

***Psych 401: 04 & 06 Capstone in Psychology  
Understanding the Influence of Visual Media on Thinking***

*Professor Neil H. Schwartz, Ph.D.*

Office: Modoc Room 202

Office Phone: 898-4968

**Class Meetings:**

**Section 05: 2:00-3:15 TR Modoc 221**

**Section 07: 3:30-4:45 TR Modoc 222**

**Office Hours:**

Tuesdays and Thursdays  
10:30 AM -12:30 PM  
or by appointment

Email [nschwartz@csuchico.edu](mailto:nschwartz@csuchico.edu)

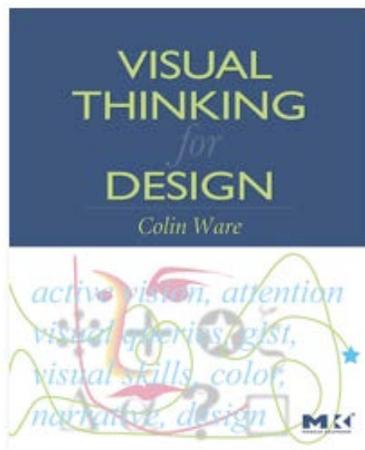
URL <http://www.csuchico.edu/~nschwartz>

\*\*\*\*\*

**Required Textbook**

Ware, C. (2008). *Visual Thinking for Design*. New York, NY: Morgan Kaufmann.

ISBN: 9780123708960



## **Course Description**

This course is designed to teach students about the power of visualizations as tools with which to think, reason, and problem solve. Visualizations refer to the 2D and 3D static and animated visual displays that depict conditions, situations, processes, places or events as they appear in maps, diagrams, graphs, pictures, or schematics. Visualization media and tools are ubiquitous. Students study graphs, charts, timelines, and formulae to learn concepts in school. Executives make graphics presentations to corporate boards for high stakes contracts; mechanical and electrical engineers examine schematics to build bridges and design cars; medical students use interactive visualization tools to learn delicate surgical procedures. Litigators convince jurors with animated and static visual displays. Finally, Internet-based commercial vendors, news agencies, and textbook editors rely on graphs, pictures, illustrations, and animations to emotionally and cognitively arouse—to stimulate interest, ensure comprehension, incur purchases, persuade and inspire—in short, to connect with the human mind. And yet, the editors, executives, engineers, litigators, educators, journalists, and other consumers who rely on the visualizations, often have little or no understanding of how, or if, the visualizations really work. That is, it is not always clear how to go about designing visualizations beyond the idiosyncratic preferences of the designer and the user. Typically, outcomes are judged as metrics of success—Did sales go up? Was the contract signed? Did the jury come back with a preferred verdict? The problem with these metrics is that they are time-consuming and expensive to reveal, and the feedback loop from design to outcome is long, typically incomplete, and often fraught with complexity between mind, display, context, use, and purpose. Thus, this course is aimed at providing students with an understanding of the way the human mind processes visual graphics and the principles for designing them to meet commercial and educational goals.

## **Course Format and Evaluation Procedures**

**Instructional methods.** This course will be delivered via three principles methods of instruction: a) lecture & class discussion, b) project development, and c) classroom presentation of your project. Lecture is designed to interpret and explain content in your text--to make it come alive with explanation, illustration and relation to your everyday lives. Class discussions are incorporated to allow you to actively process information-- to be able to interact with information in terms of your own experiences as well as the experience of others. Interactive discussions make content more comprehensible and more memorable at the same time. Secondly, there is no teacher like direct experience. Consequently, you will have the opportunity to conduct a piece of research in order to solve a problem using visualizations (in the form of 2D static or animated graphics) on a subject of Psychology you find fascinating. In your research project, you will to develop a set of graphics to test differences in human performance relative to: (a) comprehension, understanding, or preference for a publishing problem (e.g. page layout or type of graphics in science, business, litigation law, or advertising. Finally, at the end of the semester, you will turn in the written document of your research (with references) for

grading. You will also present the findings of research to the class in a PowerPoint or Prezi presentation—a presentation that describes the research, the visualization you used to test your hypotheses, and the data-based outcome of your test.

