



# Augmenting Reality in a Plant Science Lab

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augmented reality

# puzzle

zap the puzzle and it comes to life...



## MARVEL ULTIMATE SPIDER-MAN

Actual puzzle image on back of box

48 Piece Puzzle 15 inches x 11.25 inches (38.1cm x 28.6cm) Cardina



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the code!

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TURFGRASS MANAGEMENT



# Taken with a bird's-eye view

**Feathers in filmdom's cap.** Rio 2's macaw Tyler Blu latest bird to vie for a perch in Hollywood's avian pecking order



**IN FOCUS**  
Richard Crouse  
scene@metronews.ca

Hollywood's two most famous birds must be Donald Duck and Woody Woodpecker. Between them they've starred in almost 300 films.

This weekend Donald and Woody are joined by Tyler Blu Gunderson, a rare male Spix's macaw, voiced by Jesse Eisenberg making his second big screen appearance in Rio 2. He's joined by a cast of fine feathered friends, including a yellow canary (Jamie Foxx), a rapping red-crested cardinal (will.i.am) and a sulphur-crested cockatoo (Jemaine Clement), as they leave their home in Rio de Janeiro for the Amazon rainforest.

The colourful co-stars in Rio 2 are animated, which makes them a much more greeable lot than Timi



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# What is Augmented Reality?

- Augmented reality is the integration of digital information with the user's environment in real time.
- Unlike virtual reality, which creates a totally artificial environment, augmented reality uses the existing environment and overlays information on top of it



# AR Potential Implications in a Learning Environment

- Yuen et al., 2011

- ✓ Enhance collaboration between students and instructors and among students
- ✓ Foster student creativity and imagination
- ✓ Help students take control of their learning at their own pace and own path
- ✓ Engage, stimulate, and motivate students to explore class materials from different angles
- ✓ Help teach subjects where students could not feasibly gain real-world experience (astronomy)

Journal of Education Technology  
Development and Exchange. 4:119-140

- Determine the impact of using an augmented reality app for mobile devices on content retention of students enrolled in an introductory plant science laboratory



- PSS 1313: Plant Science
  - ✓ Spring, 2015
  - ✓ 50 students
- PSS 1313 Lab
  - ✓ 3 lab sections (~16 students/lab)
- Used AR in 3 different lab exercises
  - ✓ Vegetable planting, weed walk, turf tour











Video #1 - Intro. EDIT DELETE

00:00 00:44

Video #2 - Mowing EDIT DELETE

00:00 00:14

Video #3 - Topdress EDIT DELETE

00:00 00:33

Video #4 - Brushing EDIT DELETE

00:00 00:31

Video #5 - Roll EDIT DELETE

00:00 00:14

Contact EDIT DELETE

**Christian Baldwin**  
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LAST PUBLISHED: 13TH APR 22:24 PREVIEW

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DOWNLOAD PICK COLOR

BACKGROUND SOUND

NONE



- Two instruments (1-5 scale)
  - ✓ PRE
    - Start of the semester
  - ✓ POST
    - End of the semester

- Post lab quizzes (10 points)

- ✓ “Weed walk” lab

- Section 1 – AR
- Section 2 – No AR
- Section 3 – No AR

- ✓ All lab sections took a quiz two days later

## Data Analysis

- PROC GLM in SAS
- ✓  $P \leq 0.05$

# Student Quiz Scores

## Augmented reality vs. professor led laboratory

Lab Section	Vegetable Planting	Weed Walk	Turf Tour
1	6.8a	5.8ab	7.6b
2	6.0ab	6.6a	8.5ab
3	5.6b	5.4b	9.0a

Vegetable Planting: Section 1 used ZAPPAR. Sections 2 and 3 had a traditional laboratory meeting.

Weed Walk: Section 2 used ZAPPAR. Sections 1 and 3 had a traditional laboratory meeting.

Turf Tour: Section 3 used ZAPPAR. Sections 1 and 2 had a traditional laboratory meeting.

Total possible points: 10

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<b>Question</b>	<b>Instrument</b>	<b>Mean</b>
<sup>1</sup> Level of satisfaction	POST	4.12

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<sup>1</sup>What is your level of satisfaction with the augmented reality app component of this lab?

<sup>2</sup>What is the likelihood of you recommending this course, with the use of the ZAPPAR app, to future students?

Scale of 1 to 5, with 1 = *poor*, 2 = *fair*, 3 = *good*, 4 = *very good*, and 5 = *excellent*



# Summary

## *Student comments*

### ■ Favorite aspects

- ✓ “It is a new way to learn about information and it is fun to learn more through the videos and pictures that were provided ”
- ✓ “The information in videos you could access. It is amazing to access that on the fly”
- ✓ “Its interactive and shows material in a more interesting way than a textbook or handout”
- ✓ “Interesting, different way to learn”

# Summary

## Student comments

- Least favorite aspects
  - ✓ “Not being able to just look at a handout”
  - ✓ “Hard for all three of us to hear”
  - ✓ “If you have questions, you can't ask them”
  - ✓ “I don't have streaming for videos”
  - ✓ “Having to hold my device and trying to take notes at the same time”

- Student content retention
  - ✓ Improved with the use of AR
  
- Student led presentations
  
- Student interaction
  
  
- Future Research
  - ✓ Impact of AR on the teaching assistant

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