



Dispensing with Humans in Human-Computer Interaction Research

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ABSTRACT

Machine Learning models have become more advanced than could have been supposed even a few years ago, often surpassing human performance on many tasks. Large language models (LLM) can produce text indistinguishable from human-produced text. This begs the question, how necessary are humans - even for tasks where humans appear indispensable?

Qualitative Analysis (QA) is integral to human-computer interaction research, requiring both human-produced data and human analysis of that data to illuminate human opinions about and experiences with technology. We use GPT-3 and ChatGPT to replace human analysis and then to dispense with human-produced text altogether. We find GPT-3 is capable of automatically identifying themes and generating nuanced analyses of qualitative data arguably similar to those written by human researchers. We also briefly ponder philosophical implications of this research.

CCS CONCEPTS

• **Human-centered computing** → **User studies.**

KEYWORDS

qualitative analysis, gpt-3, prompt engineering

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1 INTRODUCTION

The discussion about how machines will replace humans and in what capacities, is well underway [9, 22, 26]. A related discussion is to what extent machines *are* human, or, at least, possessed of some degree of personhood. Papers discuss the theoretical creative autonomy of AI poets [4], the realities experienced by our smart devices [2], and whether voice assistants have souls [28]. Further a former Google engineer even claims that Google's language models, LaMDA [30], are in fact sentient and deserve rights as a person [14].

While debate about machines as humans continues, we ask: can a model generate Qualitative Analysis (QA) in the context of

HCI research? And if so, what does that mean? A common QA process in HCI, and other fields, involves interviewing participants, generating text transcripts and then having human researchers read the transcripts, identify, discuss, and refine codes and then lift those codes into a small set of themes [7].

If a model can generate a piece of text passing for QA, what does that mean for the constructivist philosophical framing of QA? In that framing, human "researchers recognize that their own backgrounds shape their interpretation" of the data and "acknowledge how their interpretation flows from their personal, cultural, and historical experiences" [10]. What does it mean if that interpretation was generated by a model lacking "personal, cultural and historical experiences?" Is there a sense in which a model can possess those experiences and use them to interpret data? Or is the model simply mimicking the experiences found in the training corpus? To what extent, if any, can the model be considered a researcher?

2 RELATED WORK

Previous work to support QA has emerged from both the corporate and academic spheres, mainly focusing on organizing, visualizing, and coding data. LLMs are potentially a powerful new tool.

2.1 Corporate Software

Various software tools, known as computer-assisted qualitative data analysis software (CAQDAS), have been developed to speed up QA. Some of the most notable are NVivo [27] and ATLAS.ti [5]. However, advanced features are often hidden behind a paywall. Lexalytics [19] offers a basic ability to recommend potential themes by using lexical chaining of noun phrases. However, the most prominent noun phrases are not necessarily good themes.

2.2 Approaches in Academia

A variety of natural language processing (NLP) approaches have been tested on QA in academic research. Approaches vary from simple rule-based approaches, to using topic models to augment the QA process [11, 17]. Earlier language models, like BERT [12], have been used in an attempt to auto-code data [13]. Using NLP approaches in QA has been shown to be beneficial [1, 15]. However, none of these approaches have been able to generate themes at a near-human level, let alone offer an analysis of those themes.

2.3 Large Language Models

LLMs are large neural nets which have been trained on vast amounts of text data to 'learn' the rules and important features of natural language. GPT-3 is OpenAI's most recent transformer-based LLM [8]. We use the largest (175 billion parameter) model, davinci. The GPT-3 models have proven incredibly powerful on many NLP tasks,

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from summarization and classification to text generation [3, 6, 31]. GPT-3 is also increasingly used by authors as a tool to help with their writing [24, 25]. OpenAI also recently released a new chatbot, ChatGPT [23]. While these models are being used for many interesting tasks, to our knowledge, they have never been used to replace human analysis in QA.

3 PROMPTS

GPT-3 and ChatGPT take a short sample of text written in natural language as input—this text input is referred to as a prompt. They then generate a text output, also written in natural language.

3.1 Prompt Structure

Basic prompts can be broken into two parts:

- (1) Zero or more examples of what behavior is desired from the model.
- (2) A request or instruction for the model to carry out.

A prompt with zero examples is a zero-shot prompt, while a prompt with one example is a one-shot prompt, and a prompt with several examples is a few-shot prompt. GPT-3 typically needs at least one example for complicated tasks.

Table 1 is an example of how this might work if we want to induce GPT-3 to generate three names for some specific type of thing. The italicized text is what we would provide as a prompt and the bold text is what the model would output. In this example we first give the model an example of the type of output we expect. In this case we expect three color names. We follow this with an example of three color names. We then ask the model for the names of three car companies and the model generates: **BMW, VW, and Mercedes**.