Evaluation procedures. This course is divided into three principal areas of student responsibility, with 230 points total points possible for the course.

<i>Performance Measure</i>	<i>#</i>	<i>Point Value Each</i>	<i>Total Points</i>	<i>% of Grade</i>
<b>Textbook Examinations</b>	<b>2</b>	<b>50</b>	<b>100</b>	<b>32%</b>
<b>Project Milestones</b>	<b>12</b>	<b>5</b>	<b>60</b>	<b>19%</b>
<b>Project Presentation</b>	<b>1</b>	<b>100</b>	<b>100</b>	<b>32%</b>
<b>Project Paper</b>	<b>1</b>	<b>50</b>	<b>50</b>	<b>17%</b>
<b>Total</b>			<b>310</b>	<b>100%</b>

**Class Projects and Extra Credit.**

Project. The research project is a data-based experiment you will get to conduct on a visualization problem—and you get to choose the problem. The assignment is comprised of three parts. Part one is the conduction of the experiment. Part two is the PowerPoint or Prezi presentation you will make to the class of that experiment. Part three is a write up of the experiment. You will have the opportunity to create a small piece of research in which principles of visualization can be tested using methods of experimental research. You will select a problem from the domain you choose; then, you will get to create the graphics and manipulate them according to visualization principles. You will design the experiment, run a small group of participants to collect data; finally, you will present and write up the results. The domains from which you will choose are:

1. Learning from Textbooks
2. Learning from Education Media (e.g. PowerPoint; Prezi)
3. Influence of Social Media
4. Influence of Headlines and Pictures in News
5. Influence of Advertising
6. Influence of Courtroom Media in Litigation Law
7. Other by Permission

Your research project can be completed either by yourself, or in a pair. The reason for the choice is that sometimes students do well working with a partner; sometimes, they do not; or, they simply like having the full control of working by themselves. In either case, it is up to you. A handout will be distributed shortly after the beginning of the semester describing the pros and cons of both.

Also, there are 12 milestones you will be responsible for in order to move your research project forward. You will have to be checked off on each milestone by the deadline date so that you do not fall behind. The milestones are:

1. Tentative Project Questions (Example: Are people more inclined to purchase products when the product pictures are in black and white or color).
2. Research Articles to Support or give rise to the project question.
3. Selection of Specific Research Question
4. Research articles that lead to, and support, the research question.
5. Identification of Independent Variables (IVAR) and Dependent Variables (DVAR)
6. Experimental Design
7. Construction of Materials
8. Building Qualtrics for Data Collection
9. Collecting Data
10. Analysis of Data
11. Building of PP or Prezi for Class Presentation
12. Write up Research Paper

Finally, you will need to acquaint yourself with three pieces of software—Photoshop, Qualtrics, and SPSS. You have access to Qualtrics and SPSS through the Psychology Department. Photoshop is available for your use as a student at the Makerspace Computer Lab in Meriam Library:

<http://library.csuchico.edu/makerspace> When there, click on Computer Lab.

### **Pre-Project Competencies**

You must establish competency with the software you are going to use by **Thursday, February 21<sup>st</sup>**.

*Note: If you use the website called “Lynda”—a resource available to you through your university Portal—it may be of great help to you. Lynda is an online set of technology courses free to you as a university student.* In order to get there, 1) go to your portal, 2) click on Lynda, 3) click on “**Sign in with your organization portal**”, 4) type in **csuchico.edu**.

If you have not been able to teach yourself how to use these software on your own, please contact my Teaching Assistant: Cory Tondreau via email no later than **Friday, February 15<sup>th</sup>**. Her email address is: [ctondreau@mail.csuchico.edu](mailto:ctondreau@mail.csuchico.edu).

***Qualtrics: Since your project is a research investigation, Cory will be holding a tutorial to teach you the basics of Qualtrics. Be sure to attend that tutorial since you will want to be taught how to use it. The dates of the tutorials will be announced soon.***

---

Extra credit. There is no extra credit option integral to this course. However, you may participate in the conduction of research as a research participant for a total of 10 extra points that will be added to your semester point total. One point can be earned for each hour you spend as an actual research participant. For example, if you spend ½ hour, the point value is .5; for three hours, the point value is 3. All participation must be obtained from official research conducted in the Department of Psychology.

