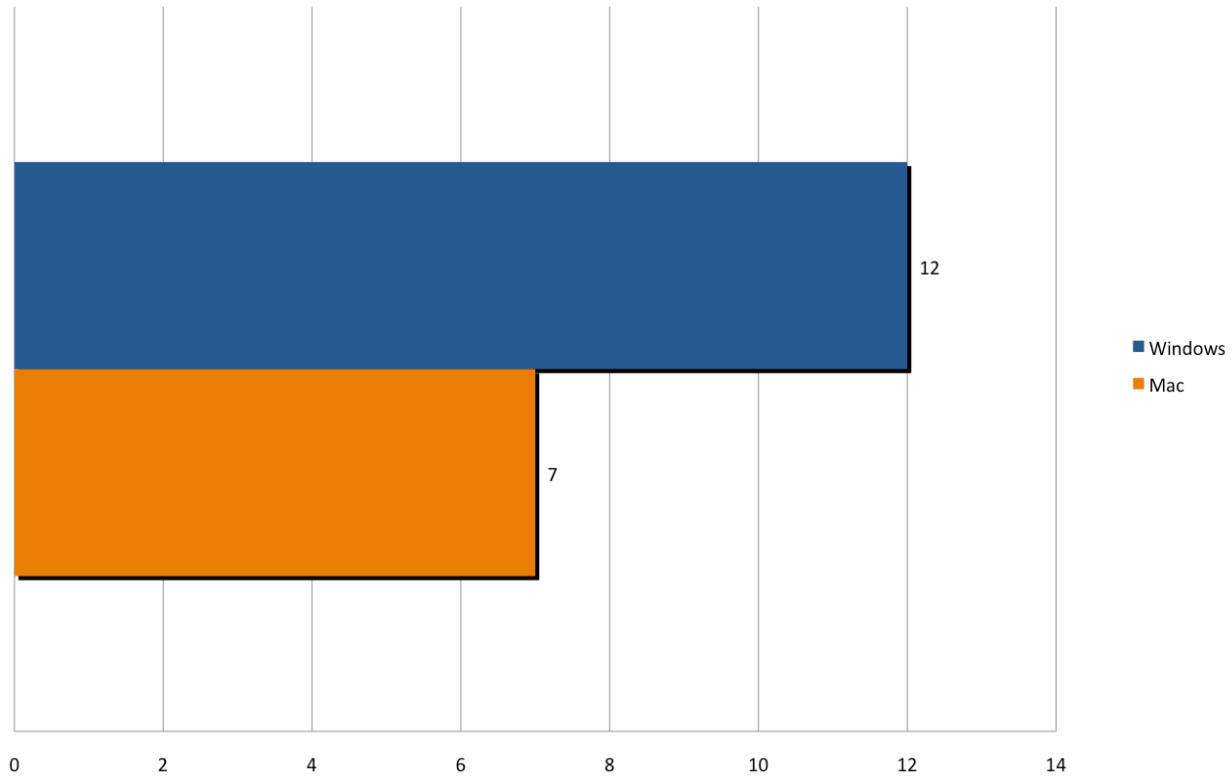
Faculty Survey

# Who Responded to the