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## **ODYSSEY: A Journey to Lifelong Statistical Literacy**

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**Milo Schield**  
 Editor: [www.StatLit.org](http://www.StatLit.org)  
 Elected member: International Statistical Institute  
 US Chair: International Statistical Literacy Project

**17 July 2014 ICOTS-9**  
[www.StatLit.org/pdf/2014-Schild-ICOTS-Slides.pdf](http://www.StatLit.org/pdf/2014-Schild-ICOTS-Slides.pdf)

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## **Statistical Literacy: Teaching vs. Practicing**

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- analytical skills: decoding statistical summaries, grammar and arguments
- communication skills: how the presentation influences the apparent strength of an argument

Students need lots of practice to develop these skills.

Students remember 90% of the subject matter if they do the task themselves even as a simulation, as opposed to 10%, 20% and 50% if they read, hear or watch someone else do the task respectively. Menn (1993)

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## **Forgetting; Group Learning**

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Group learning can be a powerful tool. Doing this online is almost impossible without some kind of forum.

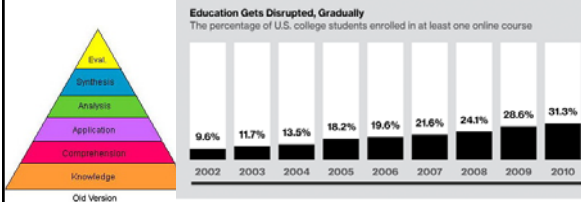


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## **Writing/Speaking Online Forums**



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Demonstrating critical thinking (see Bloom's taxonomy) requires that students write or speak. Online forums are commonly used.



Year	Percentage
2002	9.6%
2003	11.7%
2004	13.5%
2005	18.2%
2006	19.6%
2007	21.6%
2008	24.1%
2009	28.6%
2010	31.3%

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## **Classifying Online Forums**



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Online forums can be grouped into five levels:

- L1: Basic. Quick feedback. Typical
- L2: L1 + no free-riders [Moodle Q&A]
- L3: L2 + all players are anonymous
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## **Odyssey Forum**

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*Odysseys™* is a unique online forum that is used by several colleges and universities.

Before they can see anything, players must

- submit their initial response to a challenge
- grade three or four responses by others.

The system updates each player's power based on:

- the grades received from others
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For details, see Schield (2012a and 2012b).

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### **Good Forums**

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The key to good forums is the same as that for good discussions. The topics or challenges must:

- be open-ended (as opposed to right-wrong)
- encourage multiple approaches
- encourage discussion and reflection.

The following challenges have been used in teaching statistical literacy face-to-face and online.

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### **Over 40 "Challenges" in the last three years.**

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Challenges have been grouped as follows:

- Critical thinking exercises (7)
- Reading and interpreting tables and graphs (6)
- Reading and interpreting surveys (6)
- Explaining data patterns (5)
- Observational studies: Cross-sectional (7)
- Observational studies: Longitudinal (6)
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### **1) Critical Thinking**

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### **2) Reading Tables and Graphs**

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**TABLES:**

- UK Bank-Raids data
- Pioneer-Press Circulation Statistics
- Per-Person Spending: Married vs. Single
- US Dropout-Rates by race, income, ESL, etc.
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### **3) Surveys**

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2. Halloween Consumer Survey (2012)
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### **4) Explaining Data**

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### 5) Evaluating Observational Studies: Cross-sectional

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### Student Responses

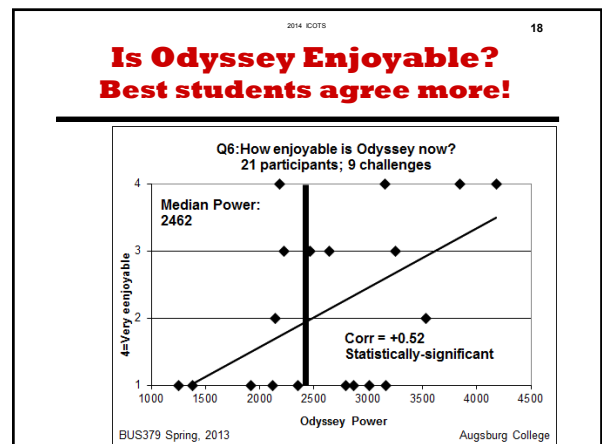
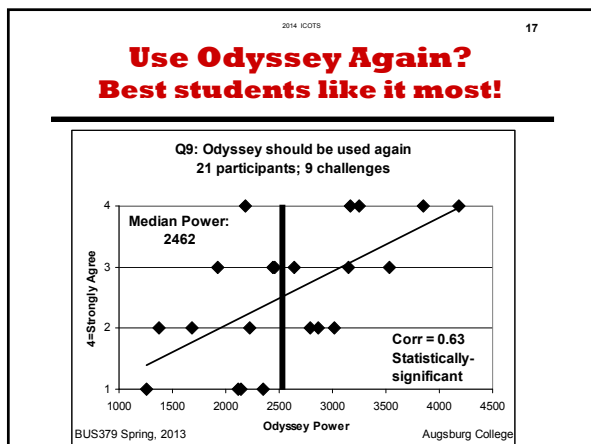
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*The best quality was the immediate feedback I received.*