### Examinations

There will be two exams during the semester, with both sampling content from lecture and text. Only content not yet tested will be sampled on each exam. Unit objectives are written for the information that will be tested on the exams. Both exams will not be comprehensive. Both exams will be of the same format, with five definitional terms, each worth 3 points, and 35 multiple-choice 4-option questions. The exam questions are written directly from the unit objectives posted online. It will be important for you to prepare answers to those unit objectives because you may use them in class while you are taking the exam.

### Grading

Grades in this course are based exclusively on the number of points earned from the performance measures designated above. They will be assigned either according to the percent of points obtained to the total number of points possible, or the student's class standing-- whichever is higher. The cutoff scores are identified below:

<i>Grade</i>	<i>Percent to Total</i>	<i>Class Standing</i>
<i>A</i>	93% & up	
<i>A-</i>	90% - 92%	<i>Above 75<sup>th</sup> Percentile</i>
<i>B+</i>	88% - 89%	
<i>B</i>	83% - 87%	
<i>B-</i>	80% - 82%	<i>50<sup>th</sup> - 74<sup>th</sup> Percentile</i>
<i>C+</i>	78% - 79%	
<i>C</i>	73% - 77%	
<i>C-</i>	70% - 72%	<i>25<sup>th</sup> - 49<sup>th</sup> Percentile</i>
<i>D+</i>	68% - 69%	
<i>D</i>	63% - 67%	
<i>D-</i>	60% - 62%	<i>15<sup>th</sup> - 24<sup>th</sup> Percentile</i>
<i>F</i>	59% & down	<i>Below 15<sup>th</sup> Percentile</i>

### Expectations of Scholastic Behavior

From time to time, a few students elect not to purchase the textbook required for this course. I am acutely aware that textbooks have become increasingly expensive—as has higher education in general. This is a terribly unfortunate condition in the United States. However, please note that the textbook **is required** for this course, and students are expected to purchase the text and read required chapters **prior to coming to class**. Class lectures and discussions are significantly richer and more intellectually stimulating when students are prepared. Indeed, students experience a deeper understanding of the concepts, principles and issues explained in class when they have read textbook material. Thus, students are expected to be scholastically prepared when there.

Attendance: When students miss a class, they lose the cognitive thread of the lecture. As a result, their comprehension in subsequent classes precipitously declines. This has a deleterious effect on performance. It also has an additive effect if a student misses a number of classes, or worse, is habitually absent. In effect, frequently absent students become conceptually lost which affects their ability to develop a rich cognitive model of the way children develop. In addition, regular attendees notice students who are missing or who come irregularly. As a result, the continuity and community of the class suffers since ill-prepared and frequently absent students make little substantive contributions in class and often bring up issues that have already been addressed and discussed. Thus, regular classroom attendance in this course is expected and required for course completion. And, of course, please note that once you are seated, do not get up to leave for a moment in the middle of class.

Electronic Devices: Students are encouraged to use laptops or tablets to take notes (and audio record lectures, if they wish). However, it is important to note that taking notes by writing is significantly more valuable in the encoding process of information into memory—far better than typing—leading to more enduring retention and deeper comprehension. In addition, laptops and tablets do put strain on behavioral self-regulation—that is, the tendency to be pulled to non-academic browsing during class. Of course, this behavior is antithetical to learning. Thus, please note that if a student is on any website or using any app at any time during class, regardless of the circumstances, the student will be dropped from the course. Finally, cell phones are not permitted in class. If you have one, it is required to be turned OFF—not on vibrate—OFF. If a cell phone vibrates during class, the student will be immediately asked to leave.

### University Policies and Campus Resources

Diversity Statement: I value diversity and I am committed to fostering and maintaining an educational environment that appreciates individual differences in all areas of instruction. To this end, I will not tolerate or condone any actions, practices, or processes that discriminate against or are prejudicial toward any person or group based on race, gender, age, religion, ethnicity, nationality, disability, sexual orientation, or socioeconomic status.