Survey? (n = 27)

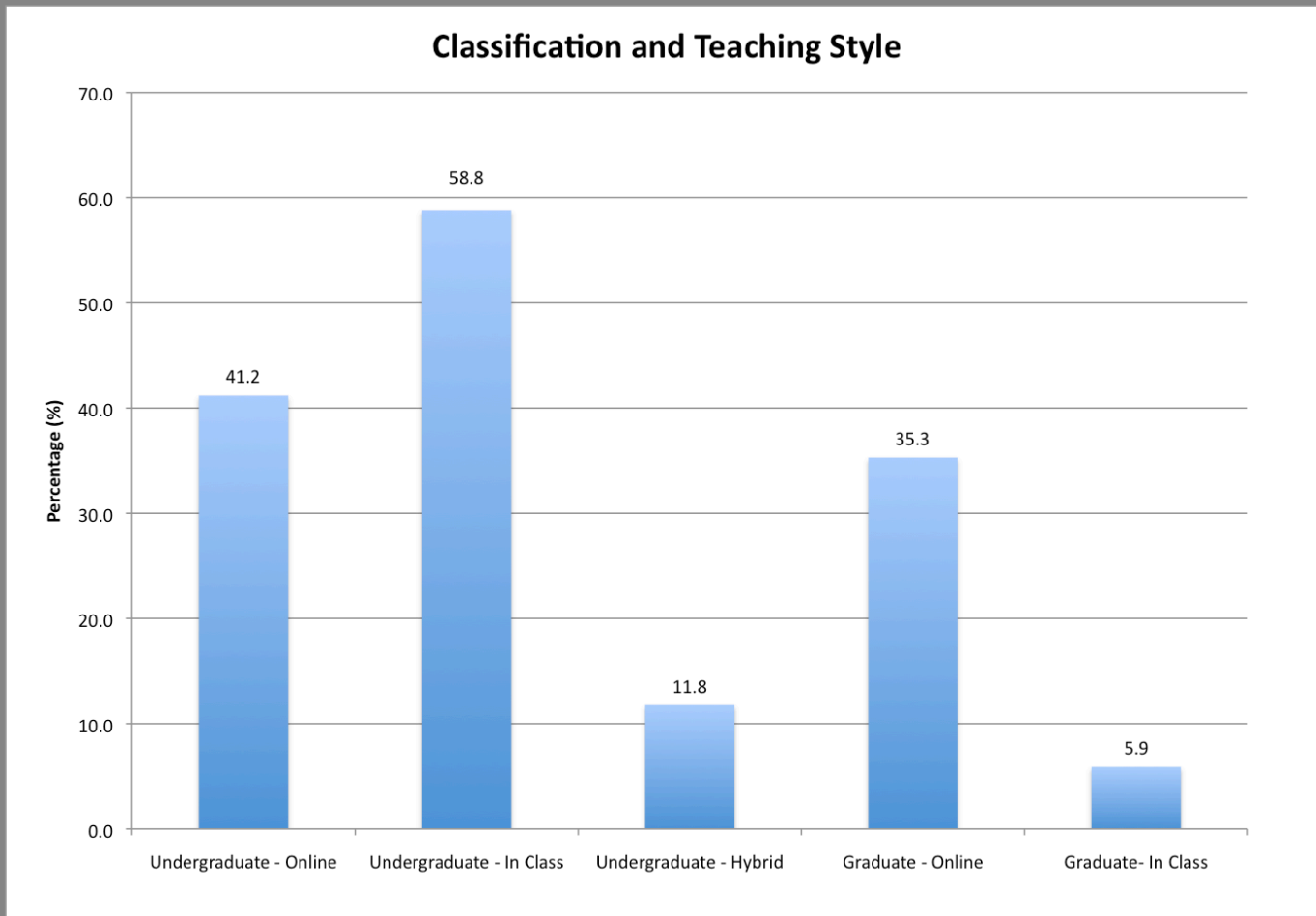


# Windows or Mac

