TEACHING STATISTICAL LITERACY USING ODYSSEYS2SENSE™: A UNIQUE WEB DISCUSSION FORUM

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Abstract

Teaching critical thinking is not easy. Teaching critical thinking to a large class, to an online class or to an accelerated class is difficult. Teaching critical thinking in a class such as statistical literacy where many of the students have low motivation can be extremely difficult. This paper focuses on the use of a new online discussion forum, Odysseys2sense™, which develops civil discourse and critical thinking through anonymous peer review. Odysseys2sense™ – henceforth referred to as Odyssey – is like a game: players get power based on scores from other players using rating criteria that involve civility, accuracy and conceptual integration. *Odyssey* has been used in teaching statistical literacy (traditional, hybrid and online) at Augsburg College. Student feedback, grading and outcomes are presented along with the strengths and weaknesses of the program. This first use indicates that Odyssey is a unique and powerful tool that can encourage critical thinking in large classes, in online classes, in accelerated classes that require rapid turnaround of student work and in quantitative classes where student motivation is low.

Keywords: Odysseys2sense™, Moodle, Internet forum

1. TEACHING CRITICAL THINKING

Teaching critical thinking is difficult; teaching statistical literacy – critical thinking about statistics – is at least as difficult. This introduction reviews two comments on this difficulty.

#1: The most comprehensive assessment of learning among college students found that “45 percent of students show no significant improvement in the key measures of critical thinking, complex reasoning and writing by the end of their sophomore years.” (AP Education, 2010)

> One problem is that students just aren't asked to do much, according to findings in a new book [by Arum and Roksa (2011)]. Half of students did not take a single course requiring 20 pages of writing during their prior semester, and one-third did not take a single course requiring even 40 pages of reading per week.

For instructors with large or accelerated classes, grading a significant amount of student writing is challenging if not impossible.

#2: Steen (2004) noted the difficulty in teaching ideas rather than techniques in a quantitative literacy course:

> Earlier QL courses "had one thing in common that contributed to their remaining a small elective rather than a major requirement -- they were designed specifically to focus on ideas rather than techniques. This made them more difficult for teachers to teach and for students to master, and for that reason they thrived only in special niches out of the mainstream of college mathematics." p. 39

Teaching critical thinking – teaching ideas rather than techniques – becomes more difficult when merged with the quest for active learning (GAISE Reports, 2007), for cooperative learning (Roseth et al, 2008) and for constructivist learning (Garfield and Ben-Zvi, 2007).

Classroom discourse is central to all these goals. To develop classroom discourse, Garfield and Ben-Zvi (2008) made some excellent suggestions:

1. Use questions that encourage students to speculate and think and do not necessarily have one right answer.
2. Require students to explain their reasoning and justify their answers. Then ask other students if they agree or disagree and why.
3. Create a classroom climate where students feel safe expressing their views, even if they are tentative. This can be done if teachers encourage students to express their conjectures, and asking other students to comment on these conjectures, and allowing students to test some of these conjectures using tools and software, rather than telling them whether they are right or wrong.

2. WEB FORUMS

Web forums are one way of addressing these needs. There are two kinds of web forums. One kind is packaged as a part of a course management system (CMS) such as WebCT, Blackboard or Moodle. For a review of other CMS systems, see EduTools (2011). The other kind of web forum is available independently of any course management system. For background see Wikipedia entries for Virtual Learning Environment and Internet Forum.

3. MOODLE FORUMS

Of all the course management systems, Moodle is probably the most widely-used – perhaps because it is free. According to Wikipedia, Moodle has 37 million users in 3.7 million courses. Appendix A presents some of the options available in setting up any one of

the four types of forums supported by Moodle. Of these four, the most relevant is the "Q & A forum." According to Moodle documentation:

> "The Q & A forum requires students to post their perspectives before viewing other students' postings. After the initial posting, students can view and respond to others' postings. This feature allows equal initial posting opportunity among all students, thus encouraging original and independent thinking."

ADVANTAGES of Moodle Q&A Web Forum:

- Allow students to respond to each other
- Give immediate feedback; promote dialogue
- Allow students to disagree (argue) in real time
- Minimize teacher time; allow large class sizes

DISADVANTAGES of Moodle Q&A Web Forum:

- Students know who writes what; may bias reviews
- Grading the quality of a post takes instructor time
- Compiling an overall grade by student takes time
- Instructor grading is not generally immediate
- Students do not see their score for a given posting

The Moodle Q&A forum does not provide any incentives for students to comment on each other or to defend their own work. Since instructor grading is not generally immediate, is not tied to any particular response, and does not involve giving any reasons, there is little incentive for players to think more critically about their comments.

4. ODYSSEY FORUM

Odyssey is an independent web forum that promotes critical discourse by providing

- complete anonymity to each participant
- participant-grading of peers
- real-time computer-generated grade summation based on the power of those generating the grades

Notice that these Odyssey features support the Garfield recommendations that students work on questions that (1) have more than one right answer and that (2) require students to justify their answers. The Odyssey anonymous feature with peer ratings strongly supports the Garfield recommendation that teachers should

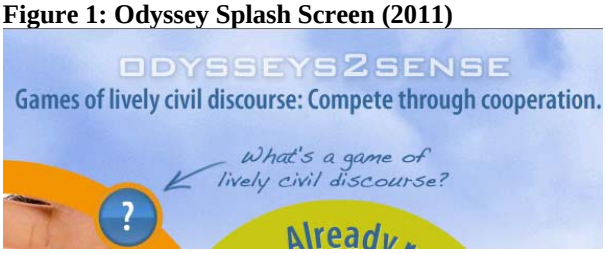
> (3) "create a classroom climate where students feel safe expressing their views, even if they are tentative. This can be done if teachers encourage students to express their conjectures, and asking other students to comment on these conjectures, and allowing students to test some of these conjectures using tools and software, rather than telling them whether they are right or wrong."

Odysseys2sense™ is at www.odysseys2sense.com.

This program is owned, programmed and operated by Dr. Larry Copes and Dr. Ben Cooper. See Facebook: www.facebook.com/pages/Odysseys2sense/195689806136

Figure 1 shows the opening screen for version 7.2 as of January 2011.

Figure 1: Odyssey Splash Screen (2011)



This program has been used for a variety of challenges:

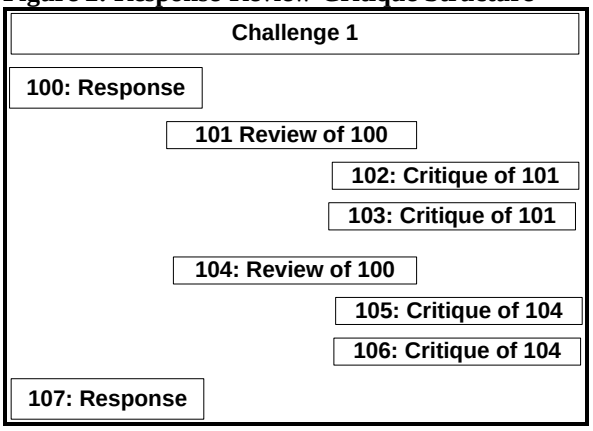
- Why do so many Americans think Obama is a Muslim?
- Should bystanders intervene when they see child abuse?
- Should the 2010 elections be a referendum on Obama?
- Is democracy socialism?

Academic use is a small but growing part of the uses.

- Are polls right in claiming Americans are quite ignorant?
- What's the clearest definition of confidence interval that you can find?
- Why do people say "I hate math?"
- Can you compare sizes without using numbers?

Appendix B is the Odyssey FAQ. This distinguishes responses, reviews and critiques (as shown in Figure 2) and presents the scales used to evaluate comments.

