

# Microlearning with Mobile Devices: Effects of Distributed Presentation and the Testing Effect

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## Overview

Learning anywhere at anytime is not a new concept. Books have been available for centuries and were probably the first “mobile” learning device. What is new is access to interactive learning content, contact and communication with teachers and other students, and assessment through mobile devices and smartphones.

**This study is grounded in more than a century of research and literature.**

- Spaced or Distributed Presentation learning (DP) provides more effective learning outcomes and improved recall. (Ebbinghaus, 1913; Craik, F.I.M, 1970; Gates, 1917; Melton, 1970; Raaijmakers, 2003)
- The Testing Effect improves long-term memory and retrieval of information. (Gates, 1917; Roediger and Karpicke, 2006; Johnson and Mayer, 2009)
- Microlearning content consists of small learning units and short-term-focused activities and can support instructional materials and larger curriculum goals. (Hug 2005)
- Two-thirds of Americans' own smartphones and 86% of those ages 18-29 have a smartphone. (Pew Institute, 2015)
- Smartphone usage continues to increase and is almost at the saturation point, as compared to desktop and laptop adoption which has remained flat or decreased. (Pew Institute, 2015)

## The problem

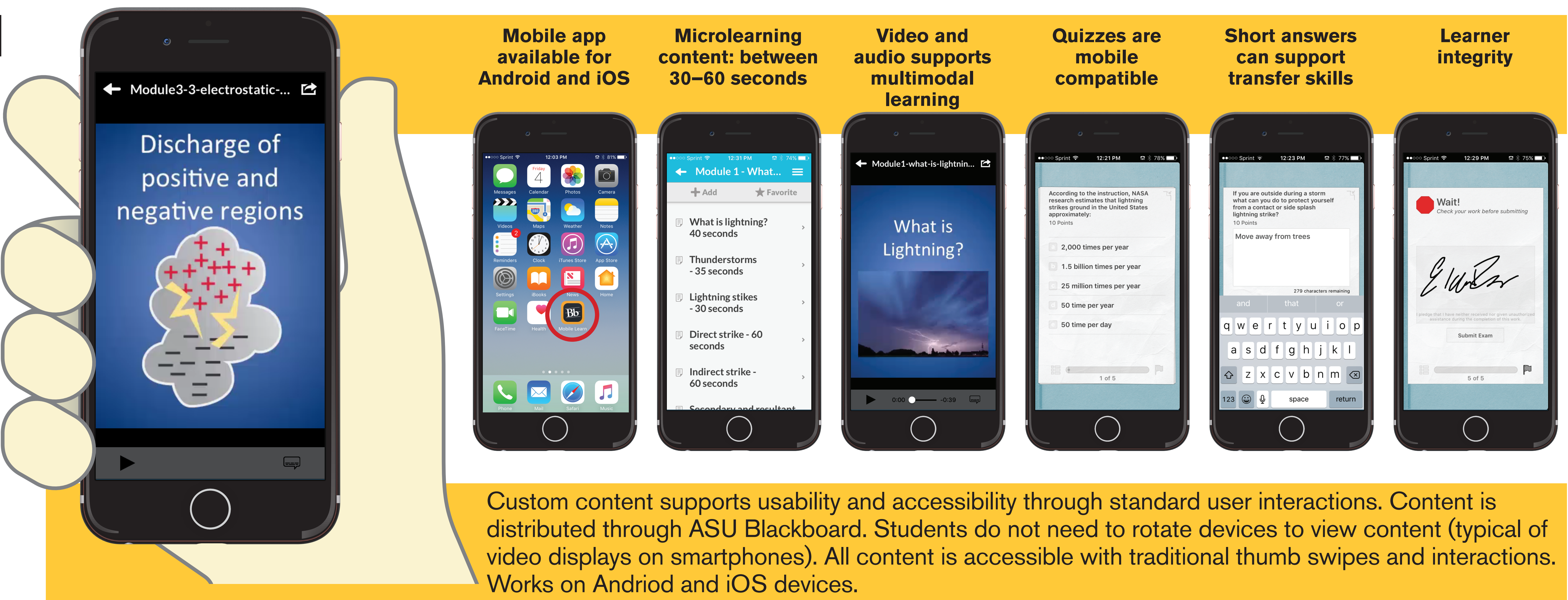
- Instructors are unprepared to integrate mobile technologies in learning (Chen and Denoyelles, 2013)
- Students prefer to use personal mobile devices for social interactions, rather than learning or contacting instructors (Dahlstrom, 2012)
- Most higher education is based on multi-hour lectures or Massed Presentation (MP) which is less effective than DP for learning (Ramen, et. al., 2010)

## Hypotheses

- **H1** = There is a relationship between DP microlearning and learning outcomes.
- **H2** = There is a relationship between testing and learning outcomes.
- **H3** = There is a relationship between students' attitudes about using personal mobile devices and a willingness to engage in learning on their devices.

## Goals

- Explore limitations of mobile learning and student attitudes about mobile learning.
- Provide insight and guidance for development of mobile learning in higher education.
- Develop best-practices for faculty to integrate mobile learning into curriculum.