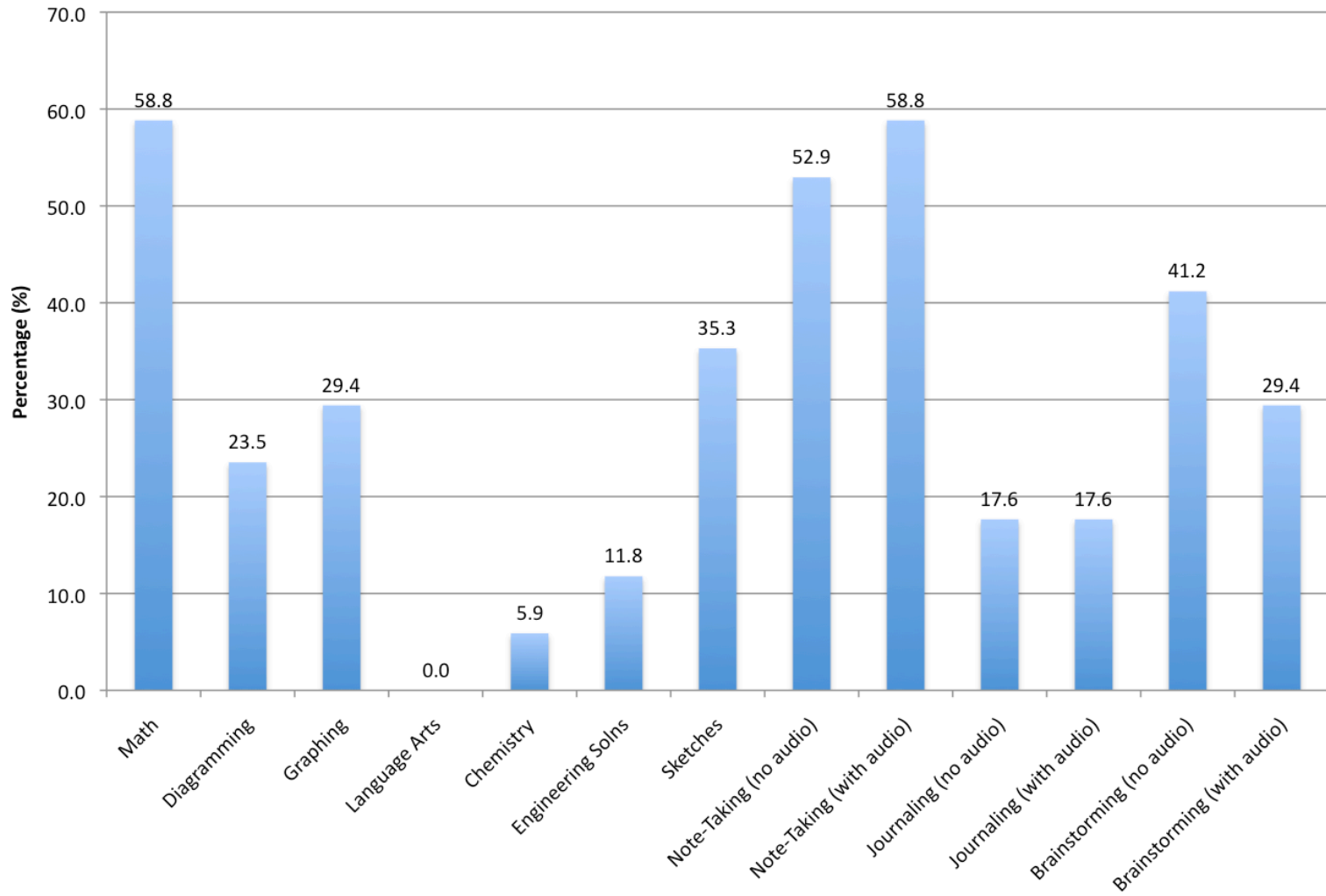
Do you have a Windows or Macintosh based computer?



