Critical Reading on CHI Papers

Agenda

Part 1: Introduction [3 min]

Part 2: Discussion on General Guideline [10 min]

Part 3: Customizing Critical Thinking Questions in HCI Domain [40 min]

Part 4: Discussion and Feedback [7 min]

Part 1: Introduction to Tasks

Instructions for General Guideline and Critical Questions

Please read the general guideline and paper structure. We are going to discuss it and customize critical thinking questions in each (sub)section of the paper.

1. The general guideline is summarized from related online tutorials, books and handouts.

2. The paper structure is identified from analyses of CHI2019 full papers and late-breaking work.

3. For heading category, we provide example section/subsection title, content example (randomly select) and prototypical questions. In total we have 19 categories, each takes around 2 mins on one page.

4. For each category, feel free to ask critical thinking question (not restrict to the example content) based on your reading experience.

Part 2: Discussing General Guideline

Step			General Guidance	Example Question
0) Set a reading goal			Think about why you have selected the paper and how your critical analysis of it may contribute to your inquiry.	Why am I reading this paper?
1) Understand the general idea			Try to understand the general idea of the paper by going over the abstract and introduction.	What is the key idea of the paper?
2) Dig into each section that you are interested in	**Compre-hension**	i) **what**	Try to be engaged in analyzing the claims of this part, which is often in the first sentence of each paragraph.	What is being argued?
	Criticism	ii) **how**	Try to extract the logic that leads to the claims of this part, such as the methods that the authors use.	How the claims are supported?
		iii) **why**	Try to identify authors' rationales for their logic and claims.	Why do authors use this dataset?
		iv) **how well**	Try to evaluate the strength, weakness, and relevance of the supporting points for claims that are made.	Are the assumptions reasonable?
3) Reflect on the paper			Think about how can the paper contribute to your future work, e.g., its method, its findings, its discussion.	What is the value of this paper?

Part 3: Customizing
Critical Thinking Questions in HCI

Abstract

Introduction

Related Work

Method

Common category of CHI papers (sub)sections

Data Collection

System / Design

Study / Experiment

Participants		Task		RQs / Hypothesis

Procedure		Evalution/Measures

Analysis

Results

Discussion

Conclusion

Limitation/Future Work		Implication/Considerations

Reference

Heading No. 1: Abstract

Notes: please provide us any possible critical thinking question when you read the content under this heading based on your experience.

Example Title	"Abstract"
Example Content	Complex virtual reality (VR) tasks, like 3D solid modelling, are challenging with standard input controllers. **We propose** exploiting the affordances and input capabilities when using a 3D-tracked multi-touch tablet in an immersive VR environment. Observations gained during semi-structured interviews with general users, and those experienced with 3D software, are used to define a set of design dimensions and guidelines. These are used to develop a vocabulary of interaction techniques to demonstrate how a tablet's precise touch input capability, physical shape, metaphorical associations, and natural compatibility with barehand mid-air input can be used in VR. For example, transforming objects with touch input, "cutting" objects by using the tablet as a physical "knife", navigating in 3D by using the tablet as a viewport, and triggering commands by interleaving bare-hand input around the tablet. Key aspects of the vocabulary are **evaluated** with users, with **results** validating the approach.
Example Critical Thinking Question	What is the key idea? What is the main findings? Who is it in dialogue with? ….

Heading No. 2: Introduction

Example Title	"Introduction", "Introduction and motivation","Challenges", "Introduction & Background", "Introduction and Background", "Motivation", "Contribution"
Example Content	Vulnerability is a common experience in everyday life: people deal with uncertainties, risk, and emotional exposure in diverse life arenas– when presenting ideas at work meetings, when engaging in leisure activities … Interestingly, vulnerability as a design value is rarely embraced in technology design and HCI … In the course of conducting the research described in this paper, we have come to believe that vulnerability may be an important design value to embrace when creating technology aimed at augmenting social experiences in games and perhaps beyond … Our research group focuses on co-located social contexts, with the aim of designing technology that enhances and supports rich in-person experience… The end device was designed to help players express personal affiliation, and to support wearers in experiencing and expressing moments of physical strength and prowess … In this paper we report on the design process, as well as our study of usage and appropriation of the technology in the LARP …
Example Critical Thinking Question	What is the background of the research? What is the authors' motivation to carry out such research? What are the claimed contributions of this paper? …