Figure 2: Response-Review-Critique Structure

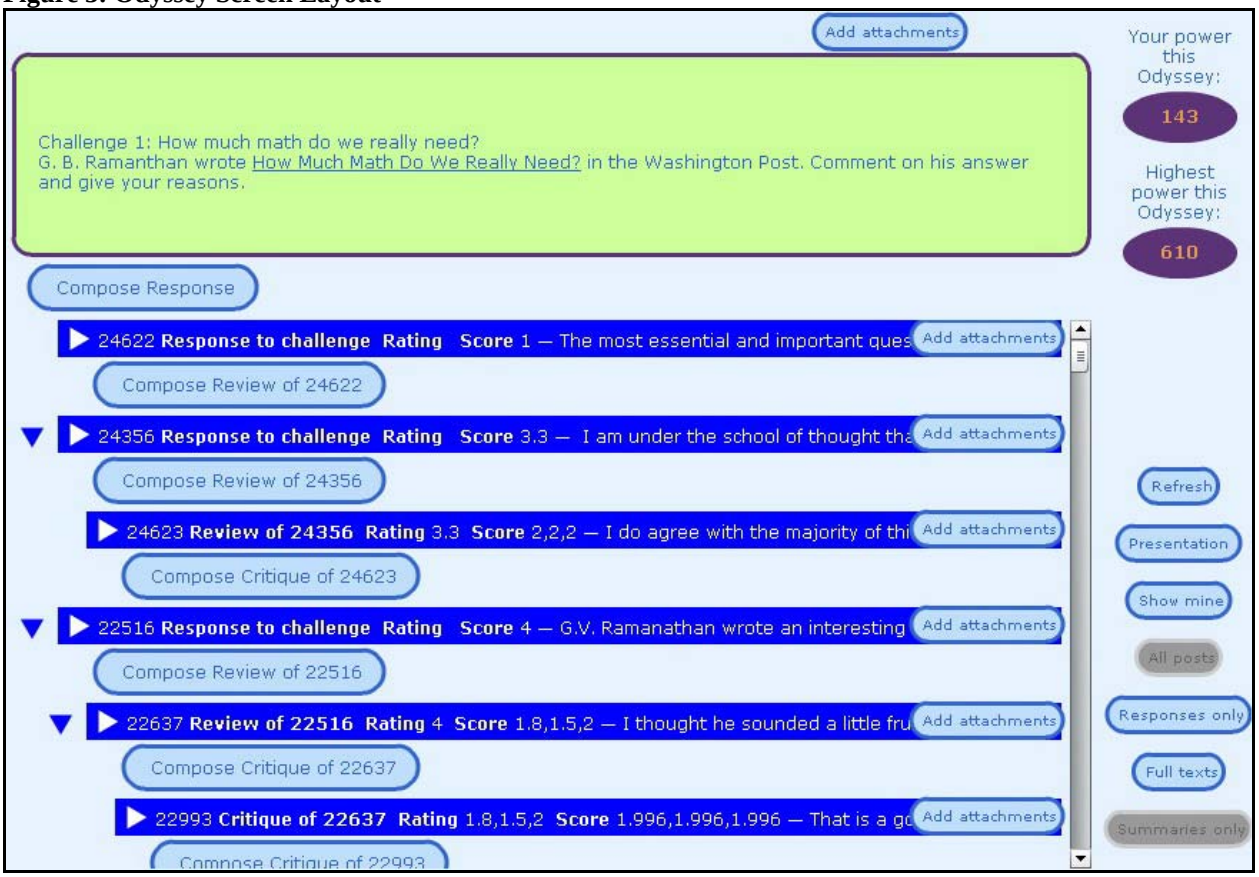


To understand how the Odyssey system works, go to the Odyssey web site and press the HELP button. Appendix C lists the mini challenges available.

The appendices present details on all aspects of the Odyssey program including login, setup, scoring, power, reports, designer recommendations and the survey used.

Figure 3 is a screen capture of an Odyssey challenge. Note the Odyssey power displays in the upper-right corner. These can be used to assign grades.

Figure 3: Odyssey Screen Layout



5. USING POWER TO GRADE STUDENTS

Odyssey power was used to grade students in classes taught in spring, summer and fall 2010 at Augsburg College. Initially, students received a flat amount provided their power exceeded some fraction of the maximum power – say 60%. This allowed the teacher to see how well the power reflected student performance according to the teacher's standards.

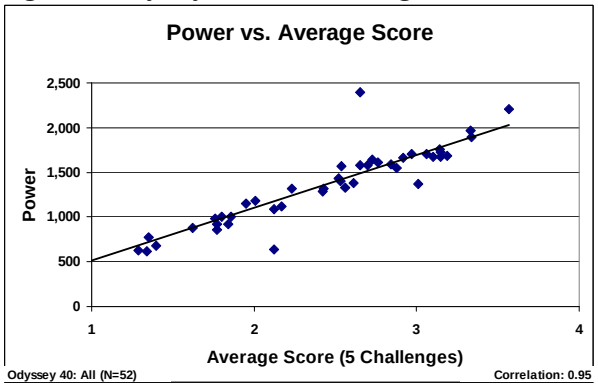
In the summer course, power was weighted as 10% of their course grade. The intent was to enter the final power as a percentage of the highest power in the class. However the traditional (sinusoidal) grading resulted in a maximum power of nearly 9,000. For those students having power of 3,000, this would have been a disaster. So, appropriate adjustments were made.

In my fall 2010 BUS 379 course, Odyssey power was weighted as 15% of their course grade. Power was calculated using the linear method. Each student's final power was entered as a percentage of the highest power in the class. As the teacher of that class, I was very satisfied with the resulting grades.

Here is the distribution of student powers: 2392, 1963, 1893, 1727, 1683, 1674, 1671, 1595, 1582, 1553, 1434, 1401, 1384, 1316, 623 and 385. I eliminated the highest grade as an outlier. As a percentage of the second-highest grade these were 100, 100, 96, 87, 85, 85, 85, 81, 80, 79, 73, 71, 70, 67, 31 and 19.

A primary cause of low power was receiving low scores from colleagues. Figure 4 shows that as average score received increases, the calculated power also tended to increase. This data is for 52 Augsburg students in an Odyssey (#40) in fall 2010. . Correlation = 0.95. This score is averaged over the challenges assigned. Failing to complete all the challenges will give a lower average.

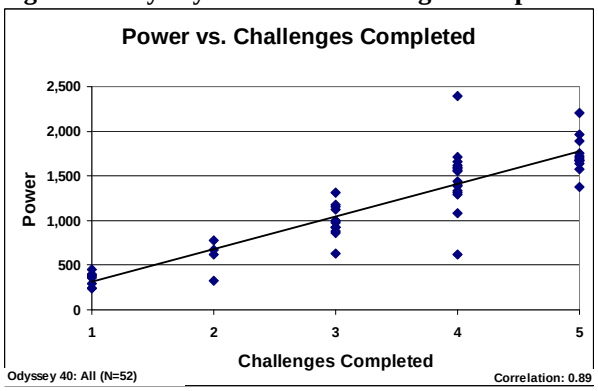
Figure 4: Odyssey Power vs. Average Score



Source: Odyssey 40 Summary Brief Report: 12/20/2011

A secondary cause of low power was student failure to complete the number of challenges assigned. This is shown in Figure 5 for all 52 Augsburg students in Odyssey 40 in fall 2010. Correlation = 0.89.

Figure 5: Odyssey Power vs. Challenges Completed



Source: Odyssey 40 Summary Brief Report: 12/20/2011

Of the 52 students, 23% completed 5 challenges, 31% completed four, 23% completed three, 8% completed two and 13% completed only one. Note: In class #5, the last of the five challenges was optional.

6. STUDENT EVALUATIONS: OVERALL

The following evaluations were obtained from 73 students in 7 classes with 4 teachers in fall 2010. Of these 72 students, 42 were Augsburg students in four classes in Odyssey 40 (Classes #1-#4) and 31 were students in three classes at the University of Minnesota and at Metropolitan State University enrolled in Odysseys organized by Dr. Larry Copes. All 73 students completed the same survey. The 31 students in Dr Copes' classes were all grouped into one class (#5).