# Teaching Style

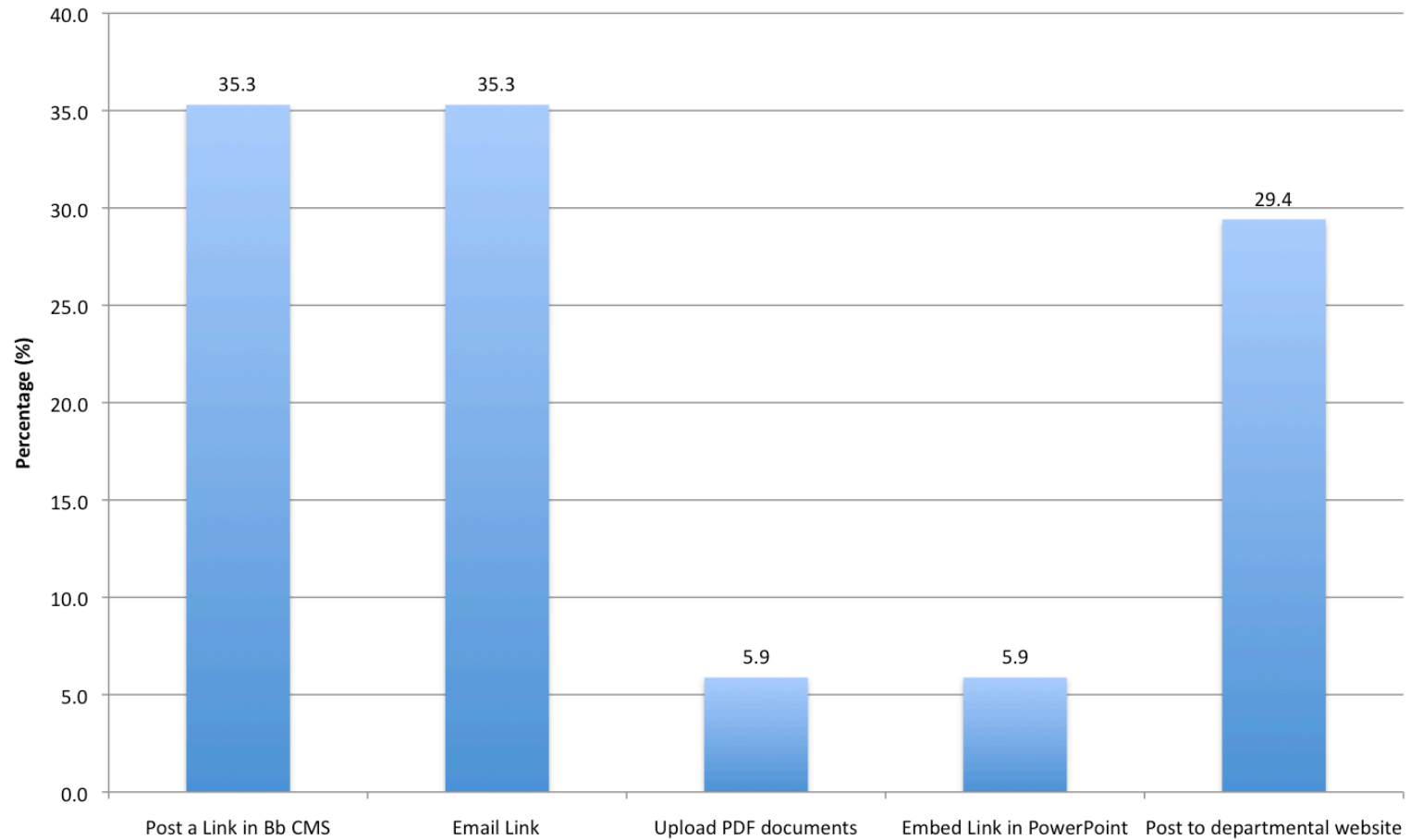


## Livescribe Usage



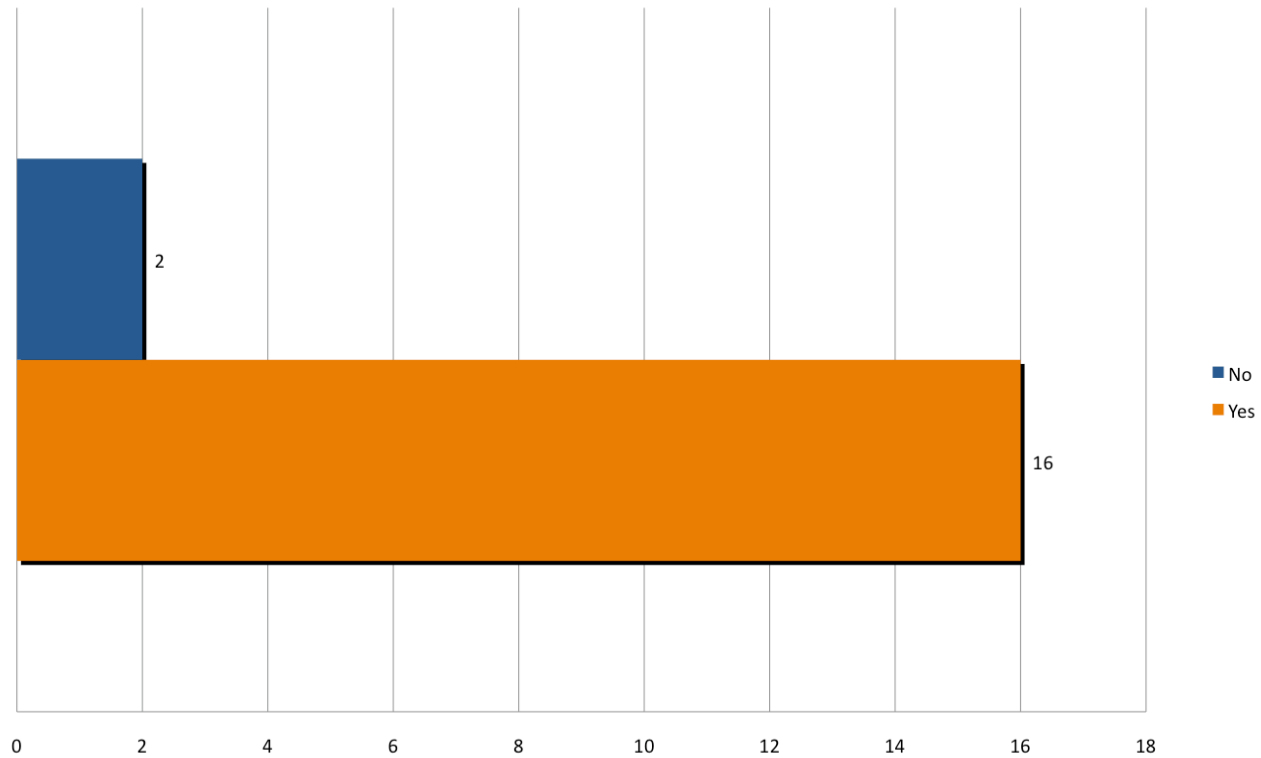