Heading No. 3: Related Work

Example Title	"Related Work", "Background","Introduction and Background","Introduction & Background"
Example Content	**Informing users of smart systems** Investigations of a context aware system [17], which employs machine learning algorithms to make decisions, have demonstrated not only the benefits of making the motivations behind automated decisions salient to novice users (via text notifications), but that explanations of why system behaviour occurred result in better user understanding than explanations of why not, an observation supported in a later study [13] of simulated driver assistants (albeit through a different modality). Researchers found that … … Our work builds on this by conducting a lab study specifically designed to evaluate the impact of exposing lay users to pattern matching processes. Zhao et al. [31] conducted a study examining … Our work builds on these findings by demonstrating the capacity of algorithmic feedback …
Example Critical Thinking Question	What are the existing methods that could address the similar problem / user needs in this paper? How the proposed works in this paper differ from previous ones? How convincing is authors saying that links to or differs from related work?

Heading No. 4: Method

Example Title	"Method", "Methodology","Concept","Methods","Overview", "Approach"
Example Content	**3 METHODOLOGY** Our investigation followed a three-step process. In Step 1, two HCI researchers conducted … **3.1 Step 1: GenderMag Analysis** For Step 1, we followed the GenderMag procedures described in [15, 17], which begin by choosing persona(s). We chose the Abby and Tim personas… **3.2 Step 2: Facet-Driven Redesign** The outcomes of the analyses identify not only where an issue can arise, but why that issue might arise … **3.3 Step 3: Qualitative Empirical Study** In Step 3 we qualitatively analyzed 20 participants' use of the Original vs. post-GenderMag high-fidelity prototypes, with 10 participants per condition for each scenario (Table 2)… **3.4 Bringing the Three Steps Together** …
Example Critical Thinking Question	What is the author's purpose to adopt such methods? How does the proposed methods achieve the purpose step by step? Do any claims in the methods seem too certain? …

Heading No. 5: Data

Example Title	"Data Collection","Data Collection and Analysis","Data","Dataset"
Example Content	**Data Description** *Stimuli.* We utilize data of 318 mobile apps from Rico, a dataset which collects 9, 772 apps from Google Play. The selected apps are randomly sampled from the top three popular genres: business (104 apps), entertainment (106 apps), and Social & life-Style (108 apps). For each app, we randomly choose the ive screenshots, which are the visual information commonly presented in the app market for each app. The screenshots are 1080 × 1920 pixel images in JPEG format. *Crowd Ratings.* To collect the perceived personality of mobile app UIs, we recruit 542 participants on Amazon Mechanical Turk …
Example Critical Thinking Question	What are the purpose of creating/using this dataset? Are the sources of the dataset reliable? Do they have the right data for the following analyses? …

Heading No. 6: System / Design

Example Title	"Apparatus","Implementation","Design","Setup","Design and Procedure", "System Overview", "Hardware", "Design Space","Software","System Design","Prototype", "System Description"
Example Content	**Final Design** *True Colors* is a Y-shaped wearable that was worn around the upper chest area (front side), shoulders and upper back by the AugmentsinNewGyrLARP(see Fig. 1andvideo1). Its internal wire structure makes it slightly flexible, to adapt to different shoulder sizes. While the front interface was designed to be used by the wearer, empowering them to initiate action, the back was designed for others, divesting thewearer of full control. *In-game*, this could have a positive or negative effect. Here we illustrate this, describing the functions and interactivity of the device, the in-game actions and meaning, out-of-game technical details, and stipulated role playing instructions. *Affiliation and expressive color.* All devices had a 'true color', corresponding to the distinctive color of the AugNet that device connected to, which was pre-programmed based on the wearer's character sheet. By touching the capacitive touch sensors on the front of the device (Fig.1 (B)) Augments could choose to display this color, a neutral color (white light), or any of the other AugNet's colors…
Example Critical Thinking Question	What design choices are made by authors in developing the system? How do the authors argue for their design choices? Are you convinced by the arguments for design choices presented? …

