Questions from use in IST 331 based on the FDUCS book by Ritter, Baxter, and Churchill (2015)

Frank Ritter, 16 feb 2016, draft

Glossary. Define these terms, quickly,

   (a) Dunbar's number
   (b) pluralistic ignorance.
   (c) GOMS
   (d) KSAs
   (e) Formative evaluation
   (b) pluralistic ignorance.
   (c) KLM
   (d) HTA
   (e) Summative evaluation

CH 1.

1) Why study usability? (1.1)

2) Note two ways how webmasters can increase the usability of their websites?(1.1)

3) Give examples of two types of data that designers can use to improve their software.(1.1)

4) Who is most to blame for the Kegworth airplane disaster? Why? (1.2)

5) Given this mapping of buttons to lights, order them from best to worst, and note why.(1.2)

6) What can a designer do to help a user to notice a warning? (1.3)

7) When should you start to study the user? Name at least three situations (1.3)

8) Give two payoffs for understanding the user (1.3)

9) Give two situations when system designers should spend time understanding users.(1.3)

10) What causes airplanes to crash? (1.4)

11) Why is the anthropometric level of usability analysis important? (1.4)

12) Comment on Facebook's design with respect to each aspect of the ABCS.(1.4)

13) What are the ABC's? (1.4)

14) Comment on the iPhone 5s (device and iOS, the newest iPhone) with respect to each aspect of the ABCS (1.4)

15) Name two areas of user behavior that users are unlikely be able to tell you about regarding their own work (1.4)

16) Comment on a GPS system with respect to each aspect of the ABCS, making one suggestion for how to support the user better (1.4)

17) Describe one way knowledge about the user can be organized besides the ABC's (1.4)

18) Johnny pushed the wrong button on an interface. Note 4 ways you can help Johnny (1.4)

19) Why is the anthropometric level of usability analysis important? (1.4)

20) Using terms from the ABC's, describe how distractions can disrupt learning (1.4)

21) Given this schematic view of a user, note 4 ways that errors can arise. (1.5)

22) Using terms from ACT-R (shown below), describe how distractions can disrupt learning.(1.5)

23) Comment on a self-driving car with respect to each aspect of the ABCS, making one suggestion for how to support the user better based on each letter of the acronym.(1.5)

CH 2.

1) Explain user-centered design (UCD) and why should it be used?(2.2)

2) Justify why studying psychology is important to improve computer technology.(2.2)

3) How can cognitive simulation support interface design and what are its limitations?(2.2)

4) How would the fields of HCI and ergonomics differently address the usability of the iPhone6 (the newest iPhone)? (2.2)

5) Based on material in the book, Give two suggestions when you design a cell phone for older users. (2.2)

6) Describe each of standards, principles, and guidelines. Explain at least one limitation of them that they all share (2.3)

CH 3.

1) What is haptic perception? (3.3)

2) One version of Fitts' Law is Time = 70 ms * Log2 (target distance / target size + 0.5). Note two implications of Fitts law for a smart 'car' (3.3)

3) Note two advantages of haptic interfaces and two disadvantages. (3.3)

4) One version of Fitts' Law is time = 70 ms * $\log_2$ (target distance / target size + 0.5) Note two implication for the menu design. (3.3)

5) One version of Fitts' Law is Time = 70 ms * Log2 (target distance / target size + 0.5). Note what changes may be necessary to this law when using a thumb on a smartphone.(3.3)

6) Assume that Fitts law roughly applies for gestural computing technologies such as Google Glass (shown). What adjustments would you anticipate making to predict usability? (3.3)

7) Note four systems where anthropometrics makes a difference.(3.3)

8) Based on material in the books, Give two suggestions when you design a cell phone for older users. (3.4)

CH 4.

1) Suppose you want to provide the user with real-time updates on outside temperature in a nonverbal format. Pick one of the following modalities and explain in 1-2 sentences why they are suited for this task: (a) Touch, (b) Sight, (c) Hearing. (4.1)

2) (a) What is a JND? (b) How can you apply this concept to interface design? (4.2)

3) Fill in the four empty table cells related to Signal Detection Theory. Explain what they mean with respect to search engine use.(4.2)

4) What is an advantage of running a usability study in a quiet room, and what is an advantage of running it in a cafeteria?(4.2)

5) What important tradeoff in interface design does signal detection theory highlight?(4.2)

6) Give and justify two reasons for studying psychology to improve computer

technology. (4.2)

7) What is meant by color blindness? (4.3)

8) Distinguish between sensation and perception. Why this distinction is it useful?(4.4)

9) What types of objects are best found with visual search? Explain briefly. (4.4)

10) What types of objects are best found with visual search? Explain briefly. (4.4)

11) Give one example on the application of vision to interface design to take advantage of how eye searches.(4.4)