## How do you share your Livescribe teaching modules with others?



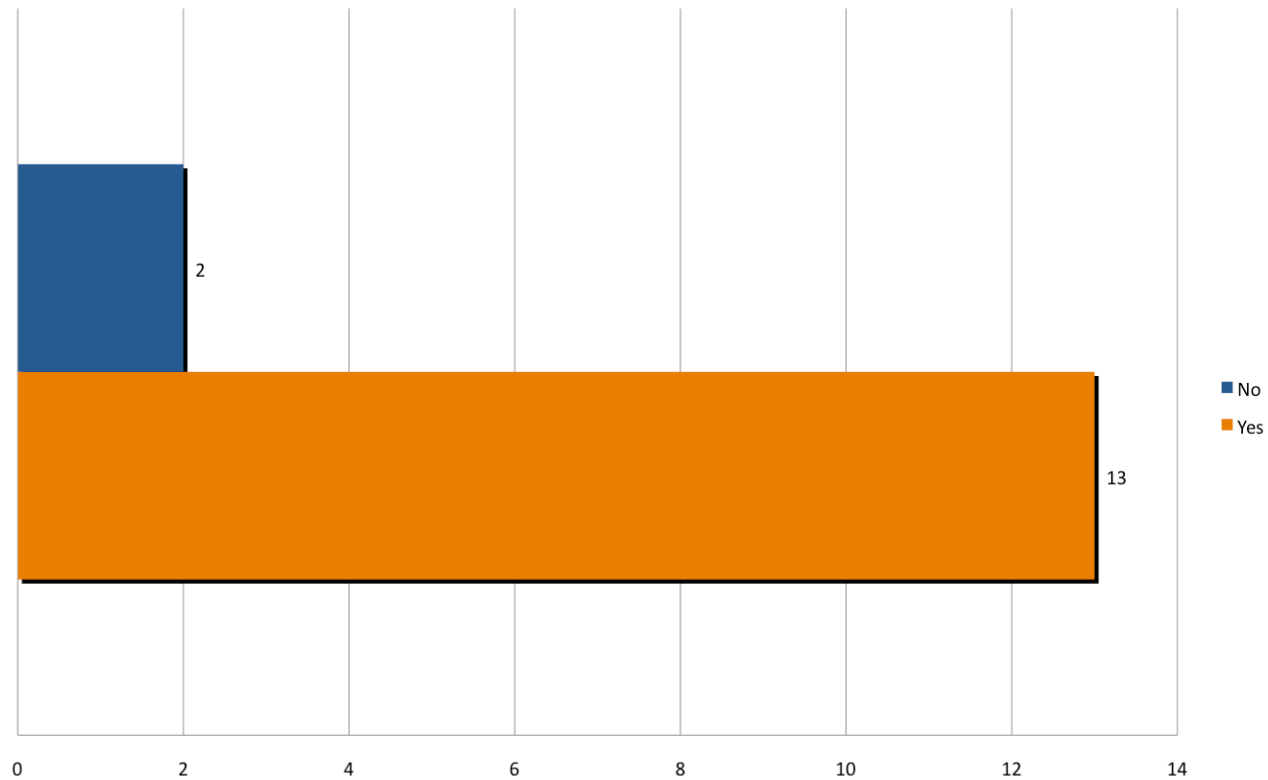
# Easy to Install?