Heading No. 7: Research Question

Example Title	"Hypotheses","Research Questions","Research Questions and Hypotheses"
Example Content	**Hypotheses** We formulate the following hypotheses for our experiment: *H1* Scrolled barcharts (SB) will perform significantly slower than all other visualizations. We believe the necessary interaction to scroll through the list will result in the scrolled barcharts requiring a longer completion time than all other visualizations. *H2* Treemaps (TM) will yield significantly less accurate performance than all other visualizations for all tasks. Assessing area is significantly less accurate than assessing lengths or position. These were formulated prior to running the experiment. They correspond to our motivations for conducting this work …
Example Critical Thinking Question	What are the independent variables and dependent variables in the statements? Are these research questions or hypotheses matched authors' proposed works in Introduction? Are there any backups for coming up with these research questions or hypotheses? …

Heading No. 8: Experiment / Study

Example Title	"Study Design", "Experiment Design","Preliminary User Evaluation"
Example Content	**5 DEPLOYMENT STUDY** In August of 2016, we launched an 18-month deployment study of Project Sidewalk. Washington DC was selected as the study site because … We recruited two types of users: volunteers through social media, blog posts, and email campaigns … … We posted a total of 298 assignments over a 6-month period.
Example Critical Thinking Question	What is the author's purpose to conduct this experiment? What type of experiment it is, e.g., lab study, field study, comparison, etc.? How appropriate is the design and process of the experiment? …

Heading No. 9: Participant

Example Title	"Participants","Participants and Apparatus","Participants and Procedure","Participant Recruitment"
Example Content	**Participants** In total, we conducted eight sessions, four for each for design task, for a total of twenty-four participants. Ten of these participants identified as male and fourteen identified as female, consistent with enrollment in our undergraduate and graduate UX programs. We recruited three participants for each protocol session, drawing on existing undergraduate and graduate students at our institution with a background in UX or interaction design. To participate, students must have had at least one semester of UX or interaction design education and some level of professional work experience in a UX-focused position as an employee or intern. We formed groups of that represented multiple skills or educational levels, encouraging a range of potential social and collaborative design interactions during the session.
Example Critical Thinking Question	Are the participants representative as targeted users? Are the sample size of the users enough for the study? What are the background of the users that should be considered in this study? …

Heading No. 10: Task

Example Title	"Task","Tasks","Materials","Task and Procedure","Material","Task Support and Interruptions"
Example Content	**Task** We adapt the 2D task used in previous mode-switching investigations [18, 48, 83] to a 3D task for VR. Considering that a common class of VR consumer applications are for sketching, painting, and 3D modeling (e.g. [8, 10, 23, 55, 60, 60, 79, 87]), with much prior research in these areas [5, 31, 39, 74, 85], we use 3D line drawing as our fundamental task. Note that this is an abstraction of many 3D tasks, such as creating objects other than lines (e.g. cubes, spheres), transforming an object (e.g. moving, scaling), or panning a world scene. Regardless, for the purposes of our experiment, the explicit mode change is more important than the gross movement of the hand during the task. All tasks were performed in a standing position…
Example Critical Thinking Question	What is the purpose for carrying this task? How do the authors decide this task? Is the task appropriately situated in a real-world context? …