Appendix Q has the exact questions and responses. Here are the highlights with three same-instructor classes combined into one. This survey was conducted at the end of the course. Students were asked to recall, retrospectively, how they viewed the Odyssey at the start of the course.

Odyssey difficult: 52% agreed at start; 15% at end.
Odyssey valuable: 36% agreed at start; 63% at end.
Odyssey enjoyable: 49% agreed at start; 62% at end.
Prefer Odyssey online to teacher-graded papers: 72%.
In start-end comparisons, all the changes were positive.

Odyssey improved your critical thinking: 70% agreed (12% considerably, 26% moderately and 32% slightly), 22% were neutral, and 8% disagreed.

Here are some of the positive student comments:

- Convenience, straight-forward, anonymous
- Something new, fun and engaging
- Instant feedback/scoring
- Feedback is more honest and less fluffy
- Thought-provoking arguments
- Involved critical thinking, learn from others
- Able to critique others
- I can read as many responses as I want

Here are some of the negative student comments:

- Glitches that wouldn't let me turn in my response.
- Hard to navigate around.
- Confusing at first. Needs an easier web interface.
- Don't understand how it [power] works. Don't know if I'm getting graded fairly.
- Visual design [of screen] is awful. Learning the way it [the system] works took a while.
- Cannot compare power with other players.
- How confusing the system is.
- Some people didn't grade fairly.

Here are some of their recommendations

- Follow USA Today format. Don't give an author's perspective. Let students decide [select their own conclusion and justify it].
- Improve submission process: sometimes work did not save.

To get a better understanding of these results, consider Table 1 which illustrates the results by class.

Table 1 Percentage who Agree By Class

	# of Students	19	8	4	11	31	73
	Class ID	#1	#2	#3	#4	#5	ALL
Q1	Prefer written	37	13	0	18	27	25
Q3	Difficult-Start	68	38	50	36	52	52
Q4	Difficult-End	37	13	0	18	3	15
Q5	Valuable-Start	37	50	75	27	29	36
Q6	Valuable-End	47	88	75	45	71	63
Q7	Enjoyable-Start	37	50	75	55	52	49
Q8	Enjoyable-End	42	63	75	64	71	62
Q9	Scores objective	32	38	75	64	52	48
Q10	Value responses	26	63	50	55	68	53
Q14	Power -> quality	21	25	75	55	58	45
Q15	Like as game	11	25	50	64	42	36
Q16	Improve CT	47	63	100	82	77	70
Q17	Use in future	26	38	100	55	61	51

Note the substantial variations between the classes:
Q1: 37 points: 0% - 37%: Prefer written
Q4: 37 pts: 0% - 37%: Difficult at the end
Q6: 43 pts: 45% - 88%: Valuable at the end
Q8: 33 pts: 42% - 75%: Enjoyable at the end
Q9: 43 pts: 32% - 75%: Responses are valuable
Q14: 54 pts: 21% - 75%: Power indicates quality
Q15: 53 pts: 11% - 64%: Like as a game
Q16: 53 pts: 47 - 100%: Improves critical thinking
Q17: 74 pts: 26% - 100%. Recommend use in future

This variation by class can be explained by the difference in teachers: they may have spent more or less class time introducing the Odyssey, introducing the challenges and following up on the results. Alternatively, this variation by class can be explained by the difference in students – specifically differences in their quantitative skills and/or aptitude. A third explanation involves the interaction between students and challenges. Students in non-quantitative majors may have different preferences than students in quantitative majors.

Table 2 shows the distribution student answers to Q16: "How much did Odyssey improve your critical thinking?" broken out by Q1: "Would you rather have written assignments than Odyssey assignments?" Note the correlation between Q1 and Q16. Of those that preferred the Odyssey to written assignments, 79% agreed that Odyssey improved their critical thinking versus 44% of those that preferred written assignments.

Table 2 Doing Odyssey Improved Critical Thinking

Improve		Prefer	Prefer	
Crit. thinking	Q16	Odyssey	Written	ALL
Negative	0	4%	17%	7%
Neutral	1	17%	39%	22%
Slightly	2	31%	33%	32%
Moderately	3	31%	11%	26%
Considerably	4	17%	0%	13%
	ALL	100%	100%	100%
	Ave	2.4	1.4	2.2
	#	54	18	72

Further research is needed to see why 7% of these students (5 out of 72) felt that doing the Odyssey was a negative value (waste of time).

7. CHALLENGES ASSIGNED

The challenges used in three different Odysseys are presented in Appendix P. Here are student evaluations of specific challenges in Odyssey 40: Fall 2010. The following are the percentage of Augsburg students (45) that found each challenge valuable:

1 How Much Math Do We Really Need? (64%)
2 Joel Best: Social Construction of Statistics (51%)
3 Interpreting Data Display [Movie revenue] (64%)

8. ODYSSEY AS A GAME

Odyssey can be promoted as a game. Some students like this emphasis; others do not.

Promoting Odyssey as a game has merit. Odyssey is almost "real time" as in a game compared to the delay of days or weeks for instructor grading of written essays. And there is opportunity for a player to clarify their review or to question the ratings given by their reviewers. For today's students, many of whom are very accustomed to playing games, this metaphor may be helpful and motivational.

Promoting Odyssey as a game may be counter-productive for some students. Odyssey is not generally played for fun. The element of luck is minimal (who you are scored by). And the use of games in college classes may be seen as inappropriate. In such cases, Odyssey can be promoted as an on-line forum instead.

9. TEACHER EVALUATIONS

Teacher evaluations are most critical for academic tools. At this point only a few teachers have used Odyssey academically, so these reports are just anecdotal.

Presser (2011) after MAA JMM "I am thrilled. I am just 3 challenges in to my first Odyssey and thus far I have had more interaction than I have ever had in any other discussion board thing I have attempted."

Schield at JMM 2011: "I am more excited about Odyseeys2Sense than anything I've seen in my 25 years of trying to teach critical thinking to today's students."

10. RECOMMENDATIONS FOR TEACHERS

Teachers who have not used a web forum may be advised to start with a less demanding forum such as the Moodle Q&A. See Appendix A. Doing so will make sure they are ready to take on the complexity of the Odyssey forum.

Students need encouragement at the beginning to get past the difficulties of learning a new piece of software. Having the teacher demo the software and speak positively about the approach is essential to being successful. As Odyssey designer, Larry Copes, noted: "doing this in class saves lots of frustration later, because some of my students can't read or follow instructions."

While I set the number of reviews for my Odyssey at three or four, I over-ride this on the first Odyssey at one, and on the second Odyssey at two.

Students need teacher oversight. Some students give excellent answers that other students may not fully appreciate while other students may give weak or poor answers and receive unjustifiably high grades from players who are not accustomed to giving low ratings. In both cases, the teacher can intervene. The teacher can give higher ratings for creative answers and low ratings for weak answers.

Writing good challenges is an art. To promote discussion, challenges must be more open-ended than just a right-wrong matter but cannot be so totally open-ended that they don't provide any structure for analysis.

Finally, students need classroom guidance from teachers. Students want to know what would be a good answer for each challenge. Posting a grading template for each challenge might be very helpful.

Presser noted, "I posted several sample responses for each challenge (highlighting some of the mistakes I had seen in poor writing assignments in previous semesters.) I then posted sample reviews of these responses. These seemed to have given students the guidance they need. My grades are always fairly comparable with what they are getting from the class." "I posted graphics on our classroom management system displaying the distribution of Power scores and the association between power scores and participation numbers to let them know where they stood. That has been the biggest question so far."

While the use of this Odyssey program can promote critical thinking based on peer reviews, students still look for active teacher involvement.