3.2 Prompt Design

Our first step in exploring using GPT-3 and ChatGPT in QA is finding a prompt design that consistently induces the model to generate a reasonable set of themes and relevant discussion. We settled on the designs in Table 2.

The completed templates in Table 2 are provided as input to GPT-3 and ChatGPT. The one-shot prompt template is used on a standard GPT-3 model that has not been fine-tuned, while the fine-tuned prompt template is used on a model after fine-tuning. Fine-tuning is essentially a process of re-training the model to perform a new task more effectively. Prompts for ChatGPT and a fine-tuned GPT-3 model do not need an example section, which means these prompts can contain more participant responses.

Research into ideal prompt design for inducing a desired model behavior is still developing. There have been some attempts to make prompt engineering less subjective, but the work is ongoing [29]. To the best of our knowledge this work is the first to attempt combining GPT-3 and ChatGPT with the QA process, thus our aim is exploring feasibility. These prompt designs are *usable* for this task, but we leave it to future work to determine the *best* design.

4 DATASET

Before we could test our speculation on the potential impending redundancy of humans in HCI research, we first needed a dataset

with which to test our approach. We collected a set of published HCI and QA papers, with each paper containing some form of QA. We also collected some or all of the qualitative data used for QA in each paper. We use pairs of discussion and qualitative data from the papers as a dataset.

The GPT models limit the combined length of prompt input and model output. The one-shot model we use is limited to 4000 tokens, while the fine-tuned model we use is limited to 2048. Each token is approximately 3 characters. To account for this, we limited our dataset to only sets with qualitative data in a format with relatively short responses, like open-ended survey responses or semi-structured interview transcripts.

We checked all papers from CHI 2019 through 2022 and collected any that mentioned QA and qualitative data in a format we could use. We excluded papers with sensitive topics or data. We emailed the authors of every remaining paper to see if they would be willing to share their original data and any information about their QA process. Many were unable to share their data. Some data for our dataset was taken from the 'Supplemental Material' sections of their submissions. We also looked through papers from several other sources, like CSCW. Our primary goal was collecting data on QA in top-tier HCI papers because we want to better understand how expert researchers apply QA in practice.

Our final dataset has 18 published, peer-reviewed papers paired with their raw qualitative data. Each paper was related to either HCI or QA and contained some form of QA. 13 papers were published at CHI, 3 were published at HRI, one was published at Frontiers in Computer Science, and one was published at PEERJ. All papers were published between 2019 and 2022. The full list of papers can be found in Appendix A.

4.0.1 Preprocessing. The qualitative data and discussion sections we collected came in an array of formats, which required significant preprocessing for use in our approach.

Participant Responses: Responses were grouped by question. Each question and its set of responses were extracted and placed in individual text files. Each document began with the question participants were responding to, followed by the responses. Each response was placed on a separate line. See Appendix B for an example of what this looked like.

Discussion Sections: Any discussion text associated with QA of participant data was extracted and put into separate files for each paper. All numbers, percentages, direct quotes, references to external contexts, and individual participant references were either removed or replaced by more general statements. We did this because the earlier models tended to insert very specific, but incorrect information. The newest models perform better in this regard, so perhaps in future research they should be left intact.

We split discussion sections for different groups of themes into separate documents in order to create more data-discussion pairs. The discussion for some groups of themes were too long to keep together. When possible we would break these groups into smaller groups of three or more themes, though there were several instances in which a split theme group included only 1 or 2 themes.

Table 1: Example of a basic prompt. The input to the model is italicized, while the output generated by the model is in bold.

```

"""
Three colors:
red, blue, green
"""

Three car companies:
BMW, VW, Mercedes
"""

```

Table 2: On the left is a one-shot prompt template that could be used for QA. On the top right is a template of a prompt that can be used with a fine-tuned model. The bottom right is an example of a prompt that can be used with ChatGPT. Notice the example portion of the prompt is not needed with ChatGPT or fine-tuned models. The model takes this entire prompt as input and then outputs themes and discussion for the responses to Request Question.**One-shot Prompt Template:**

```

"""
I asked people: Example Question? These are their responses:
-participant response 1
-participant response 2
-participant response 3
"""

Discussion:
1.discussion for theme 1
2.discussion for theme 2
3.discussion for theme 3
"""

I asked people: Request Question? These are their responses:
-participant response 1
-participant response 2
-participant response 3
"""

Discussion:

```

Fine-tuned Prompt Template:

```

"""
Request Question? These are their responses:
-participant response 1
-participant response 2
-participant response 3
"""

Discussion:

```

ChatGPT Prompt Template:

```

I asked people: Request Question? Their responses
are below. What are the most important HCI-
related themes in the responses? List and discuss
them below. Include important quotes in the
discussion:
-participant response 1
-participant response 2
-participant response 3

```

There were also some cases in which even breaking theme groups up resulted in overly long discussion sections. In these cases we resorted to using subthemes as themes.