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*It helped me read and understand graphs and articles better using my critical reasoning skills. Odyssey helped me develop more confidence in my ability to critically evaluate articles and graphs and charts.*



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**Conclusion**

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Students need to practice in class what they should be doing after the class is finished.

Most students will encounter statistics in their personal lives via the everyday media.

They need practice analyzing statistics in the media.

Odyssey is one way of doing this online.

See the associated paper for details.

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**Bibliography**

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**Survey**

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How many of you are in or are connected with

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**Statistics Education Problem**

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When teaching Intro Stats, how many discuss:

- different kinds of observational studies?
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Most teachers don't teach these; most teach an *abstinence-based course*. [Only 1% of the 300+ ICOTS abstracts mention *cause*]

Most college students will encounter *causation* repeatedly both professionally (social sciences, law, medicine) and personally (health/politics).

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Statistical Literacy for Managers**

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First half: **Traditional Descriptive & Inferential**

1. Tables & graphs in ordinary English
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**Need Focus/Support Group  
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**Need feedback/support from statistical educators**

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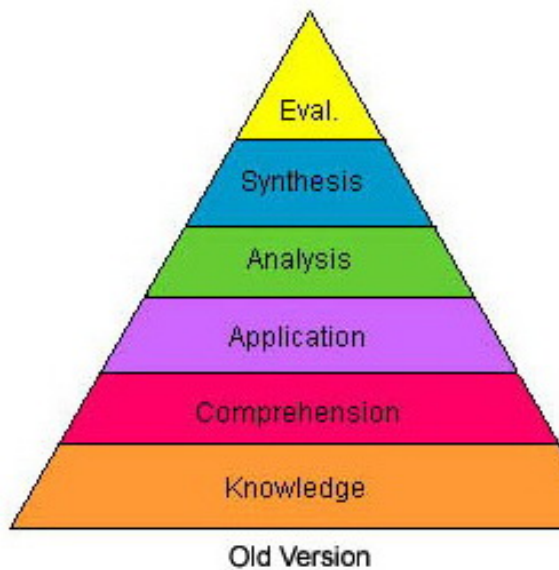
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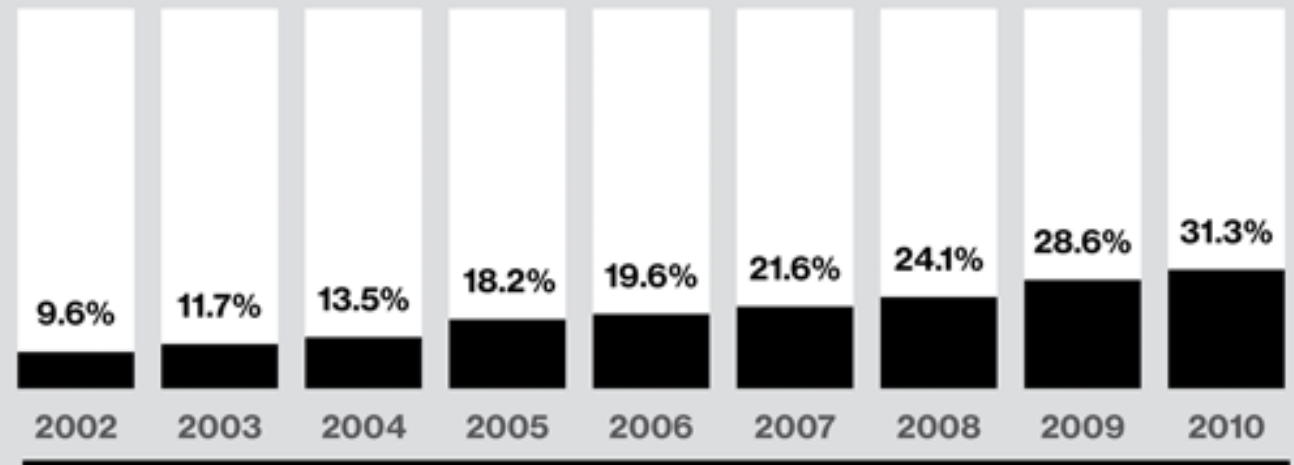
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## Education Gets Disrupted, Gradually