Academic integrity: Students are expected to be familiar with the University's Academic Integrity Policy. Your own commitment to learning, as evidenced by your enrollment at California State University, Chico, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Judicial Affairs. The policy on academic integrity and other resources related to student conduct can be found at: <http://www.csuchico.edu/sjd/integrity.shtml>.

Campus Policy in Compliance with the American Disabilities Act: If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Students with disabilities requesting accommodations must register with ARC (Accessibility Resource Center) to establish a record of their disability. Special accommodations for exams require ample notice to the testing office and must be submitted to the instructor well in advance of the exam date.

IT Support Services: Computer labs for student use are located on the first and fourth floor of the Meriam Library, Room 116 and 450, Tehama Hall Room 131, and the Bell Memorial Union (BMU) basement. You can get help using your computer from IT Support Services; contact them through their website, <http://www.csuchico.edu/itss>. Additional labs may be available to students in your department or college.

Student Services: Student services are designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. Students can find support for services such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. Student services information can be found at: <http://www.csuchico.edu/current-students>.

Americans with Disabilities Act: If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations.

Accessibility Resource Center <http://www.csuchico.edu/arc>

530-898-5959 Student Services Center 170 [arcdept@csuchico.edu](mailto:arcdept@csuchico.edu)

Student Learning Center: The mission of the Student Learning Center (SLC) is to provide services that will assist CSU, Chico students to become independent learners.

The SLC prepares and supports students in their college course work by offering a variety of programs and resources to meet student needs. The SLC facilitates the academic transition and retention of students from high schools and community colleges by providing study strategy information, content subject tutoring, and supplemental instruction. The SLC is online at <http://www.csuchico.edu/slc>. The University Writing Center has been combined with the Student Learning Center.

**Course Schedule**

<b>DATE</b>	<b>TOPIC</b>	<b>READING ASSIGNMENT</b>
<b>January 22</b>	Introduction to the Course	
<b>January 24</b>	Human Cognitive Architecture	Baddeley
<b>January 29</b>	Humans as Active Processors	Alba & Hasher
<b>January 31</b>	Multimedia Learning Theory	Mayer; Moreno
<b>February 5</b>	Cognitive Load Theory	Sweller et al.
<b>February 7</b>	Visual Queries	W: Chap. 1
<b>February 12</b>	Theory of Vision	W: Chap. 2
<b>February 14</b>	Review for Exam 1	HCA, ST, CLT, MLT, W:1, & W:2
<b>February 19</b>	<b>Exam 1</b>	HCA, MLT, CLT, W:1, & W:2
<b>February 21</b>	Processing Color	W: Chap. 4
<b>February 26</b>	Understanding Visual Objects Words and Meaning	W: Chap. 6
<b>February 28</b>	Understanding Visual & Verbal Narrative	W: Chap. 7

Psych 401 Capstone in Psychology Schwartz

<b>March 5</b>	Creative Meta-Seeing	W: Chap. 8
<b>March 7</b>	Review for Exam 2	
<b>March 12</b>	<b>Exam 2</b>	W: 4, 6, 7 & 8
<b>March 14</b>	<b>Project Development</b>	
	<b>Spring Break</b> March 18– March 22	
<b>March 26</b>	<b>Project Development</b>	
<b>March 28</b>	<b>Project Development</b>	
<b>April 2</b>	<b>Project Development</b>	
<b>April 4</b>	<b>Project Development</b>	
<b>April 9</b>	<b>Project Development</b>	
<b>April 11</b>	<b>Project Development</b>	
<b>April 16</b>	<b>Project Development</b>	
<b>April 18</b>	<b>Project Development</b>	
<b>April 23</b>	<b>Project Development</b>	
<b>April 25</b>	<b>Project Development</b>	
<b>April 30</b>	<b>Project Presentations</b>	
<b>May 2</b>	<b>Project Presentations</b>	
<b>May 7</b>	<b>Project Presentations</b>	

Psych 401 Capstone in Psychology Schwartz

<b>May 9</b>	<b>Project Presentations</b>	
<i>Final Week</i> <i>May 13<sup>th</sup> to May 17<sup>th</sup></i>	<b>Project Presentations</b> <b>Research Papers Due</b>	