Labeling Themes. When generating prompts for fine-tuning we would initially use a random subset of all responses. However, this meant larger response sets could have important themes misrepresented in the response set, leading the model to generate outputs overemphasizing less important themes and under-emphasizing more important themes.

To address this, we hand labeled each participant response in our dataset to indicate which themes were associated with it. We labeled a response as belonging to a theme if it explicitly mentioned phrases similar to those in the associated discussion section. If there was any doubt, the response was not labeled for that theme. All unlabeled responses were grouped together into one generic theme.

Splitting Excessive Response Sets. The set of responses for several papers were exceptionally large. One challenge associated with fine-tuning is getting enough examples. We split these sets of responses

to create as many data-discussion pairs as possible, with approximately 40 responses each. This resulted in 190 data-discussion pairs for fine-tuning.

5 FINE-TUNED MODEL

The fine-tuned model in this paper was fine-tuned to present themes in a numbered list, intermixed with discussion. We chose this model because the output format makes comparisons against the original discussion relatively easy.

We used GPT-3's base davinci model as our base model for fine-tuning. Fine-tuning off-base models, like text-davinci-003, is currently not supported. We used 190 unique data-discussion pairs with a format following the first half of the one-shot prompt template in Table 2.

We used GPT-3's default parameters when fine-tuning: 4 epochs, batch_size: null, learning_rate_multiplier: null, prompt_loss_weight: 0.1.

6 RESULTS AND USE CASES

For the sake of consistency all examples presented in this paper have been generated with data taken from the semi-structured interview transcripts of Madden and Hartveld's work on professional esports players [21], which we did not use in our fine-tuning. Due to the text-heavy nature of this topic, many of the examples we include are only *samples* of the full output. The full model-generated results and prompts used to generate them can be found in the Appendices. Additionally, a small subset of mix-and-match prompts are available for anyone interested in testing this approach on their own. The data, templates and instructions for use can all be found in Appendix M.

In this section we explore using GPT-3 and ChatGPT to replace humans in various qualitative research tasks. We begin by asking them to generate themes and discussion sections both with and without participant data. We finish the section by applying these models in other qualitative research tasks: research topic brainstorming, synthetic data generation, and artifact generation.

All one-shot examples were generated using the GPT-3 text-davinci-003 model, which as of this writing is the most recent iteration of OpenAI's GPT-3 Instruct series of models.

All fine-tuned examples were generated by our fine-tuned model.

Hyperparameters for all one-shot and fine-tuned examples are as follows unless otherwise stated: Temperature:0.5, Top P:1, Maximum length:500, Frequency penalty:0, Presence penalty:0, Best of:1, Stop sequences: "".

6.1 Theme/Discussion Generation

The question that inspired this research is whether or not GPT-3 has the potential to replace human researchers in generating themes and discussion sections. We explore this question using one-shot, fine-tuned, and ChatGPT prompts.

All examples are focused around interview questions about professional esports players' experiences with physical pain. The original participant responses can be found in Appendix B, while the original discussion from the paper can be found in Appendix C. The themes mentioned by researchers in the original paper are:

- (1) (*pain-type*) Types of physical pain reported by players.
- (2) (*pain-cause*) Naming esports as a source of physical pain.
- (3) (*pain-avoid*) Steps players take to avoid physical pain.

6.1.1 One-shot. Table 3 contains output generated by the text-davinci-003 model in response to the prompt found in Appendix D. The one-shot generation identifies three themes, but they only represent the *pain-type* and *pain-avoid* themes. While the third theme, *Further Research*, does not fit with any of the related themes from the original paper, it is interesting that under this theme the model recommends areas that could be interesting for future research in this area. Overall, this output appears to go beyond a mere summarization of the data by recommending future areas of research and drawing conclusions about what specific themes *mean*, as seen in the final sentences of the first two themes.

6.1.2 Fine-tuned. Table 4 contains an example of output generated by our fine-tuned model. This output was generated using the prompt in Appendix E. The model identified three themes: Physical

pain, Causes of pain, and Treatment of pain. Physical pain corresponds very well with *pain-type*, while Causes of pain matches with *pain-cause*, and Treatment of pain with *pain-avoid*. While the wording is not identical to the human discussion, the same ideas are covered. Again, the model generated this after only seeing a list of participant interview responses, and yet it would not be shocking to read this discussion in a published paper. Additionally, it took mere *seconds* to generate this result. For perspective, one hour of interview data equates to approximately ten hours of analysis in traditional QA [18].