Heading No. 11: Procedure

Example Title	"Procedure","Interviews","Task and Procedure","Participants & Procedure","Study Procedure"
Example Content	**Procedure** For our study, we use three of the five A-roll videos that we also used for the expert data collection task in Section 3. All videos and user interface conditions were complete counterbalanced in order. Workers received $10 for the 30 minute task. Workers were instructed to make the video more engaging by inserting B-roll. They used three different user interface conditions to edit the three videos. Workers accessed B-script via a web interface. Before the start of the task, workers were asked to report basic demographic information, how good they are at video editing, and how familiar they are specifically with the B-roll video editing task. To keep the number of conditions and the task-length appropriate for the participants, we tested the recommendation quality in a between-subject design. Users were randomly assigned to either expert-annotation based recommendations, our algorithmic recommendations, or interval-based recommendations. Figure 7 provides a detailed overview of the experiment design.
Example Critical Thinking Question	Is it clear for you to go through the study procedure in your mind? If not, what should be more clear? Are there any critical description that you found impressive? Is the workload for each participant appropriate? …

Heading No. 12: Measures

Example Title	"Measures","Measurements","Questionnaires","Observations","User Evaluation","Survey"
Example Content	**Skin Conductance Measurements** Building on the data analysis approach used by Andersen et al. and Blum et al. [1, 3], a logistic regression analysis was conducted to investigate the contribution of the maximum phasic activity following the reception of a notification to the prediction of its perception. Based on prior work on skin conductance activity, interactions between PhasicMax and the participants' age and gender were included as predictor variables [7]. To address Q2, interaction with self-reported fear of missing out (FoMO) was also included in the model. To attenuate the influence of inter-subject PhasicMax variations on the model's coefficients, the base-2 logarithm of the raw PhasicMax values was used [4]. Table 1 presents the logistic regression model employed for the analysis, its estimated regression coefficients and the output of Wald's test investigating the contribution of each predictor variable to the model's fitness.
Example Critical Thinking Question	What is the purpose for each measurement? Are the measurements from reliable sources? Are you convinced that the measurements can achieve their purposes properly? If not, why? …

Heading No. 13: Analysis

Example Title	"Data Analysis","Analysis and Results","Results and Analysis","Analysis","Data Collection and Analysis","Qualitative Analysis","Data and Analysis","Quantitative Analysis"
Example Content	**Data Analysis** All data was translated from Hindi to English by the first author, and collectively analyzed using the inductive process outlined by Merriam [52]. We conducted several rounds of open coding, focusing on findings relating to the mobile and internet practices of the ASHAs. Generated codes were shared and discussed by all authors after each iteration. The first round of coding closely followed the text. The next round of coding was more high-level and resulted in codes such as "use of WhatsApp for work", "social media to connect with family", and "infrastructural barriers to internet use". Subsequent rounds of coding combined several codes to surface larger themes such as "challenging gender norms in the household" and "power dynamics with doctors". The emergent themes highlighted the ASHAs' use of mobile phones and the internet to navigate and increase their participation as peripheral members of various communities of practice [46], leading us to use the lenses of intersectionality [82] and legitimate peripheral participation [47] in our analysis.
Example Critical Thinking Question	What type of methods is used in analyzing the data, e.g., statistic, qualitative, etc.? Do they use the right method to analyze the data? If not, what could be the alternative method? Is the description of data analysis clear enough for you? If not, what details should be added? …

Heading No. 14: Result

Example Title	"Results","Findings & Discussions","Analysis and Results","Preliminary Findings","Findings","Qualitative Feedback","Summary","Results and Discussion","RESULTS","Quantitative Results","Results and Analysis","Accuracy","User Experience","Result"
Example Content	**4 RESULTS** **Descriptive statistics** Table 1 shows an overview of the three groups: influencers, powers users, and the total population. The comparison is based on the lifetime of players. On average … In terms of group play, it is also interesting to consider with whom both influencers and powers have played with. On average, … **Testing Hypotheses** To assess our hypotheses, we took the following three steps: … **Retention and Influencer Conversion** For testing our hypotheses, we limited our observations to two weeks before and after. A question remains what kind of influence influencers may have on other players beyond this period. For this analysis …
Example Critical Thinking Question	What are the main findings reported in this part? How does the data support the main findings? Are you convinced by the interpretations presented? …