## Research design

### Quantitative research

#### Independent variables

- Time of assessment after instruction
- Pace of delivery of instruction

#### Dependent variables

- Learning outcomes
- Completion rate of microlearning modules
- Performance on quizzes
- Attitudinal surveys

## Participants

This research has been reviewed and approved by the Social Behavioral IRB, STUDY00003713. Participants are being recruited through a wide variety of sources.

- **My ASU web banner** — participants are entered into a prize drawing for Amazon gift cards
- **ASU Sport teams** — participants receive community service
- **ASU Fraternity** — participants receive community service
- **ASU extra credit** — participants receive extra credit through various instructors
- Students may be classroom based or online

## 2 x 2 Factorial

### Time of Assessment Main Effect

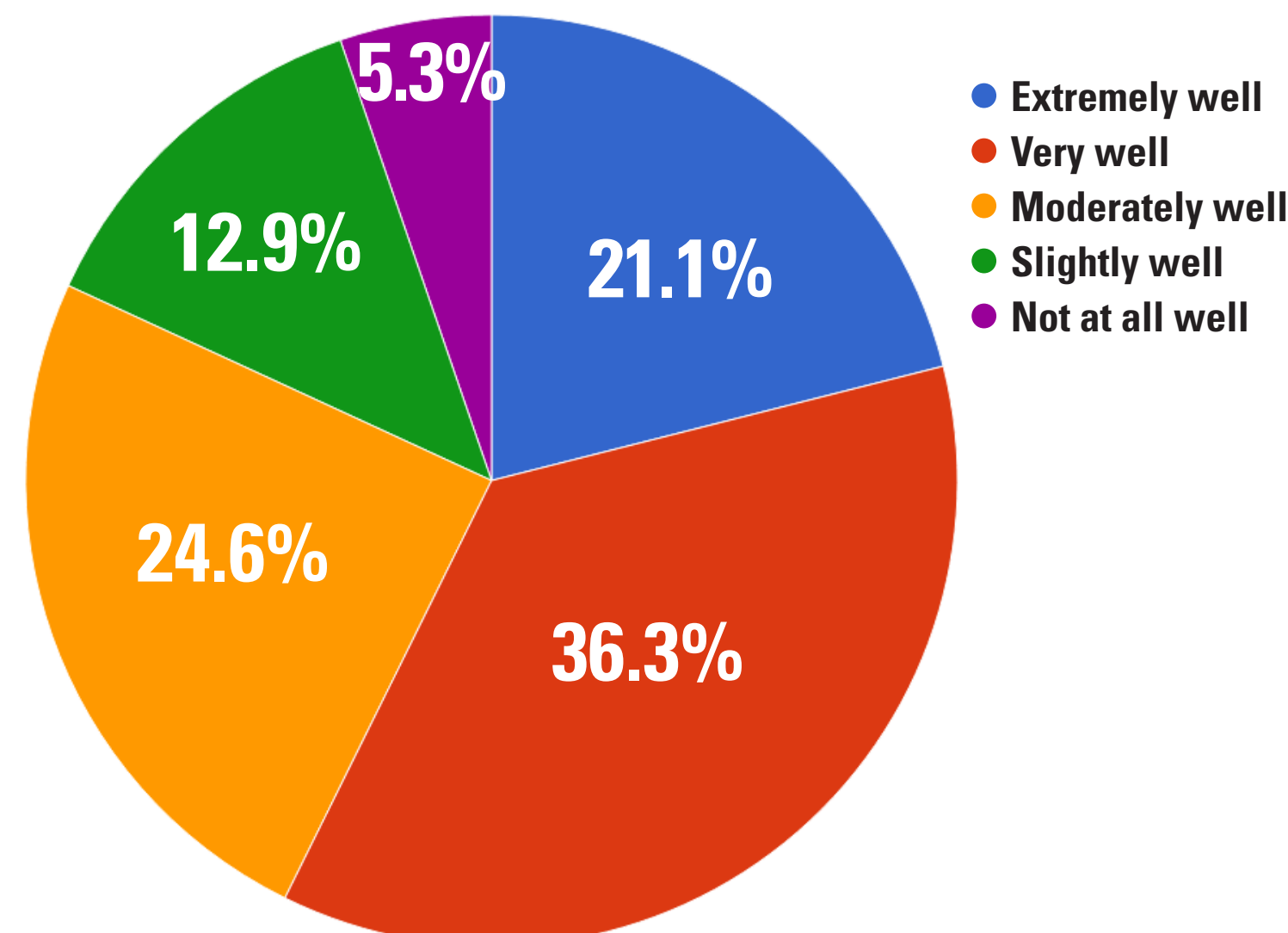
Pace of Instruction  
Main Effect

	Immediate, plus final assessment. <b>(B1)</b>	One week. Assessment of weekly content. <b>(B2)</b>
Once-per-day instruction. Availability ends at midnight each day. <b>(A1)</b>	<b>A1/B1</b>	<b>A1/B2</b>
Self-paced. Presentations are available all at once participants consume instruction at their own pace. <b>(A2)</b>	<b>A2/B1</b>	<b>A2/B2</b>

## Preliminary survey information

172 respondents: 24.4% Freshman, 23.3% Sophomore, 19.8% Junior, 18.6% Senior, 14% Graduate student

I think mobile devices can help me stay on top of assignments and instruction.



I use my mobile device(s) approximately \_\_\_\_\_ hours per-day.