12) Explain the terms "Brightness", "Saturation", and "Hue" for color description.(4.4)

13) How can you help direct the user's attention on a search engine's output using aspects of visual perception?(4.4)

14) How can you help direct the user's attention on a GPS/SatNav display using aspects of visual perception?(4.4)

15) Imagine you are designing an app for Google Glass (glasses with a built-in display and CPU, shown here), such as a calendar (but you can choose a different app if you describe it first). How can you decrease a risk associated with the use of the app using aspects of visual perception?(4.4)

16) Explain the pop out effect. Give one application of this effect. (4.4)

17) Note three depth cues. Give one application of this aspect of vision for interface design.(4.5)

18) Name three Gestalt principles and state how you can apply them to website layout design (4.5)

19) Name two principles of visual grouping, and note how can you use these principles to improve usability or decrease errors when you design a webpage.(4.5)

20) What is the scale used to measure sound intensity? (4.6)

21) Describe intrinsic and extrinsic motivation. Explain which one guides your behavior in this class?   Which one will guide users in your class project site (note your class project site) (4.7)

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your class project site). (4.7)

23) You are designing a space shuttle system for NASA. You are told that your users are all experienced astronauts, but are told little else about them. What are 3 implications for design? (4.7)

24) How, through design, can you help someone study materials online? (4.9)

25) Give examples of two types of data that designers can use to improve their software. (4.9)

26) List 5 ways that an interface designer could assist the user to manage their attention.(4)

27) What is habituation and what role does it play in the design of alarms?(4.2)

CH 5.

1) Explain primacy and recency effects of memory.(5.1)

2) Explain declarative and procedural memory. Note how their aspects influence interface design.(5.2)

3) Why are multiple-choice exams seen as easier than short answer exams?(5.2)

4) Describe the relationship between these memory processes: encoding, retention, and retrieval (5.2)

5) List and provide an example of 5 types of memories in users.(5.2)

6) Distinguish between declarative and procedural memory.(5.2)

7) Why is consistency in interfaces important? (5.2)

8) Describe two biases in human memory.(5.2)

9) Describe a way based on human memory to make an 8 letter or digit password that is easier to remember for students. (5.2)

10) Sally has trouble learning on Angel. Note 4 ways you can help Sally learn, using a computer-based tutor/system. (5.2)

11) How can you help direct the user's attention on a search engine? (5.3)

12) Consider these two learning curves for an interface. Note an example interface where you would like second curve.(5.4)

13) Why are multiple choice exams seen as easier than short answer exams? (5.4)

14) Describe and draw the learning curve (5.4)

15) What are the stages of learning? (5.4)

16) Describe 4 aspects of learning.(5.4)

17) Describe the power law of learning (5.4)

18) Recount Rasmussen's three stages of learning by describing what each stage does. (5.4)

19) Recount Rasmussen's three stages of learning by describing what each stage does.(5.4)

20) Does learning ever stop? Why or why not?(5.4)

21) Note four ways that the book presents as ways to make reading faster and easier for users.(5)

CH 6.

1) What is feeling of knowing and why is it important for designing user interfaces? (6.2)

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3) How can understanding of user's mental model help design better interfaces?(6.2)

4) What is a mental model?(6.2)

5) Why does Dawes say that interviews have poor predictive ability? (6.2)

6) Describe an ill-structured problem, or describe how to make an ill-structured problem.(6.3)

7) Provide and explain an example of a post-completion error related to a technology system.(6.3)

8) Note two stimulus-response compatibility problems with this elevator's interface.(6.4)

9) How can you help users make decisions? [one major way]. (6.4)

10) What is the availability bias and why does it appear on the exam?(6.4)

11) Note two stimulus-response compatibility problems with this elevator's interface. (6.4)

12) How can you help users make better decisions? (6.4)

13) Name one bias in reasoning and how to help reduce this bias in an interface.(6.4)

CH 7.

1) Name two of Grice's maxims, and note two examples where systems fail to meet those maxims (7.2)

2) Here is an emergency room status board. It displays information about patients in an emergency room center. Note 5 of Grice's maxim's, and how this interface violates that maxim. (7.2)

3) Give three practical ways to improve the readability of a text on a computer screen.(7.3)

4) Describe how signal detection theory can be used to analyze a webpage's readability.(7.3)

5) What is information scent, and why is it important for website design?(7.4)

6) What can you learn by studying a log of searches (7.4)

7) Name one result from information scent that has implications for interface design.(7.4)

8) What is information scent, and why is it important for web site design?(7.4)

9) What role can search logs play in website design?(7.4)

CH 8.

1. Make two distinct points arguing in favor of and two distinct points against the value of computer-supported cooperative work as compared with direct, face-to-face communication (you may use specific examples of implementations or domains of Computer-supported cooperative work, if you wish).