11. CONCLUSION

Odyssey is a very unique web discussion forum designed to improve critical thinking. Strengths include the use of anonymous peer review, "real-time" calculation of player power and positive reviews: 70% of the students agreed that using Odyssey increased their critical thinking skills. Weaknesses include the initial difficulties with the system (the time needed to get students up to speed on this system), 25% of the student preferred written assignments over Odyssey, and the fact that 21% of the students who preferred Odyssey over written were neutral or negative on whether using this program helped improve their critical thinking.

A separate weakness was the failure of many of the students to complete the assigned challenges. This was not monitored since only one of the three Augsburg instructors had access to the administrative reports.

More effort is needed to see what kinds of challenges promote student learning that students can appreciate.

Comparing Odyssey with actual hand-graded assignments or an actual Moodle Q&A forum involving the same students would provide a better context than comparing Odyssey with a hypothetical written assignment.

In our view, the Odyssey strengths definitely outweigh the weaknesses. In summary, Odysseys2Sense is a unique and powerful tool for teaching critical thinking in online classes, in large classes, in accelerated or compressed classes where students need quick feedback and in classes where student motivation is low. Teachers should take a close look at Odyssey. Not only is Odysseys2Sense™ unique and powerful in supporting lively critical discourse, but it does so in ways that students appreciate.

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APPENDICES

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Appendix B: Odyssey FAQ
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Appendix D: Participant Sign-On
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Appendix F: Odyssey Forum Setup
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Appendix J: Student Ratings Given
Appendix K: Calculating Power
Appendix L: Odyssey Reports – This Odyssey
Appendix M: Odyssey Reports – This Challenge
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Appendix O: Recommendations for Designers
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Appendix Q: Odyssey Survey

Appendix A: Moodle Forum Options

Moodle Forum Types:

- A single simple discussion - is just a single topic, all on one page. Useful for short, focused discussions.
- Standard forum for general use - is an open forum where anyone can start a new topic at any time. This is the best general-purpose forum.
- Each person posts one discussion - Each person can post exactly one new discussion topic (everyone can reply to them though). This is useful when you want each student to start a discussion about, say, their reflections on the week's topic, and everyone else responds to these.
- Q And A Forum - The Q & A forum requires students to post their perspectives before viewing other students' postings. After the initial posting, students can view and respond to others' postings. This feature allows equal initial posting opportunity among all students, thus encouraging original and independent thinking.

Source: http://docs.moodle.org/en/Forum_module

Appendix B: Odyssey FAQ

Odysseys2sense is a combination anonymous web forum / online game in which your power and influence are determined by how thought-provoking, accurate, and civil other players rate your contributions to be.

What's an Odyssey?
The Odyssey is an epic Greek story about Odysseus, a mythic hero known for his rationality and inquiring mind as well as for his patience, courage, and prowess.

Each of our Odysseys is a game consisting of challenges. To meet a challenge successfully requires you to think critically, ask questions, take risks, and demonstrate patience and expertise.

How do you gain power and influence?
Each discussion of a challenge looks like contributions to an online forum, plus reports on your power. You gain a bit of power merely by contributing to the discussion. You gain much more power if the other players rate your contributions highly. In turn, your power affects how much influence your ratings have on the scores of other players.

What are contributions?
You can make three kinds of contributions:

- Responses to the challenge. [At least one required]
- Reviews of others' responses. [May be required]
- Critiques of reviews and critiques. [Optional]

Reviews and critiques of others include ratings (entered via sliders) as well as comments.

How are contributions rated?
The community rates responses on a scheme like this:

- 1 point: doesn't answer the given question, or solve the problem, or make a clear claim
- 2 points: answers the question, solves the problem, makes a clear claim
- 3 points: same as above, but also explains the solution or defends the claim well
- 4 points: same as with 3 points, but also goes an extra step: gives a second approach, poses good extension questions, etc.

Every response has a score between 1 and 4 inclusive. Only you (and the Odyssey administrator) can see the scores of your own responses. The score is determined from the ratings that occur in the conversation about your response. Reviews and critiques are rated on three criteria:

- A: Is the rating accurate?
- H: Is the comment helpful, thought-provoking?
- C: Is it civil?

If contributions are anonymous, what motivation is there to be civil?
Uncivil contributions get low ratings from the other players and eventually are not displayed. Their authors lose power and influence. Players may also give low ratings to contributions that cite the author's personal experience instead of facts to support claims.

How do score, rating, and power differ?
Here's the simplified version:

- Each entry you make has [receives] a score.
- That score is determined by the ratings other players give that entry (via sliders), weighted by their own powers. [Each entry starts with a default score: 1 for a review, 2,2,2 for a response or critique]
- Your power is determined primarily by the scores of your own entries and a little bit by the number of entries you have made.

It's actually somewhat more complex:

- Suppose you make an entry, and player A comes along and rates your entry very low. But then suppose other players give very low ratings to player A's criticism of your entry. In that case player A's influence over your score diminishes.

Source of this FAQ: Odysseys2Sense.com
[Note: “Ratings” are given; “scores” are received]

Appendix C: Odyssey Help Demos

Odyssey offers the following help demonstrations:

0 Feedback
1 Starting play
2 Contributions
3 Ratings
4 Successful play

Appendix D: Participant Sign-On

Your profile: For the most part, this information will not be shared with anyone else. See privacy policy."

Required fields

- Email:
- Password:
- Repeat password:
- Screen name: [Used in absence of an actual name. Leave blank if an actual name is entered.]
- Security question:
- Answer to security question:
- Email me when another's entry changes my power? Yes No [Default is Yes]
- Number of paid entries remaining: 5 [determined by the payment options]

- Given name (first name in US):
- Family name, surname (last name in US):
  [Actual names are generally required for those in academic courses.]

"The rest of this information is optional but allows us to do research and to highlight Odysseys that might interest you."

- Country:
- Postal code:
- Sex: F M
- Year of birth (YYYY):

Appendix E: Administrator Startup

There are two ways a new instructor can become an administrator of their own Odyssey.

1. "Anyone whose power reaches 5,000 can set up his or her own game-like forum without a fuss." [Source: E-mail from Larry Copes]
2. E-mail: Larry Copes <Copes@EdMath.org>

You can then setup a "source." A "source" indicates a group of Odysseys administered by the same person.

Click on the command line: Become a source to set up, maintain, and promote your own Odyssey(s)

- Source title: [Your subject and/or school]
- Main Contact: [Your e-mail address]
- Source type (course, media, general, etc.) [Select course for academic use.]

Press *Save* button.

Appendix F: Odyssey Forum Setup

After obtaining administrator privileges you can setup a new Odyssey. Log in at www.odysseys2sense.com. Select "Administer source for which you are the main contact." Complete the following:

Source: _____ [I use "statistical literacy"]

Name of Odyssey: _____
[Full name is "Source"&":"&"Odyssey Name".

Odyssey description text box: _____

Type:

- Publicly available [Default]
- Responding restricted to those with code
- Viewing Odyssey restricted to those with code
  Code if participation is restricted:

Player name needed? Yes No [No is default]
[Select Yes for Academic uses]

How many reviews of other responses are required before a new response is recorded? (May override for a particular challenge.) ___ [Normally 2-4]

What method for calculating power for this Odyssey?

- Standard. [Sinusoidal: quick start (1000 on first response), flat middle (1500-3500), stronger finish (above 3500)]
- Linear [Recommended for academic uses]

Start date: _____

Expiration Date: _____

Paying:

- Source ($40 US per Odyssey per year, up to 100 challenges; free for players)
- Player (you pay nothing to set up; players pay 2 cents US per entry, of which you get none) [This option is used when students are told to buy 250 entries for $5.00. This allows students to use up any unused entries by participating in other public Odysseys.]
- Both ($10 US per Odyssey per year; players pay 2 cents US per entry, of which you get half)

Payment status: **new Odyssey** [system generated]

Last modified: 2011-01-18 [system generated]

Contributions so far: 0 [system generated]

Note: Academics generally select the Player option.