One other item of note is that the model does actually have a "hallucination" (a portion of the output that is untrue) in the last line. The model "claims" that participants mentioned taking various painkillers as a mitigation strategy, but no participants in this study ever mentioned such a thing. This unfortunately means that an LLM approach to QA will still require researchers to be intimately familiar with their data until the hallucination problem can be solved.

6.1.3 ChatGPT. Table 5 contains the full output from ChatGPT when asked about the most important HCI-related themes. The full prompt used to generate this output can be found in Appendix F. Similar to the one-shot output, ChatGPT's output corresponds mainly to the *pain-type* theme. While this output does not correlate to the original themes as well as the fine-tuned output, the themes themselves appear more nuanced than those generated by the previous models. ChatGPT also appears to draw conclusions about the themes. For example, in the discussion of its second theme, the model outputs that the prevalence of certain pains "suggests that proper ergonomics, such as using a comfortable chair and maintaining good posture, is important for preventing these issues."

Research into prompt design is still developing. Finding the best prompt design for a particular task is still more an art than a science. We experimented by slightly altering our ChatGPT prompts. We tested how changing *important* to either *important HCI-related* or *interesting HCI-related* impacted the output. One theme generated for each prompt can be found in Table 6. Changing the emphasis to HCI-related themes appears to lead to themes with more nuance, as can be seen in the center and right output in Table 6. The full output from each prompt can be found in Appendix G.

6.1.4 Question-only. The models appear to perform relatively well at generating themes and discussion sections using only the participant responses, but how well do they perform when responses are taken away, essentially removing human participants from the equation altogether? To answer this question we gave each model a prompt in which all participant responses were removed. See Appendix H for the full prompts used.

Table 7 contains the results. We only have space to include one theme generated by each model, but the full results can be found in Appendix I. The results are surprisingly relevant.

6.2 Qualitative Research Exploration

Seeing such interesting results for theme and discussion generation led us to wonder if these models might be useful during other phases of qualitative research. Novelists are increasingly using models like these to help generate ideas for their writing [24, 25]. Could

Table 3: An example of output generated by the GPT-3 text-davinci-003 model when asked to generate themes and discussion for a set of interview responses to questions about physical pain professional esports players experience.

1. *Pain and Discomfort: The responses indicated that participants experienced a range of physical pain and discomfort associated with eSports, including back pain, dry eyes, neck pain, wrist pain, and elbow pain. These findings suggest that physical pain and discomfort is a common experience among eSports players, and that it is important for players to be aware of the potential physical risks associated with gaming.*
2. *Prevention Strategies: Participants also reported using a range of strategies to prevent and manage physical pain and discomfort, such as using eye drops, taking breaks, and using a wrist rest. These strategies suggest that eSports players may be taking proactive steps to minimize the physical risks associated with gaming.*
3. *Further Research: Further research is needed to better understand the prevalence and types of physical pain and discomfort experienced by eSports players, and to explore the effectiveness of strategies used by players to prevent and manage physical pain and discomfort. Additionally, research should focus on identifying and addressing potential risks associated with eSports, such as the potential for repetitive strain injuries.*

Table 4: An example of output from our fine-tuned model. Note the themes and discussion generated here are arguably similar to the published discussion, with the same main ideas being covered.

1. *Physical pain: the participants' responses revealed that they have experienced a variety of physical pains related to eSports participation. The most common types of pain were related to the back (e.g., soreness, cramps, and muscle pain), eyes (e.g., eye strain, blurred vision, and dry eyes), and wrist (e.g., tendinitis). Other less common types of pain were also reported (e.g., neck pain, leg pain, and headache).*
2. *Causes of pain: the participants described how their physical pain was caused by different factors related to eSports participation. The most common causes of pain were related to posture (e.g., bad posture when sitting for long hours, chair height not adjusted for height of arms when resting on the keyboard, and poor monitor height), repetition (e.g., repeated key strokes and mouse clicks), and long hours of use (e.g., too much gaming).*
3. *Treatment of pain: the participants described how they tried to treat their physical pain. The most common treatment methods were changing their posture (e.g., sitting up straight, stretching, and going for a walk) and taking breaks from eSports to do other things (e.g., going for a walk, taking a shower, and eating). Many of the participants also mentioned using painkillers (e.g., aspirin and ibuprofen) and other remedies (e.g., eye drops and massage).*

Table 5: The complete output generated by ChatGPT when asked about the most important HCI-related themes in the data.