2. Sketch and label an effective social network for writing a group report.

3. Note two ways that computer-supported communication (like AOL Instant Messenger) is different from face-to-face (F2F) in a good way, and two ways that it is different in a bad way.

4. How could group exams be administered so that students learned more?

5. How could group work be improved in this course so that students learned more?

6. (a) Explain the "diffusion of social responsibility". (b) Explain an attribution error that people make (often called the fundamental attribution error).

Agre Reading

1. Give four of the 26 ways that Agre proposes as ways to become a leader.

2. Agre notes 26 ways to identify an issue, and then 5 ways to follow up. Note two of the ways to follow up on an issue.

CH 9.

1) Briefly describe the difference between normative and descriptive errors(9.3)
2) Describe the tradeoff between studying large and small numbers of users. (9.4)
3) A student just found a typo, in the textbook book, this week. Use theories besides 'it's a typo!" (hit the wrong character) to describe how it could happen after numerous people (like, 2 proofreaders, 3 authors, an editor, and 100 students) read it before. (8.2)

Ch. 9: Social: Theories and Models

1. List three ways to improve overall player payoff in the prisoner's dilemma game.

2. Note two ways that groups be organized to reduce social loafing.

3. How should groups be organized?

4. Sketch and label an effective social network for writing a group report.

5. Give and explain two ways that group problem solving is different from individual problem solving.

6. List two strategies for the teacher and two for the student to improve overall student payoff in the IST 331 class using the payoff matrix-based approach used in the prisoner's dilemma game.

7. Name and explain two important effects covered in the readings from the social level.

8. Give two reasons to explain why individuals in groups do not behave as they would on their own.

9. List two strategies for the teacher and two for the student to improve overall student payoff in the IST 331 class using the payoff matrix-based approach presented by Axelrod.

10. Note two ways that the social level and the individual level of analyses interact.

11. Describe five useful variables to record when conducting a study on group collaboration using Skype as a communication media. (Think back to the group lab conducted in class.)

12. Name four factors you can change to encourage teamwork (out of those by Axelrod and the sections on motivation in The ABCS, or other sections) and give a brief description of each factor.

2. Note and explain four factors that affect team performance.

CH 10.

1) Name one aspect of humans that lead or allow people to make errors (10.1)

2) Name two ways to study errors (10.1)

3) What can we say about the Columbia shuttle accident? (10.1)

4) Name two mechanisms in humans that give rise to errors.(10.1)

5) How can users reduce the number of errors they make (at least two ways)? (10.1)

6) Give four implications for design that arise from human error.(10.5)

CH. 11 Task analysis

1) Describe two implications of learning for interface design (11.2)

1. List two goals that a web designer might hope to accomplish when analyzing important web site tasks with a task analysis (such as the Keystroke Level Model or GOMS)?

2. Estimate how long will it take Ritter to pack his office for the move to the new building. Note your assumptions.

3. List two goals that an mp3 designer might hope to accomplish when analyzing important mp3 tasks with a task analysis (such as the Keystroke Level Model or GOMS)?

4. Who is Kieras and what work has he done?

5. Sketch a task analysis for using an ATM using GOMS, the KLM, or hierarchical task analysis.

6. What aspects of interaction with the Google calendar does the KLM not explain or cover?

7. Task analysis has been used in human factors and HCI in several ways. For example, it enables us to understand how well a new system "fits" the old system. Could you list other four usage of task analysis?

8. Sketch a task analysis for using a cell phone to redial using GOMS, the KLM, or hierarchical task analysis. Note clearly your assumptions and explain the components.

9. List two aspects on how activity theory is different from GOMS.

10. Consider a new way to log in to Penn State systems. Assume that the user name does not change. Assume that a user's password is 8 characters, mixed case. The new way is to move the mouse to all four corners of the screen (Upper left, bottom right, upper right, bottom left), and then to click the existing login button. (This new way has the movement curves as the identifying information.) How long will each method take?

11. Given a task analysis of a new smart phone, explain two uses of it for designers.

CH. 12

1) What is the most important cognitive dimension to consider when developing smartphone applications, and why? (12.2)

Ch. 13: Empirical Evaluation and User Testing

1. Give and explain two ways in which an organization can overcome the problems of a system with poor usability.

2. When should you do post-hoc interface evaluations?

3. There are numerous measures that can be used to indicate usability. List four of them.

4. Describe two ways to do usability testing and/or interface testing after an interface is built, and note one advantage and one disadvantage of each of them.

CH. 13

1) The difference between external and internal validity (13.2)
2) What is the availability heuristic? (13.3)
3) What is the selectivity heuristic? (13.3)
4) Note 4 mistakes to avoid when running usability studies, perhaps based on your studies.(13)
5) What gives more reliable data, survey data or behavioral data? (13.5)
6) What is an advantage of running a usability study with friends and family, and what is a disadvantage?(13)

Ch. 14: Summary and Putting It All Together

1. Over the class you have learned a lot of material. What was the most important and interesting of this material? What additional material would you have taught in the class if you could choose?