Was the Livescribe Pulse Pen easy to install?



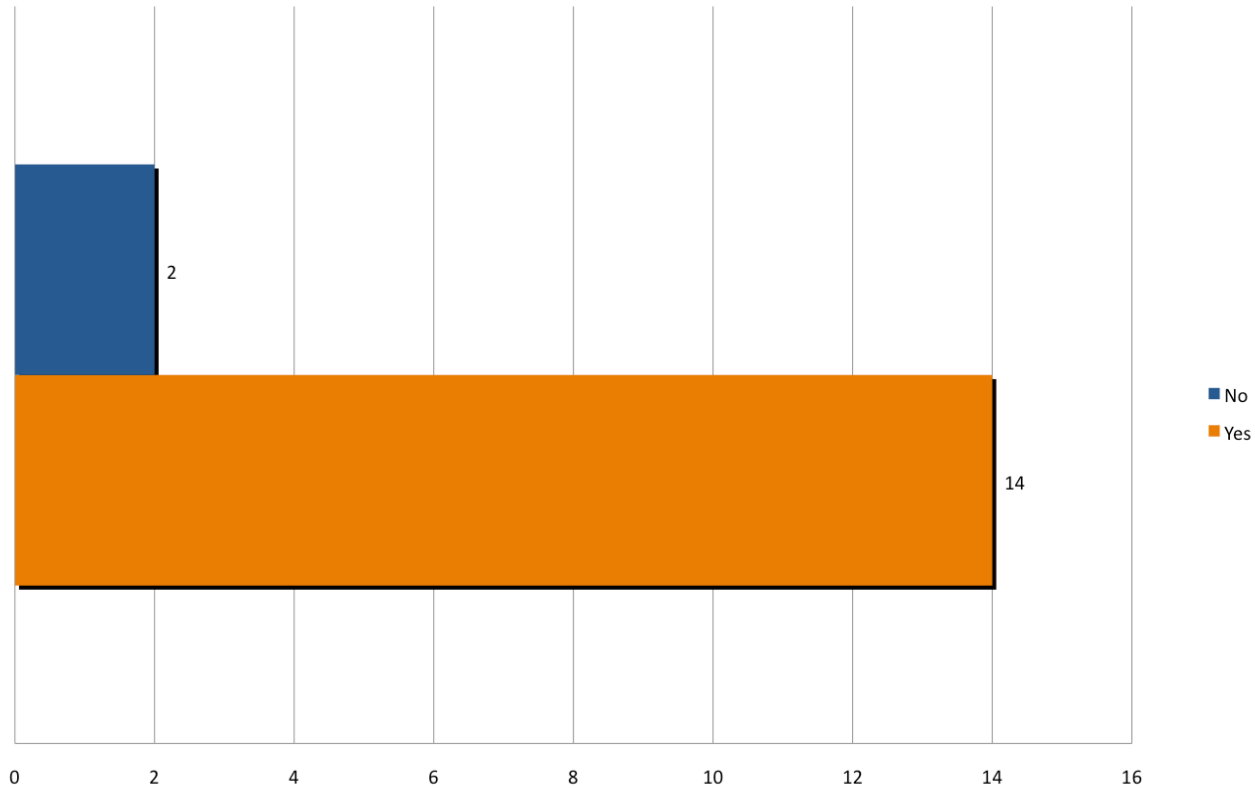
# Save Time?