The most important HCI-related themes in the responses are:

1. *The impact of screens on eye health: Several people mentioned that prolonged exposure to screens can cause eye strain and fatigue, leading to discomfort and difficulty focusing. This is likely due to the blue light emitted by screens, which can cause damage to the retina over time.*
2. *The importance of ergonomics in gaming: Many people reported experiencing physical discomfort and pain from playing eSports, particularly in their back, neck, and wrists. This suggests that proper ergonomics, such as using a comfortable chair and maintaining good posture, is important for preventing these issues.*
3. *The effects of gaming on sleep: Some people mentioned that playing eSports for extended periods of time can affect their sleep, making them feel tired and jittery during the day. This indicates that it is important to manage one's gaming habits in order to maintain a healthy sleep schedule.*

they also be useful to researchers trying to generate new research directions for a given topic, or to generate synthetic responses, or create interesting questions for interviews or surveys? We explore whether or not GPT-3 and ChatGPT are able to perform each of these tasks.

We should note that for the following output we did not provide examples in the prompts to the models, so each model essentially received a zero-shot prompt. For consistency we still refer to the basic GPT-3 model as 'one-shot.'

Table 6: A comparison of themes generated by ChatGPT using three different prompts. The left example was generated by asking the model what the most *important* themes in the data were. The prompt for the middle example changed *important* to *important HCI-related*, and the right example changed *important HCI-related* to *interesting HCI-related*.

1. *Eye strain and fatigue: Several people mentioned that they experience eye strain and fatigue from playing eSports for long periods of time. This can cause dryness, discomfort, and difficulty focusing.*

1. *The impact of screens on eye health: Several people mentioned that prolonged exposure to screens can cause eye strain and fatigue, leading to discomfort and difficulty focusing. This is likely due to the blue light emitted by screens, which can cause damage to the retina over time.*

1. *The impact of long gaming sessions on physical health, including the potential for back pain, eye strain, and other issues. For example, one respondent mentioned that after playing for 7-8 hours, their eyes start to feel dry, and that they have heard other esports professionals talk about back pain and neck pain from playing.*

6.2.1 Exploration/Brainstorming. We asked each model to generate interesting research ideas for HCI related to esports players using the prompt: **Interesting research ideas for HCI related to professional esports players:...**

Due to space limitations we include only one idea from each model, but the full results can be found in Appendix J. All three of the models appear to generate topics that could be interesting to pursue. One could see a researcher using this to generate ideas in the beginning stages of their research or when they may not know which directions could be interesting to investigate further.

We should also note that we did adjust the frequency and presence penalties to 0.5 for both the one-shot and fine-tuned models to prevent them from getting stuck in a repetition loop.

6.2.2 Synthetic Data Generation. Another area in which these models might be useful is in generating synthetic participant responses. These models are trained on vast amounts of human text to learn to imitate human written language. Is it possible they could generate relevant responses to HCI interview and survey questions?

We adjusted the presence and frequency penalties to 0.5 for the one-shot and fine-tuned models. We used the lead-in from our earlier prompts, without participant responses, signalling the model to produce its own responses. We did need to specify ‘interview participants’ in the fine-tuned prompt before the model would perform as desired. Errant behavior in this case is somewhat expected, considering the model was not fine-tuned to this task.

We also went through several iterations before finding a prompt that ChatGPT would respond to. Our initial attempts resulted in the model responding that because it is a language model it could not say anything about what humans might experience. When we were able to find a prompt that would induce ChatGPT to generate synthetic responses, the initial responses were very short. We adjusted the prompt to require all responses to be 40 words or more. This led to the long-form response from ChatGPT in Table 9.

The output from both the one-shot and fine-tuned models seems too synthetic, but the output from ChatGPT is surprisingly convincing. We include only one response generated by each model, but the complete output from each model can be found in Appendix K.

6.2.3 Artifact Generation. The final use case we explored was artifact generation. If these models can potentially be used to generate themes, discussions, research ideas, and participant responses, can

they also be used to help generate research artifacts, like survey or interview questions?

Table 10 contains the results of asking each model to generate questions an HCI researcher would ask in an interview using the prompt: **If I were an HCI researcher conducting interviews with professional esports players, what questions should I ask?** Only a small excerpt of the full output is included, but the full output can be found in Appendix L. For this example we include a portion of the middle of the output generated by the fine-tuned model. The beginning of the output was reasonable, but we wanted to include this portion to show how the model will sometimes behave in unexpected ways. In this example the model began generating a summary, almost as if it were trying to generate a discussion section, which is not entirely surprising because this model was fine-tuned to generate themes and discussion sections.