2. Over the class you have performed several labs. What was the least important and (most importantly) why?

3. There are trade-offs in system design. Note one of them with respect to cell phones.

4. Describe the Risk-driven Incremental Commitment model and two implications for your course project.

5. The book notes 6 summary aspects of users. Note two of them and what each means for design.

6. Using *concepts from the course*, discuss whether we will see free textbooks in our lifetimes. Note two reasons why and two reasons why not.

4. Describe how the Risk-driven incremental commitment model approaches system design

9. Compare the fundamental attribution error and the fundamental attribution error of design.

OTHER:

1) Name one result from Byrne's paper that has implications for interface design.

2) First, note you project web site. Then, note two ways you can help users find information they are seeking on your web site.

3) Note 5 ways noted in the book or in your labs that you can make material on your web site easier to read.

4) Your perception lab was to provide background on running usability studies and to give some insight on how to improve web sites. Here is a picture of a web site. Suggest two questions about how to improve it that a study like your perception lab (or the default lab, if different) could start to address.

5) Note three ways that you can help a user learn how to use your interface based on your lab and the book.

6) What do the CASHE labs tell us about website design?

7) Note two ways how webmasters can increase the usability of their web sites?

8) Name two ways an individual can increase the effectiveness of communicating an idea.

9) What is currently the most important aspect of user behavior to consider when developing smartphone applications, and why? (more than one chapter)

10) Give and justify two reasons for studying psychology to improve computer technology.

11) Which basic ethic precaution do you have to take when running an experiment involving human subjects?

12) Based on your experiences with the labs and the readings, what are some important factors to consider when building an interface? List three (3) for full credit.

13) A company has hired you to predict how long it will take workers to make an object with an online tool. The company studied 100 first time users. The first object took on average a minute and 40 seconds. The 10th object took 1 minute 30 seconds. How long will they take, on average, to make the 100th and 1000th objects? (Answers to the nearest second for ½ credit, show work for full credit.)

14) Your perception lab was to provide background on running usability studies and to give some insight on how to improve web sites. Here is a picture of a web site. Suggest two questions about how to improve it that a study like your perception lab (or the default lab, if different) could start to address.

15) Name two ways (based on the material in IST331) an individual can increase the effectiveness of communicating an idea.

16) What two approaches do those in poverty use most frequently to gather information?

17) Correct this bit of material:
Subjects' performance got worse with time as shown in Table 1.
Table 1. Problem solving time and model decision cycles for individual trials for the fifth best matched subject, Robert.

18) Based on what you've learned in this course, how can you improve your learning of college course material? Give two ways.

19) How can you help users process a page of text on a web site? Note four ways.

20) How can you help a user to perform two tasks concurrently? Give two ways.

21) Your perception lab was to provide background on running usability studies and to give some insight on how to improve web sites. Here is a picture of a web site. Suggest two questions about how to improve it that a study like your perception lab (or the default lab, if different) could start to address.

22) Based on material in the book, not personal belief or folks psyshoclogy, note how the course either works well for you or could be improved.

To sort

1. Define these terms, quickly,
(a) Dunbar's number

(b) Diffusion of social responsibility

(c) GOMS

(d) KSAs

 (e) Formative evaluation

2. Note and explain four factors that affect team performance.

3. Agre notes 26 ways to identify an issue, and then 5 ways to follow up. Note two of the ways to identify an issue. Explain why these two ways work based on material in the course. (E.g., Agre says do x, x works because of y's theory or z data.)

4. Describe how the Risk-driven incremental commitment model approaches system design.

5. How could Activity Theory be used to improve the task of writing your group lab reports?

6. Addressing envelopes
Colleen has to prepare 500 letters for a non-profit mailing. She has the addresses in an XL file and has access to a nice pen, a printer, MS Word, envelopes, and sticker sheets.
(a) Estimate how long it would take Colleen to address 500 letters by hand with a pen. Explain how you got the estimate.
(b) Estimate how long it would take to print them from an XL file and put the stickers on the envelopes. Explain how you got the estimate.

7. (a) Describe 'viscosity' and when you would like it to be high and low in an interface. OR (b) describe the Gulf of Execution and how you might improve or reduce this Gulf.

8. Assume that you are developing a mobile app for supporting student communication about courses. What are the four most important usability risks that you would want to decrease as you started to plan to create this app?

9. What is the fundamental attribution error of design and why must designers be aware of it?

10. Among the usability/HCI methods you used in your labs, name the one that has been the most useful in your project, and name one that has been the least useful. Explain your choices.