Appendix G: Odyssey Challenge Setup

There are two ways to set up a new challenge:
#1. Add a challenge to this Odyssey
#2. Import a challenge to this Odyssey from another.

#1: The following information is requested when adding a new challenge without importing:

Name: _____

Statement of challenge: [Enter into a textbox.]

Summary to entice readers: [Enter into textbox]

For both textboxes, four options are available:
1. HTML to start and stop bold: and ,
2. HTML to start and stop italics: and .
3. HTML to create a hyperlink. [Set browser to allow use of "scripted windows.".
   - "Please enter the URL for your link It probably starts with http://"
   - The programs creates this HTML code: <A HREF="http:URL" TARGET="page2">. It may take manual editing to enter the close for this hyperlink.
   - The separate page is necessary to open the URL in a separate page.
4. Add attachment [This must be a jpg or gif image. It cannot be a PDF at this time.]

Number of required reviews before response is recorded: [Leave blank unless you want to override the number entered in setting up the Odyssey.]

Contexts (separated by commas): [For future use]

Number of contributions so far: 0 [System generated]

Start date: YYYY-MM-DD

Deadline for responses (if any)--date: YYYY-MM-DD

Deadline for responses--hour (0-23): [Note a time of zero or 24 does not work properly at this time] 99

[Note: The deadline does not prohibit a late entry.]

SAVE command button.

#2: The following describes the process of importing a challenge from another Odyssey.
- Enter Challenge ID: a unique ID number.
- Press the Import command button.

Note that when you import a challenge, you also import any attachment and all the contributions involving that challenge. These contributions may add new players that will appear on various reports. You can import challenges that you as a source have already set up. To import challenges (and their discussions) from another source, you must arrange payment through us

Appendix H: Odyssey Controls

The Odyssey controls are different; they take time to understand. Consider the screen layout in Figure 3.

Note the arrows to the left of every comment. These toggle between Summary Only and Full Text for a given comment.

Note the Power Indicators on the upper-right.

- Traditional-scoring Odyssey: The top power is your power based on all the Odysseys you have done. Power this Odyssey is your power in just this Odyssey. Odyssey Best is the best power in just this Odyssey.
- Linear (academic) scoring Odyssey: The top power is your power in this Odyssey based on linear scoring. The second/center power is your traditional power in this Odyssey. The third power is the highest power in this Odyssey based on traditional scoring.

Note the command buttons on the right.
Refresh. See posts that arrived after you entered.
Presentation: This button controls "the order in which contributions are displayed." Options are (a) Responses with fewest reviews first [the default], (b) Chronological order and (c) My contributions first. Players generally shift to (c) My contributions first to see who has reviewed or critiqued their posts. Administrators can also choose (d) Highest score first. This allows them to quickly scan the extremes scores – high and low.
Show Mine toggles with Show All in the same place. Show Mine shows any contributions made by you. Expand to see how others replied to your posts
All Posts toggles with Responses Only [the default].
Full texts toggles with Summaries Only [the default].
This is a global change. The arrows to the left of comments expand just the item involved.

Appendix I: Odyssey Ratings vs. Scores

Odyssey references ratings and scores. There are two relevant interpretations:
- Ratings are evaluations of responses; scores are evaluations of critiques and reviews.
- Ratings are given; scores are received.

Odyssey uses the latter. Scores are received – either by default if no rating is given, from the rating given in an individual evaluation or from the average of ratings in several evaluations. Ratings are given: one rating per comment. Ratings are outgoing; scores are incoming.

Appendix J: Student Ratings Given

To see how students rate each other, consider this data from the player history reports for the 52 students in Odyssey 40 in fall 2010 assigned 5 challenges..

Table 3 Review and Critique Ratings

	Review	Critique Ratings		
	Ratings	Accurate	Helpful	Civil
Count	480	82	82	82
Mode	3.0	2.00	2.00	2.00
Average	3.16	1.12	0.98	1.66
Median	3.25	1.50	1.25	2.00
Skew	-0.39	-0.99	-0.73	-1.42
#Negative	N/A	10	11	3

In this data, the ratio of reviews to critiques was about six to one. The modal rating given in reviews was a 3.0 (75% of the maximum). The modal rating given in critiques was a 2.0 (100% of the maximum).

Table 4 Review Ratings by Challenge

Challenge	ALL	1	2	3	4	5
Mode	3	3	3	4	4	3
Average	3.16	3.00	3.17	3.21	3.10	3.22
Median	3.25	3.10	3.20	3.30	3.20	3.30
StdDev	0.68	0.79	0.69	0.67	0.73	0.54
Skew	-0.39	-0.38	-0.12	-0.42	-0.40	-0.43
Count	480	54	147	161	61	57
%Below 2	5%	9%	6%	5%	7%	5%
%Below 3	25%	28%	22%	25%	34%	25%
%Equal 4	15%	9%	16%	15%	21%	15%

Table 4 shows the ratings given in reviews of responses by challenge and overall. The percentage that are below two is always less than 10% while the percentage that equals the maximum (four) ranges from 9 to 21%. The slight decrease in the percentage of below two and the slight increase in the percentage of fours may indicate that players are creating better responses or that reviewers are getting easier in their ratings as the Odyssey progresses.

The low percentage of critique ratings that are negative (< 10%) suggests that the use of the -2 to +2 values may be slightly biased upward relative to the 1 to 4 values used in reviews that rate responses.

For this Odyssey with five challenges assigned, the student averages were:

- two reviews given (the minimum number generally required) obtained by dividing the 480 reviews given by 5 challenges and 52 students.
- one or two critiques given during the entire Odyssey obtained by dividing the 82 critiques given by the 52 students.

Appendix K: Calculating Power

The Odyssey calculation of power is a propriety formula. But if Odyssey power is to be used to grade students, teachers need to understand the key points.

There are two ways Odyssey power can be calculated:

1. Traditional or sinusoidal. In this method, power increases rapidly initially (zero to 1,500), increases slowly (1,500-3,500) and then increases rapidly (3,500 and up). This is done to increase the motivation of players who are not required to play.
2. Linear or academic. In this method, power increases linearly no matter what level the player has.

The following analysis of power was done on Odyssey 40 during fall 2010 using the linear method of calculating power. A multivariate regression of Odyssey power on three predictors (score, response and other) gave these results:

Table 5 Power Regression Coefficients and P-Values

	Slope	P-value
Intercept	-9.65	0.71
Score	467.82	0.00
Response	-39.81	0.08
Other	26.16	0.00

Score is the average score received on responses in all challenges assigned. *Response* is the number of responses submitted which is the same as the number of challenges completed. *Other* is the number of reviews and critiques submitted.

For those submitting reviews for all the challenges, average scores received on reviews generally vary between two and four while Other generally varies between ten (two reviews required per challenge) and twelve (with two critiques per Odyssey). For these players, the difference in review scores between two and four is a difference of over 800 in power while the difference in Other comments between 10 and 12 gives a difference of 50 in power.

Students who submit a high number of reviews and critiques can "game" the system slightly, but in doing so they are presumably learning something by reading and evaluating the comments they are evaluating.

Note that the slope for the Response variable is negative and not statistically significant. This may be due to the fact that the average score is calculated on the number of challenges assigned – not on the number of challenges completed. Students failing to complete some challenges automatically get lower average scores.

This regression was done on data collected at the end of the course: retrospective cross-sectional.. Thus, the longitudinal appearance may be misleading.

Appendix L: Odyssey Reports – This Odyssey

There are six reports available to the administrator: three on the Odyssey as a whole and three on a particular challenge. For reports on either, select: "Administer this Odyssey, add and edit challenges"

For reports on the Odyssey as a whole:

1. Short Summary report on this Odyssey
2. Full Summary Report on this Odyssey
3. Report on history of individual player's power

To get reports on a particular challenge, press the "Administer" button next to the desired challenge.