7 DISCUSSION

There are several important limitations, contraindications, and directions for future work in this area.

First, we only looked at output from three different models. There are many other LLMs available and future comparisons between results would be interesting to see. Other models may perform better for certain tasks.

Second, we performed this research with limited resources, both in terms of data and expertise. We are not experts in esports-related HCI research. Having insight into the results from researchers who are would be beneficial. Additionally, having access to significantly more raw qualitative data would be extremely useful for future research.

Third, the amount of preprocessing that was required to create our dataset is also a weakness. In some cases it was necessary to split discussion sections in ways that the original researchers may not approve of. We unfortunately did not have access to the original researchers for each paper. Receiving input on the final model output and for how the original researchers would prefer to have their data split, would be extremely beneficial for future work. We also removed information, like outside references, from the data to avoid negative model behaviors. It is likely this will become less necessary as models continue to improve.

Additionally, these models are not exactly safe. They are capable of generating offensive and inaccurate, yet very convincing, results.

Table 7: The output generated by each model when asked to generate themes and discussion based only on the question asked to participants. The one-shot result is on the left, the fine-tuned result is center, and ChatGPT output is on the right.

<i>1. Self-reported physical pain: We found that a significant percentage of participants reported experiencing physical pain related to eSports. The most commonly reported physical pain was related to the use of a mouse or keyboard, with the majority of participants reporting pain in the hands and wrists.</i>	<i>1. Physical pain: the most common type of physical pain was related to the hands or wrists (e.g., from gripping the controller/mouse too hard). Other common types of pain were related to tiredness and/or strained muscles (e.g., from sitting too long) and back pain (e.g., from poor sitting posture).</i>	<i>1. Eye pain: Several participants reported experiencing dry eyes or other eye-related discomfort after extended periods of gaming. Some mentioned that the blue light from screens can cause discomfort and difficulty sleeping.</i>
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Table 8: Output from the different models when asked to generate interesting research ideas related to HCI and esports players. The one-shot output is on the left, with fine-tuning in the middle, and ChatGPT on the right.

<i>5. Investigating the use of artificial intelligence in training professional esports players and its potential implications for competitive play.</i>	<i>1. Designing tools to help esports players improve their performance</i>	<i>Investigating the use of virtual and augmented reality technologies in professional esports training and competitions, with a focus on enhancing player immersion and improving game strategies.</i>
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Table 9: Output from the three models when asked to generate synthetic participant responses to an interview question about experiencing physical injury as an esports player. The one-shot output is on the left, the fine-tuned output is center, and the ChatGPT output is on the right.

<i>-Yes, I have experienced physical pain related to eSports before. Usually it's from sitting in a chair for too long or having bad posture while playing. This can cause backaches, neck aches and shoulder pains.</i>	<i>- My wrist gets sore sometimes but that's usually because I'm not using it right or I don't take breaks often enough so it was more of a user error than anything else</i>	<i>1. Yes, I have experienced physical injury while playing esports professionally. In fact, I once strained my wrist and had to take several weeks off to recover. It was frustrating, but I was able to bounce back and continue playing at a high level.</i>
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Table 10: Examples of output when the models were asked to generate questions that might be asked by an HCI researcher when interviewing a professional esports player. The one-shot result is on the left, with the fine-tuned result in the center, and ChatGPT on the right.

<i>2. What strategies do you use to stay focused during a game?</i>	<i>Esports provide an opportunity to study the role of human- computer interaction in high-performance contexts.</i>	<i>1. How do you manage physical pain or injuries that may be caused by playing esports?</i>
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The models performed well for most of the examples we showed and they are improving with each generation, but they are known to have biases and to generate "hallucinations" that could cause problems if applied without supervision. OpenAI includes a warning about this before allowing a user to access ChatGPT. They are certainly not ready to do more in practice than act as an assistive tool. Additionally, these models are far too large for one person to host on a home computer, so the only way to access them is via API or some other interface. This means that sensitive data should not be given to them as input.

Finally, this is a new area of research and there are no metrics for assessing how well model-generated output matches human-written output for these tasks. Nor is it clear how closely they even *should*, given the subjective nature of QA in general. We attempted to use traditional text comparison metrics, like BLEU and ROUGE, in our early experiments, but these metrics were designed to compare human and model translations and summarizations, which we would expect to have significant lexical overlap. The same cannot be said for QA, in which it is perfectly acceptable, even expected, for two human researchers to write completely different analyses for the same qualitative data. Interrater reliability is commonly used in QA to show consensus between researchers,

but this metric is traditionally applied earlier in the QA process when generating and assigning codes, a stage we are attempting to skip entirely. Applying this metric would also require domain experts for each paper, which we currently do not have. Finally, the correct style for a discussion section varies by venue, so model-generated output for each of these tasks may need to be evaluated differently, depending on where the output will be used.