Does the Livescribe Pulse Pen save you time?



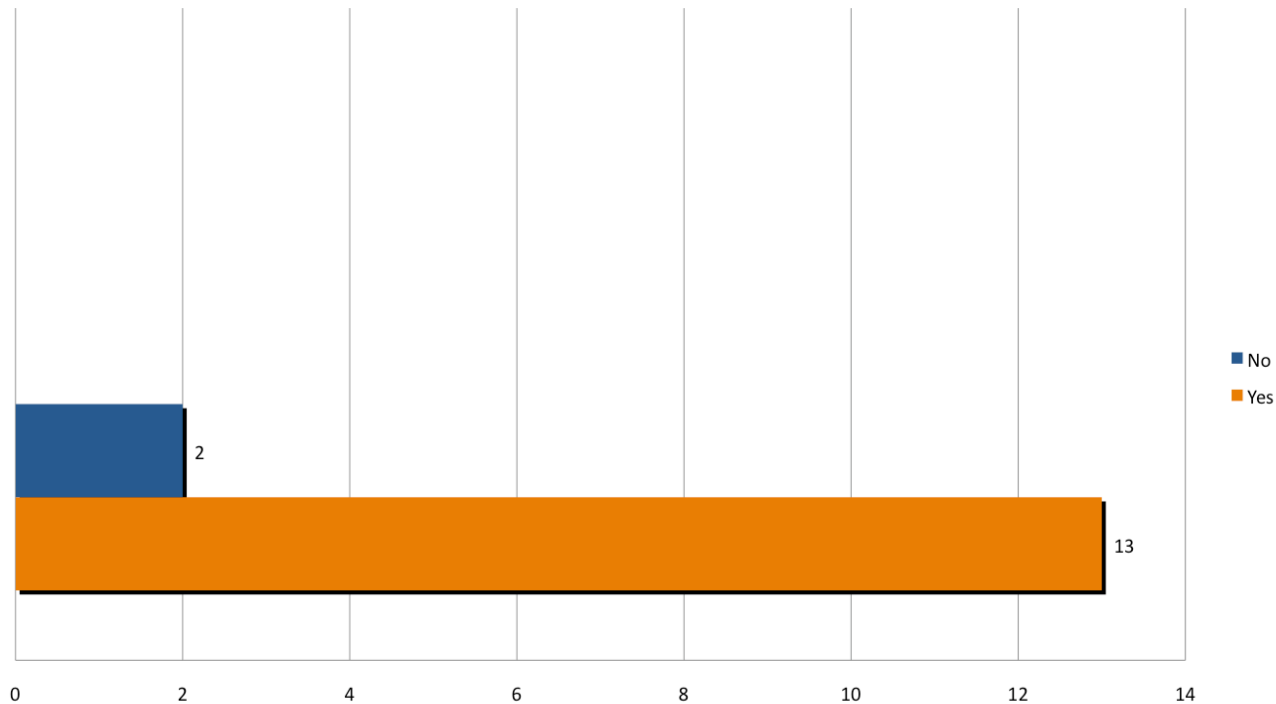
# Would You Recommend the Livescribe?

Would you recommend the Livescribe Pulse Pen to a colleague?