4. Summary report, this challenge, this Odyssey
5. Summary report, this challenge, all Odysseys
6. Detailed report, this challenge for all Odysseys

Here are the details on each of these reports:

Figure 6: Odyssey Short Summary Report

Report on Odyssey 40
Statistical Literacy: Augsburg 2010 Fall Day

January 26, 2011, 3:27 am
Number of challenges for which mean scores are calculated: 5

player ID	player name	Odyssey power	mean response score	number of responses	number of other posts
[illegible]	[illegible]	2543	3.19	5	15
[illegible]	[illegible]	2050	2.01	3	13
[illegible]	[illegible]	739	0.75	1	2
[illegible]	[illegible]	1972	2.17	3	8
[illegible]	[illegible]	2558	3.06	5	17

1. Short Summary Report. See Figure 6. The title is the same as that for the full report: Odyssey Number, Source and Title along with the date and number of challenges for which the mean scores are calculated.

The body has one line per player. Each line has the player ID (E-mail) and Player Name along with their Odyssey power, mean response score, number of responses and number of other posts.

Three explanatory factors are provided for low Power:

- having done less than the full number of challenges. This is readily seen in the "number of responses" column where the player with 738 Power completed only one of the three assigned challenges.
- Have received low scores from other participants as shown by the "mean response score". Notice the player with 2050 Power received a lower mean response score than the player with 2543 Power.
- Having done fewer than average other posts (reviews and critiques).

Teachers can use this report to identify students who need help or encouragement in posting responses or who are receiving low scores from their classmates. This is most useful when sorted ascending by Power.

Figure 7: Odyssey Full Summary Report

Report on Odyssey 40
Statistical Literacy: Augsburg 2010 Fall Day

January 24, 2011, 4:08 am for
Number of challenges for which means are calculated: 5

Player e-mail and name — Odyssey power: 2543 — Responses: 5

Challenge	Day/time	Days after deadline	Score	Your rating	Reviews received	Reviews made	Critiques made
1	2010-11-08 23:48:28	0	3.6	none	1	1	0
2	2010-11-14 21:03:11	14928.1	2.196	none	2	4	1
3	2010-11-18 23:22:08	0	3.335	none	3	4	0
4	2010-12-01 19:27:32	0	3.514	none	3	3	0
5	2010-12-09 22:40:06	0	3.3	none	2	2	0
		Mean assuming 5 response scores:	3.19	Totals:	11	14	1

2. Full Summary Report. See Figure 7. The report title presents "Report on Odyssey ##" and gives the name of the Odyssey, the date/time and the number of challenges used to calculate the mean score.

The report body gives summary information for each player in this odyssey. For each participant the first line gives four fields: their e-mail address, their last and first/given name, their Odyssey power and their total number of responses made. The subsequent challenge line(s) give 8 fields: the Challenge ID, the day/time at which their review was posted, the days after deadline by which your review was posted, your score, your rating, reviews received, reviews made and critiques made. Note: "your rating" is the rating that whichever administrator requested this report gave to that player's response in this challenge.

The final summary line for each player gives the mean score (based on the number of challenges stated in the report heading) and the totals for the last three fields: reviews received, reviews made and critiques made. Player summaries are sorted by player e-mail address.

Even though this is a summary report, it can run multiple pages. For the 42 students who were assigned 5 challenges, this report was 16 pages.

Optional sorts would be nice such as Player name, # of responses and Odyssey power.

Figure 8: Player History Report

Player history report

2011-01-23 17:16

Report on milo@pro-ns.net--Milo 9Schield

At time	this kind of event	resulted in this new overall power.	The change was in this Odyssey	and resulted in this new Odyssey power.	If a child was involved, its rating of	was affected by this weight change.
2010-05-26 00:37:00	new Response	100	31	100		
2010-05-26 00:42:00	new Response	200	31	200		
2010-05-26 00:51:00	new Response	299	31	299		
2010-05-26 00:57:00	new Response	398	31	398		
2010-05-29 19:56:00	new child	398	31	398	1	0.999
2010-05-29 19:56:00	new child	787	31	787	3	0.999
2010-05-29 20:50:00	new child	787	31	787	1	1
2010-05-29 20:50:00	new child	993	31	993	2.1	1

3. Player History Report. See Figure 8. The header includes the date, time, e-mail address and player name.

The report body involves seven fields. The first five are the date/time of the event, the kind of event (new response, new review, new child, or existing child), overall power, Odyssey involved in the change and new power in this Odyssey. If a child was involved, the last two fields are the rating and the weight of the change. The ratings for reviews (0 to 4) and critiques (-2 to +2) are entered via sliders so they can be decimal fractions.

A "new child" is a new review or critique of something this player has posted. An "existing child" is a change in weight of an existing review or critique of something this player has posted. This report does not include the transaction ID so that player identity remains concealed.

The weight change for a new child is a single number; the weight change for critiques involves three numbers.

The formula for the weight change is a propriety element of this system.

Appendix M: Odyssey Reports – This Challenge

4. Summary Challenge Report. See Figure 9. The report header includes the challenge ID, the challenge name and the Odyssey name and number.

Figure 9: Odyssey Challenge Summary Report

Challenge report

Report on challenge 401: ADHD Leads to Weight Gain?, challenge in Odyssey 40

December 6, 2010, 9:37 am

Responses

name	time of post	Odyssey ID	score	reviews	Odyssey power
4Yusuf, Hiba	2010-12-01 15:33:33	40	3.365	7	1217
4Deitel, Brian	2010-12-01 16:11:51	40	3.329	6	1542
4Ahmed, Salma	2010-12-01 19:27:32	40	3.514	3	1353
2zupan, Cal	2010-12-02 17:20:58	40	2.85	4	1084
2Borum, Michelle	2010-12-02 20:37:47	40	3.1	2	1325
4Falk, Tedd	2010-12-02 20:49:02	40	2.8	2	1329
4Xiong, Jeffrey	2010-12-02 20:56:54	40	2.533	3	1316
, Krista Rehbein	2010-12-02 21:05:52	40	3.167	3	1618
4Piumbroeck, Tyler	2010-12-02 21:08:50	40	3.5	3	1553

This report body has six fields: name, time of post, Odyssey ID, score, reviews and Odyssey power. Contributions are classified as either responses or non-responses (reviews and critiques). Since there is just one response per participant, there is just one line per participant in the responses section. The data line includes the player's name, time of post, Odyssey ID, score, reviews and Odyssey power. The score and reviews are those received by the player commenting. The power is calculated by the system for this player.

5. Summary report on this challenge for all Odysseys: Same format as preceding but for all Odysseys.

Figure 10: Odyssey Challenge Detail Report

Detailed challenge report

2010-12-12 23:38
Odyssey 40: Augsburg Statistical Literacy 2010 Fall
Challenge 5: Water: A Diet Drink?

Read "Could Drinking Water Before Meals Help You Lose Weight?" Comment on the nature, strength and weakness of the argument. Identify a plausible alternate explanation for the observed association. Response and 2 reviews by Thurs 11 PM. Two more comments (reviews or critiques) by Sun 11 PM. Copy of article at www.StatLit.org/cp/20100823CouldDrinkingWaterBeforeMealsHelpYouLoseWeight.pdf

20303 Response to challenge, Score 3.3
The article pointed out some interesting points along with satistics to back up the arguements given. However, it didn't really state specifically how many ounces of water one has to drink inorder to achieve their goals. I found this to be the only weak point. Besides that, overall, I thought it was a well done article with some interesting information for those seeking weight loss.

20319 Review of 20303, Rating 3.1, Score 2,2,2
I believe there are many weak points besides a specific amount of water. My rating is due to the fact that they designate the idea of two cups of water. While this is not clear on a specific volume, in most terminology, two cups is equivalent to about a half liter of water

6. Detail Challenge Report. See Figure 10. This report generates a detailed log of every comment (response, review or critique) for a given challenge.