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Source: Babson Survey Research Group





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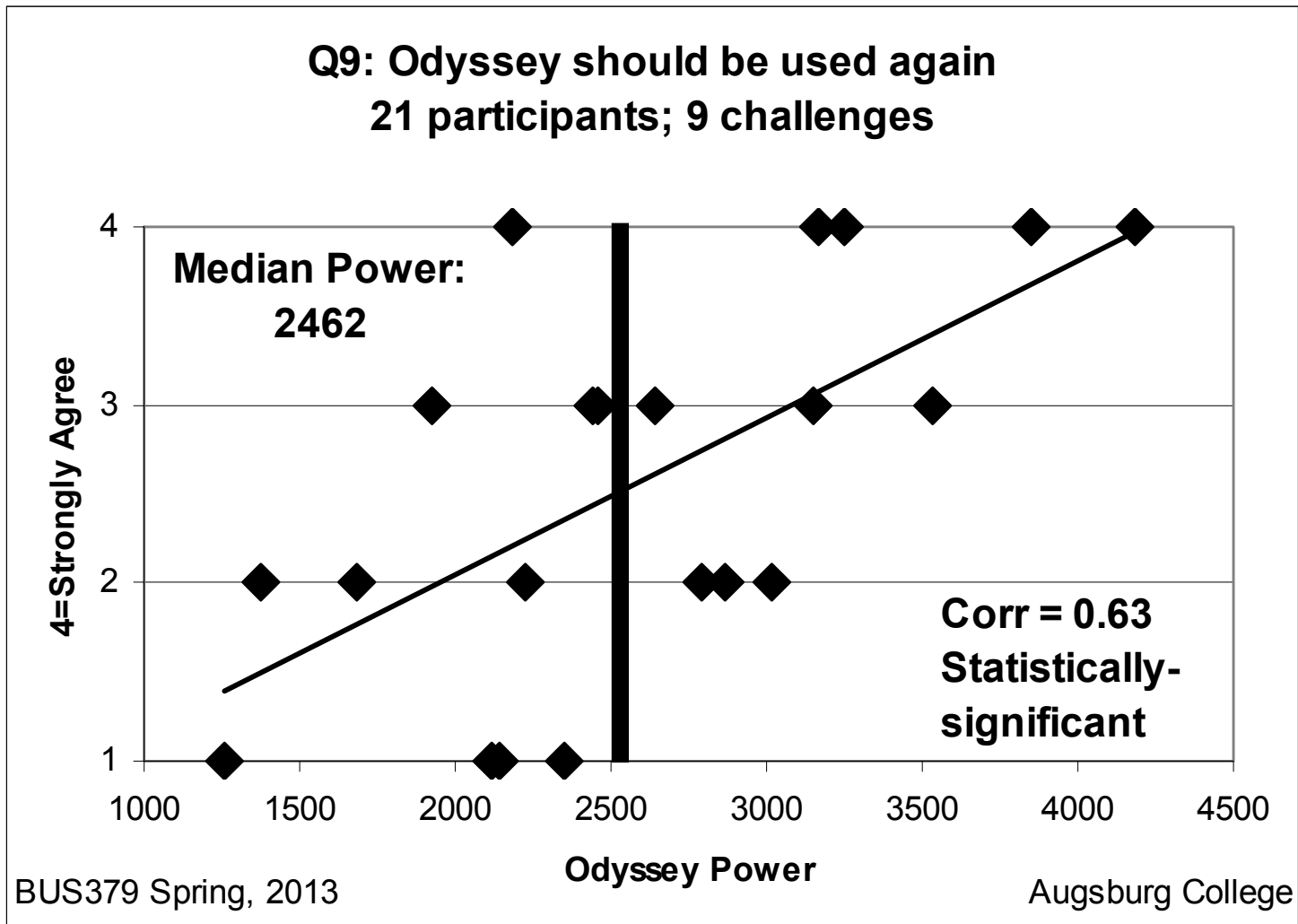
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