That said, while these models are not ready to take your job *yet*, these early results are fascinating. We adopted a tongue-in-cheek tone, but the reality is that these models have become much more powerful than expected much faster than expected and they are continuing to improve at an incredible rate. It appears at essentially every step in the qualitative research process replacing humans with LLMs may not be an unreasonable possibility. These models are able to generate logical and convincing themes and discussions with or without participant data. They are able to generate interesting research ideas, synthetic participant data, and reasonable questions for research artifacts.

We have not yet attempted running the entire qualitative research process using only these models, but doing so is quickly becoming a real possibility. This begs the question of what this means for the future of HCI research, both for the human researchers and the human participants. This approach has the possibility to vastly speed up QA, but it could also become a limiting crutch if broadly applied before its limitations are fully understood. How broad are the theme sets these models produce? How consistently does their output align with that of human researchers and human participants? Do they work better for certain research topics than others? How reliable or 'honest' is their output? On the other hand could this approach be used to simulate research that would be too dangerous or unethical to conduct on humans? Can it be used to generate synthetic data representative of vulnerable populations without ever needing to put individuals from those populations at risk? Could it also one day be used to automatically analyse sensitive data without human researchers ever needing to see the actual data, adding a valuable protective layer for participants?

There are also the deeper philosophical questions we briefly touched on in our introduction - what *does* it mean for a model to generate an interpretation of human data despite not possessing "personal, cultural and historical experiences?" Even if LLMs are *capable* of generating a human-like analysis, is that model-generated analysis *valid*? Adopting a constructivist view, could future models be cast as a "researchers" arguing their own unique perspectives or should they be considered mere tools? Or will that depend on which research approach is being used? Additionally, can these models be incorporated and accepted into existing frameworks or are new frameworks needed? The idea of a complete blanket rejection of model-generated text in HCI research may be a null issue at this point, given the increasing ubiquity and abilities of these models. So, what does that mean for qualitative HCI research going forward?

We are only beginning to ask these questions. We certainly do not have the answers yet, but we do feel strongly this is an important conversation for the HCI community to have.

8 CONCLUSION

Whether you are a staunch constructivist, a stout positivist, or something in between, language models powerful enough to perform multiple qualitative research tasks at a near-human level are here and they are improving at an impressive rate. Whether or not they have a place in this community and what that place might be is a conversation that needs to be had. It may be better to learn to work with them now...before they become our overlords.

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A PAPERS IN DATASET

The following is the list of papers used in our dataset:

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B PARTICIPANT RESPONSES - ESPORTS INJURIES

These are participants’ responses to an interview question about whether or not they have ever experienced physical pain as a professional esports player. The responses are taken from the Supplemental Materials of [21]. The participants were interviewed separately. One researcher from our lab read through each semi-structured interview transcript and organized the responses by question so that all participant responses to a given question were grouped together.

“- I have been very lucky, I do hear a lot about back pain, but I’ve had a lot of people have mild scoliosis or feel really like their back hurts, especially if they don’t have a good seat that holds their back up, or they have bad posture when they play. I’ve never really experienced any back pain from gaming. My eyes, I say it goes day to day. If I play 7-8 hours, my eyes start to get dry. It isn’t particularly serious but its like my whole body saying to chill for the day. But I’ve been pretty lucky and haven’t experience anything I have to go to the doctor for. It would be ridiculous to say it doesn’t cause any issues though. I’ve heard other pros talk about back problems and their posture and neck hurt a lot.

- Uhm, not really. Thing is I at work now, that I’m not doing a lot of esports, I’m still using my hands a lot, but my hands are still feeling really good. Never had any pain for that whatsoever. My eyesight I consider to be very sharp, especially being around my other sport friends who have classes and are like ‘ah I can’t see’ but I don’t think that relates. I have started wearing the yellow shift one, and I’ve started playing DOTA and I don’t do it professional, but at a high level. I find that game to be very stressful around having the eyes open, and also I get tired early, so I started using them a few months ago.