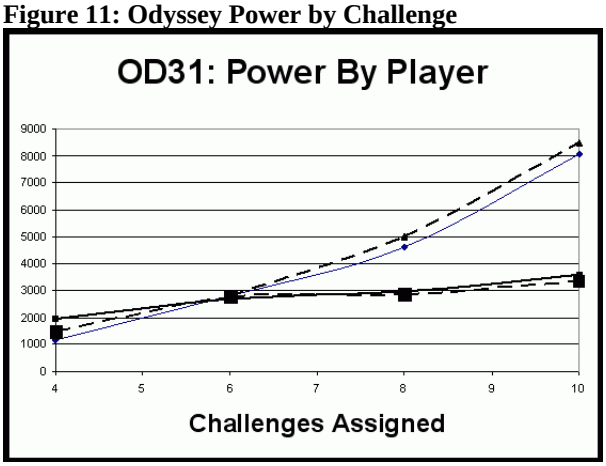
To get actual ratings, save or print the report to a PDF. Use PDF Edit/Search for "Review of" or "Critique of".

This report does not give the player's identity or the date/time of the transaction so that the player remains anonymous.

Appendix N: Odyssey Power

The calculation of power in Odyssey is not a simple process. Calculating the results of dependent relationships is straightforward so long as there are no circular references. But in Odyssey any dialogue between two players creates a circular relationship.

Figure 11: Odyssey Power by Challenge



Odyssey 31 was set with traditional (sinusoidal) power. As you can see, power increased by about 200 points per challenge for two of the players and by about 700 points per challenge for the other two players.

Appendix O: Recommendations for Designers

Try to decrease the student failure rate on response postings. The most common source of student discontent with Odyssey is their failure to get their response into the system. This response-posting failure rate seems to be 5-10% as of January 2011. Although students are told of this possibility and told to create their initial posting separately in a saved document and then copy the results into Odyssey, they often fail to do so – especially when first using the system. A failed posting with no backup requires them to recreate their initial response which generates a negative attitude toward the Odyssey system.

Consider generating a player transaction report for all transactions involving a given player for all players in a given odyssey. This eliminates the need to search by player. Each line would have a player e-mail, date/time, challenge ID, activity (player response, player review, player critique, review of player or critique of player), score, weight, player power and peer-power.

Change the default score for reviews and critiques from the current setting – the maximum (2,2,2) – to the median (0,0,0) or to something in-between (1,1,1).

Change the A-H-C scoring of critiques from the -2 to +2 system to either the continuous 1 to 4 system used for reviews or to a discrete 1, 2, 3, 4 system with clearly identified levels.

The Odyssey Full Summary Report features whatever reviews have been made by administrators. This is very helpful when there is a single administrator. But when there are multiple classes with multiple teachers, there is no way for a given teacher/administrator to identify their students and just comment on their responses.

Create an Odyssey report that includes every comment made: review, response or critique that gives both the ratings given and the score received. The header should identify the Odyssey by name and number along with the run date and time. Each comment made would be a separate line that includes the type of comment (response, review or critique), the ratings given, the score received, the type of score (default, single rating or average of multiple ratings), the challenge, the object of the comment (transaction ID), and the transaction ID of the comment. This report allows administrators to identify those cases where extreme ratings are being given – high or low. It also allows one to see how comments interact to generate the resulting score for a given response or review.

The use of "rating" for evaluations given and "score" for evaluations received may be unnecessarily subtle. This difference is like the use of credit and debit in accounting to separate outgoing from incoming amounts. Although this use of nouns is very compact, it may create unnecessary confusion. Designers should consider using "ratings given" and "ratings received" or "average rating received" to indicate the difference.

Appendix P: Challenge Details

Odyssey 27: Spring 2010.

1 Kind of point: On March 24, 2010, Yahoo News ran a story entitled "1 in 10 Chinese adults are diabetics, study finds." Your challenge is to answer these two questions: (1) What is the disputable point (claim, thesis) of this story, and what association does it claim? Please express the point in a complete sentence, with subject and verb. (2) Is the claim about causation or only association?

2 First CARE analysis: Context. On March 12, 2010 Yahoo News ran a story entitled "Women on the pill live longer: Study." Your challenge is to respond to these three questions about the news story. (1) What is the disputable point (the claim, the thesis), of the story? (Please remember to express the point in a complete sentence, with subject and verb.) (2) What evidence does the story offer in the argument that supports this point? (3) What are some alternative explanations for the association?

3 Second CARE analysis: Assembly. On March 2, 2010, Yahoo News ran a story entitled "Marriages last longer than living together?" (1) What is the

main point (claim, thesis), of the story? (Please remember to express the point in a complete sentence, with subject and verb.) (2) What statistical evidence does the story offer in the argument that supports this point? (3) What aspects of Assembly might have influenced the statistical evidence?

4 Third CARE analysis: Randomness and Error: On March 15, 2010, Yahoo News ran a story entitled "African Americans get fewer heart-protecting drugs." (1) What is the main point (claim, thesis), of the story? (Please remember to express the point in a complete sentence, with subject and verb.) (2) What statistical evidence does the story offer in the argument that supports this point? (3) What aspects of Randomness and Error might have influenced the statistical evidence?

5 Comparisons and study design: On February 24, 2010, Yahoo News ran a story entitled "Low-carb diet can increase bad cholesterol levels." Your challenge is to complete these two tasks: (1) Describe the comparisons being made in the argument. (2) Discuss the study design and how strongly its results support the argument for the point.

6 Assembly and study design: On March 8, 2010, Time ran a story entitled "Study: Women Who Drink Tend to Be Thinner." Your challenge is to complete these two tasks: (1) Critique the Assembly aspects of the article. (2) Discuss the study design and how strongly its results support the argument for the point.

7 Measurements #1: On 3 May 2010, Associated Press ran a story entitled "Oregon has lowest rate of childhood obesity." Your challenge is to show off your statistical literacy to discuss how strongly the article supports the argument of the point made in the headline. Please pay particular attention to the percentile cited.

8 Measurements #2: On 24 September 2009, Live Science ran a story entitled "Children Who Get Spanked Have Lower IQs." Please analyze this story, showing a high level of statistical literacy. Use all relevant ideas that you can, including but not limited to confounders, mechanism, the type of study design (experiment, longitudinal, etc.), and measures of center.

9 Article analysis: Gas prices and traffic fatalities. On August 25, 2008, the Associated Press ran an article entitled "High gas prices drive down traffic fatalities." Please analyze this story, showing a high level of statistical literacy, focusing especially on confounder influence and spread.

10 Article analysis: U.S. teens and phone texting. On April 20, 2010, Reuters ran an article entitled "Third of U.S. teens with phones text 100 times a day." Please analyze this story. As you discuss possible confounders, please focus on why the average number of text messages sent and received is almost three times as high among girls (80) as among boys (30), and how those confounders might be controlled for.

11 Table analysis: Dropout rates #1. Attached is a graphic of two tables. What arguments might the data support? What kinds of factors are connected with the lowest status dropout rates?

12 Table analysis: Dropout rates #2. Attached is a graphic of three tables. What arguments might the data support? What arguments might someone mistakenly claim are supported by the data?

Odyssey 31: Summer 2010

1 Lies and statistics: You may have heard the phrase "lies, damned lies, and statistics." You challenge is to respond to this question: "Why do you think statistics are associated with lies?"

2 Course anticipation: Kelly says, "Statistics are numbers, so this course will be a math course." Kit says, "Literacy is about reading. Statistical literacy may involve numbers, but this course won't be a math course." What do you anticipate about this course?

3 Fewer Boys Following 9/11: On May 24, HealthDay News carried this story: "Fewer Boys Born Following 9/11 Attacks." (1) What is the point -- the most important claim in this article? (2) What might readily or plausibly influence the statistics supporting that claim?