Heading No. 15: Discussion

Example Title	"Discussion","Discussion & Conclusion","Results & Discussion","Findings & Discussions","Results and Discussion","Discussion and Future Work","General Discussion","Discussion and Limitations"
Example Content	**7 DISCUSSION AND LIMITATIONS** There are a few limitations of our approach to fabricating combined rigid plastic and electrospun textile-based objects. First, the height of electrospun textiles produced on the printer is constrained by the strength of the electric feld between the hotend nozzle and the printer surface. As more non-conductive material is printed or placed between the two charged surfaces, the electric feld strength decreases …
Example Critical Thinking Question	What are the main claims that are discussed? How do the authors support the claims? Do you feel the discussion is insightful? …

Heading No. 16: Implications

Example Title	"Design Implications","Design Recommendations","Implications","Applications"
Example Content	**Design Considerations for Service Robot's Manner** We derive several design considerations for service robot's manner from our experimental findings, which signifies the trend of developing human-aware intelligent systems [9]. *Robot Should Maintain a Mental Model of Human…* *Robot Should Express Its Capability …* *Robot Behavior Policy Should Be Adaptive …*
Example Critical Thinking Question	How do the authors come up with these implications, e.g., from their findings, previous works, etc.? Are these implications practical or theoretical? How can you or other researchers make use of these implications? …

Heading No. 17: Limitation / Future Work

Example Title	"Limitations","Limitations and Future Work","Future work","Future Work"
Example Content	**Limitations** Our work has several important limitations. First, the context of our study was limited, as our experimental setup only explored the specific scenario of a lodging marketplace. It is not immediately clear that such findings will generalize to other online environments. Second, our studies offered strong experimental evidence of the manipulation's effect, but did not assess behavioral consequences (e.g., renting …
Example Critical Thinking Question	Do these limitations harm the results to an unacceptable extence? Are you convinced by the reasons that authors do not address these limitations in the paper? How could future work address these limitations? …

Heading No. 18: Conclusion

Example Title	"Conclusion","Discussion & Conclusion","Results & Discussion"
Example Content	**7 CONCLUSION** As smart devices move beyond early adopters and become integrated into the longer-term infrastructure of users' homes, we must critically consider how these technologies interact with complex and changing human relationships. We conducted a mixed-method qualitative study of interactions and tensions that occur between people sharing a smart home. Our results paint a picture of households where smart home use reflects existing relationship dynamics and power structures in homes (e.g. parent and child), and use that creates power imbalances; smart home drivers tend to have more access to functionality and data than passive users. We make recommendations for designers and researchers to help minimize these differences between co-occupants, to consider different relationship types, and to design for long-term use as children grow up and people move.
Example Critical Thinking Question	What is the main contribution of this work? Is it useful for your work? What are the strengths and weaknesses of the paper? …

Heading No. 19: Reference

Example Title	"References"
Example Content	**REFERENCES** [1] Moritz Bächer, Benjamin Hepp, Fabrizio Pece, Paul G. Kry, Bernd Bickel, Bernhard Thomaszewski, and Otmar Hilliges. 2016. DefSense: Computational Design of Customized Deformable Input Devices. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16). ACM, New York, NY, USA, 3806–3816. https://doi. org/10.1145/2858036.2858354 [2] Nandana Bhardwaj and Subhas C Kundu. 2010. Electrospinning: a fascinating fber fabrication technique. Biotechnology advances 28, 3 (2010), 325–347. [3]…
Example Critical Thinking Question	Are these references mainly from high-quality sources? What is the main venue of these references from? …

Part 4: Discussion and Feedback

- What types (e.g., visualization, VR) of CHI papers do you usually read?

- How did you learn to ask these critical questions when reading papers?