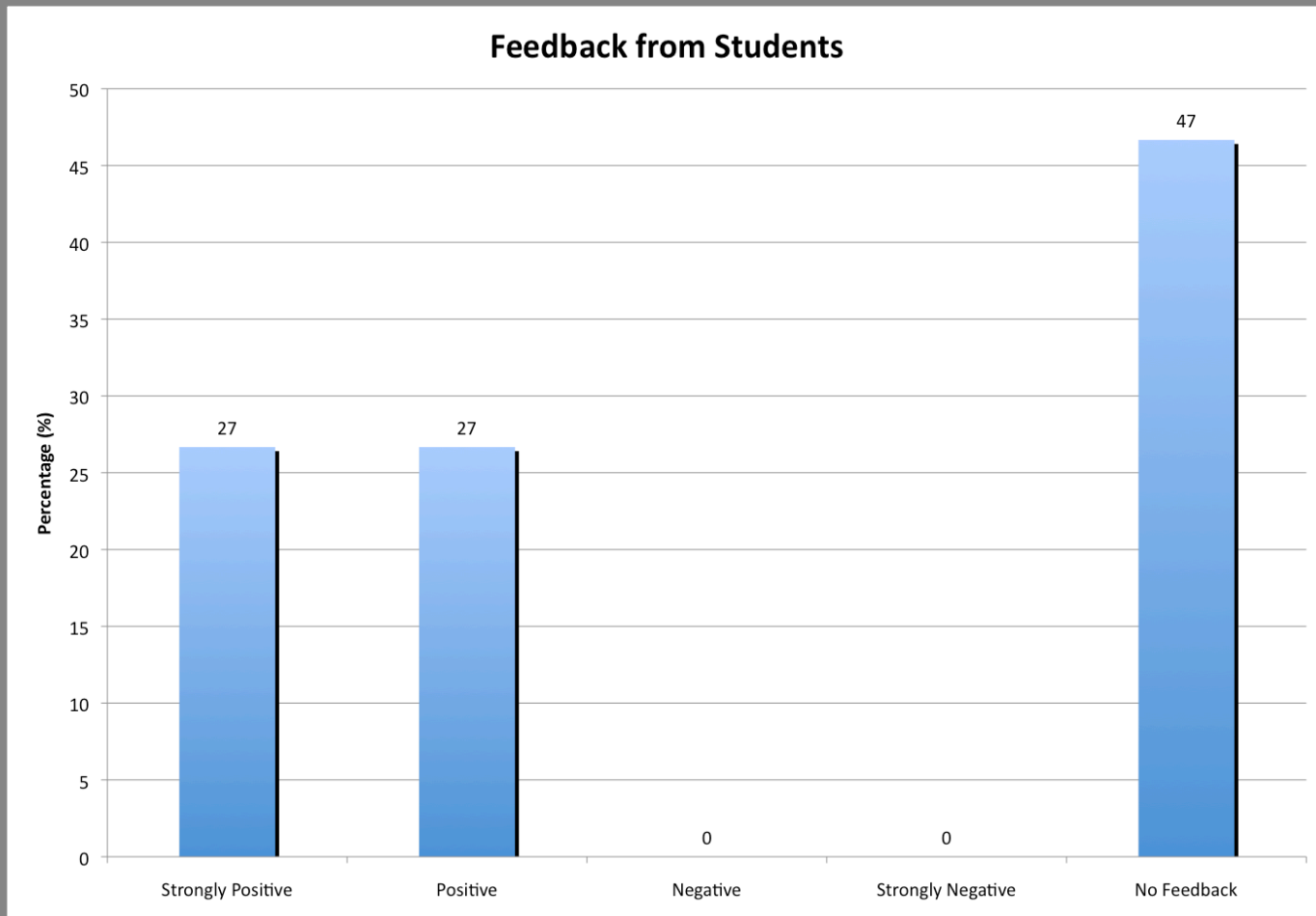


# Enhance Ability to Develop Learning Objects?

Does the Livescribe Pulse Pen enhance your ability to develop meaningful Learning Objectives?



# What are students saying?



# Conclusions

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- The Livescribe Smartpen provides a user-friendly digital interface for traditional pen and paper mathematical solutions with voice
- Helpful in engaging students outside the classroom
- Great advantage of accessibility for students
- More inclusion in courses in the Department of Agriculture, Geosciences and Natural Resources

# Example of Problem Solving

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- Example Problem (Dr. Sandy Mehlhorn)
- Welfare Analysis Graph: Externalities  
(NRM 730)