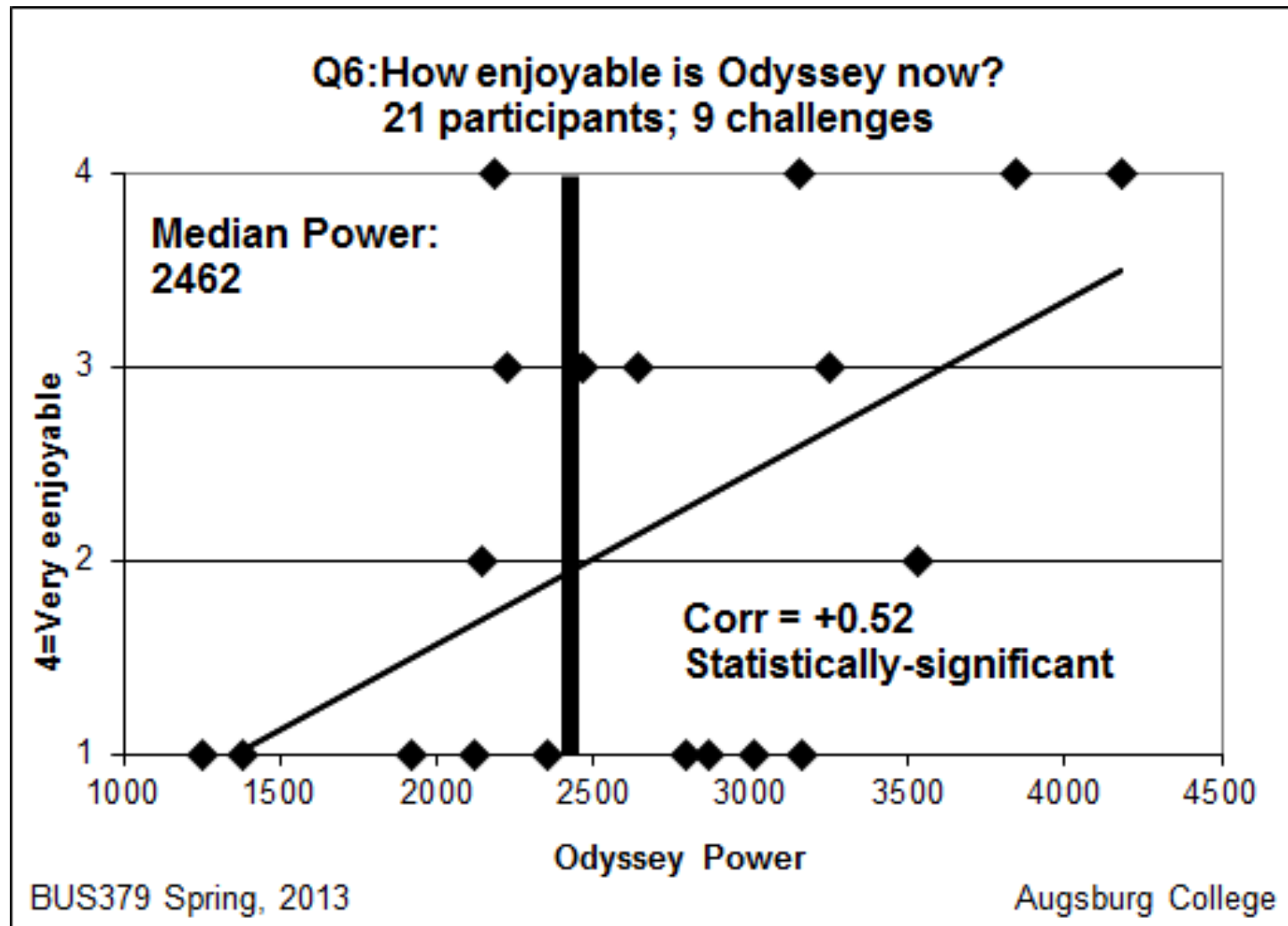
# Use Odyssey Again?

## Best students like it most!



# Is Odyssey Enjoyable?

## Best students agree more!



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