4 One in 110 Kids Have Autism: On Dec. 18, 2009, Health Day News carried this story: "One in 110 U.S. Children Has Autism." (1) What is the most dramatic statistic in this article? (2) What might readily or plausibly influence this statistic?

5 Bigger Tableware Widens Waistlines: Challenge – Comment on the quality of the study referenced in this article: "Bigger Tableware Helps Widen Waistlines", Yahoo News July 25, 2006.

6 More School Math Improves College Grades: Comment on the use of a statistical association to support a causal connection in this story: "Math courses aid science studies" by the AP on 7/26/2007.

7 Article analysis: Gas prices and traffic fatalities. On August 25, 2008, the Associated Press ran an article titled "High gas prices drive down traffic fatalities." Analyze the influence of context and confounders on this association and how they might be controlled for.

8 Article analysis: U.S. teens and phone texting. On April 20, 2010, Reuters ran an article entitled "Third of U.S. teens with phones text 100 times a day." They found that the average number of text messages sent and received is almost three times as high among girls (80) as among boys (30). Analyze the influence

of context, confounders and bias on these statistics and how they might be controlled for.

9 Banning Head Scarves: The attached table reports attitudes by country on the banning of head scarves by Muslim women in public places including schools. In this challenge do six things: (1) Describe the first percentage (29%) for Great Britain. (2) Compare the first percentages for France (78%) and Great Britain (29%). Do not include these percents. (3) Describe the second percentage (33%) for Great Britain. (4) Compare the 2nd and 3rd percentages for Great Britain (33% vs. 20%). Use likely grammar. The title claims that support for banning head scarves is tied to concerns about extremism. (5) Identify data in this table that support this claim. If none, say "None." (6) identify data in this table that opposes this claim. If none, say "None."

10 Most college men drink 5 or more: A university poster claims that most U of A men drink 5 or fewer drinks when they party. Milo claims this same result implies that "most U of A men drink 5 or more drinks when they party." He argues that they add up the percentage that drink zero, that drink one, etc. till they get to the lowest number of drinks that involve most men. Challenge. Is Milo right or wrong in his conclusion -- or maybe we can't say. If necessary, try different ways of grouping the men by # of drinks to support your claim.

Odyssey 40: Fall 2010. SCHEDULE: Submit initial response (plus 2 reviews) by Thursday midnight. Submit 2 additional reviews and/or critiques by Sunday midnight.

1 How Much Math Do We Really Need? G. B. Ramanthan wrote “How Much Math Do We Really Need?” in the Washington Post. Comment on his answer and give your reasons.

2 Social Construction of Statistics: Read the article “Telling the Truth About Damned Lies and Statistics “by Joel Best. Complete ALL FOUR tasks: (1) How well does Joel explains the social construction (assembly) of all statistics? (2) How has your understanding of the social construction of statistics changed? Give reasons/examples. (3) Identify the clearest example of a socially constructed statistic you've seen. Explain why it was so clear. (4) Give two examples of Social Construction (assembly) of statistics that you haven’t seen in the text or discussed in class. For each statistic, give another way it might be defined or presented?

3 Interpreting a Data Display: Numbers are often communicated by data displays. See the Stream Graph regarding “Movie Box Office Receipts from 1986-2008.” After "playing" around with the visual tool provided, answer these three questions: (1) Based on the data provided, how might you describe box office receipts over this 12 year period. Are there any patterns / changes over time which might be important? Can you make any comparisons / analysis of box office revenues during this time period? (2) While a stream graph is one way to display this data, what might be several other ways to display the same information shown in this graphic? (3) Give two other examples of data sets where stream graphs might be useful as a form of communicating numbers / comparisons.

4 ADHD Leads to Weight Gain? Read the associated news story. Comment on the strengths and weaknesses of the argument. Focus on what was (or was not) taken into account.

5 Water: A Diet Drink? Read "Could Drinking Water Before Meals Help You Lose Weight?" Comment on the nature, strength and weakness of the argument. Identify a plausible alternate explanation for the observed association.

Appendix Q: Odyssey Survey

This is the survey instrument used to gather the student data along with the counts for each answer for the 74 students surveyed.

1. **Which would you rather have?** (a) Odyssey challenges or (b) standard written assignments that are turned in each class period, graded by the professor, and handed back later?"
   a. Online Odyssey challenges [54] b. standard written assignments [18]

2. **Of the Odyssey challenges assigned to date, how many have you responded to?**
   a. none b. one c. two d. three e. four f. five g. six h. seven i eight j nine or more.

3. H**ow difficult was the Odyssey system to use at first?**
   a. Very easy [10] b. OK [25] c. somewhat difficult [31] d. very difficult [6] e. extremely difficult [1]

4. **Having completed several challenges, how difficult is the Odyssey system to use now?**
   a. Very easy [37] b. OK [25] c. somewhat difficult [10] d. very difficult [1] e. extremely difficult

5. **How useful, helpful or valuable did you see the Odyssey challenge system at first?**
   a. Negative value (waste of time) [12] b. Neutral [34] c. modest value [13] d. moderate value [9] e. high value [4]

6. **How useful, helpful or valuable did you see the Odyssey challenge system now (at this time)?**

a. Negative value (waste of time) [5] b. Neutral [21] c. modest value [16] d. moderate value [9] e. high value [11]

7. **How enjoyable was the Odyssey approach to civilized discourse initially?**
   a. not very enjoyable [17] b. OK [20] c. somewhat enjoyable [23] d. very enjoyable [8] e. extremely enjoyable [5]

8. **How enjoyable is the Odyssey approach to civilized discourse now?**
   a. not very enjoyable [11] b. OK [17] c. somewhat enjoyable [24] d. very enjoyable [15] e. extremely enjoyable [6]

9. **How objective do you see your Odyssey scores and power as being?**
   a. Not at all objective [13] b. Neutral [22] c. modestly [17] d. moderately [12] e. highly [6]

10. **How valuable do you find the reviews of others to your responses?**
    a. Negative value (waste of time) [11] b. Neutral [22] c. modest value [22] d. moderate value [12] e. high value [5]

11. **Have you disagreed with the reviews of others to your responses?**
    a. Never [8] b. Once [39] c. Twice [13] d. several times [10] e. many/most times [2]

12. **Have you voiced your disagreements with criticisms of your response by critiquing?**
    a. Never [27] b. Once [22] c. Twice [9] d. several times [12] e. many/most times [2]

13. **How relevant was the scoring (Power) in indicating quantity (amount) of your comments?**
    a. Negative value (waste of time) [9] b. Neutral [29] c. modest value [19] d. moderate value [9] e. high value [5]

14. **How relevant was the scoring (Power) in indicating the quality of your comments?**
    a. Negative value (waste of time) [11] b. Neutral [28] c. modest value [22] d. moderate value [9] e. high value [2]

15. **How do you like the game aspects of the Odyssey program?**
    a. strongly dislike [4] b. dislike [13] c. neutral [30] d. like [21] e. strongly like [5]

16. **How much do you think Odyssey helped to improve your critical thinking?**
    a. negative (waste of time) [6] b. neutral [16] c. slightly/modestly [23] d. moderately [19] e. considerably [9]

17. **The Odyssey program should be used as a central element in future statistical literacy classes.**
    a. strongly disagree [6] b. disagree [15] c. neutral [15] d. agree [31] e. strongly agree [6]

18. **Have you gotten better in making a stronger, cleaner argument in your initial reply than when you first used the Odyssey?**
    a. No, much worse [1] b. No, a bit worse [0] c. No change [5] d. Yes, somewhat better [27] e. Yes, much better [9]

What do you like and dislike most about using Odyssey Power to determine a part of your grade.

Like: _____

Dislike: _____

What kinds of challenges were most and least interesting?

Most interesting: _____

Least interesting: _____

What did you like and dislike most about the Odyssey system?

Like: _____

Dislike: _____

What parts of the Odyssey system need the most improvement for you? How could it be improved?

_____

If you haven't participated in some of the challenges, why not?

_____\