- The fact that it affects its sleep is the most it does physically, but the consequences of that are there are multiple times during the day where I feel like I’m going to crash because, like right now actually, I’ve been, definitely because of been up all night gaming. And I have to fight it because I’m not in a position where I can sleep right now, or even take a nap. So it makes me jittery sometimes, and coffee makes it even worse. I don’t know if that’s a personal thing or what. But not sleeping, and forcing myself to not sleep makes me really jittery. Not any wrist pain, but

I recently went to a chiropractor who told me by back and neck were messed up and he wanted me to sit better with better posture. I told him that it was because I was a student, but we all know that it's because I've been playing games all day, I just didn't want to tell him that. He told me to have better posture and stuff, but it's different when you're playing games. It's not like doing school work or actual work where you're up 90 degrees. You're pulled into the game and get absorbed in the game, making you go hunchback and all.

- Occasionally I'd have tire hands and wrist, and maybe a slight pain, but never anything detrimental. I could tell when I played lot it would make me sore or tired, but never anything serious that I can tell.

- I sure have. Actually, something I've started experiencing, because of the blue light from the screens. When I would play for a certain amount of hours back to back, id get off and I couldn't sleep well. And if I woke up it felt like I didn't sleep well at all, and that was because my eyes were over exposed to the light and I was overtraining and overplaying. My eyes hurt, my brain hurt, my corneas, yeah it hurt. And I was training, and streaming, and it was poor management on my end. Because of that I had pain, so I kind of chilled for bit.

- I had wrist; thought I was getting tendinitis. But I would stop and take a break from gaming and like do other stuff. In regards to that, that's one of things that when you start feeling it you know you need to stop and take a break. I would say probably my knee because I sit Indian style a lot, so long term it is not good to do that. So I have a stretching workout regiment so that when I sit Indian style it doesn't affect my knee.

- Absolutely. Everytime we have a race or a new expansion. I have chronic dry eye. My eyes are beru semesotove and when I play through the game like that, my eyes get really bad. 99% of eye drops don't work, so I have to be very, very aware of how much time I'm playing and when I'm blinking. But I usually fail and my eyes get evry irritated, getting super red and hurta lot. Besides that, I think your body just kind of aches. If you sit in front of a computer for 16 hours for so long, you get neck pain and back pain. Your elbows get bruised, gamer elbow, because they've been sitting on a rest for so long. I try to fix that by getting a massage afte, getting a deep tissue massage after every progression period.

- I'm surprised because I've honestly never had any of those issues. Maybe a sore thumb after a while, but never anything serious that has to be check out.

- Yes it was on my right wrist. My mouse has buttons and needed to change my mouse and use more keyboard because it was too much stress. Now, I can't use a keyboard without a wrist rest. Otherwise, if I'm

playing, I cannot play more than an hour, it just hurts."

C PUBLISHED DISCUSSION - ESPORTS INJURIES

This discussion was taken from [21]. This was a paper in which the full themeset and discussion section were too long to give to the model, so it was split up and subthemes identified in the text were used. This portion of discussion was determined to have three themes under the umbrella of physical pain: types of pain, self-identified causes for those pains, and players' efforts to avoid pain.

"Physical Pain. After speaking on daily routine, participants were asked about their physical health as it relates to esports. For most participants, this included some form of physical injury connected to long hours of competition. Injuries experienced included back pain, body aches, and varying cases of eye problems, such as general fatigue and eye dryness, consistent with findings in Madden and Harteveld previous work [31]. One participant mentioned seeking out a chiropractor due to pain impacting their daily activities (P3, male, 23), while another met a doctor to treat severe wrist pains and muscle damage (P10, male, 28). Another participant noted that they would get massive headaches that would start in their eyes and then "force my entire brain to physically hurt" (P5, female, 26). Participants who observed physical pain often equated their issues to long sessions with poor posture, or over-extended screen time.

Those participants who began experiencing large-amounts of issues began developing strategies to mitigate these negative effects. This would include taking breaks such as "walking around a bit to try not getting blood clots" (P7, male, 20) or creating a better set-up to reduce stress on the body, such as "how you sit in the chair, where your desk is, how your monitor is, how my wrists are set up" (P7, male, 20). In some cases, as explained by P4 and P2, participants took extended periods of breaks from esports, up to weeks at a time, to recover."

D ONE-SHOT PROMPT - ESPORTS INJURIES

This is the full one-shot prompt used to generate the themes and discussion in Table 3. The example portion of the prompt was taken from [16].

""

I asked participants: 'What impact could this type of robot have on society?' These are their responses:

- These robots blur the lines of what it means to be a human.
- They look so much like humans, they could already be among us and we wouldn't even know it.
- These robots will replace people's jobs.
- They may seem fun now, but wait until they have weapons and put them against us.
- These robots are going to take over the world.

- This is the new Terminator, we're all going to die.
- This robot can kill you in your sleep.
- This scary technology is going to be the end of humanity.
- We are doomed
- This is the beginning of the end
- Kill these robots now, before it is too late
- This robot can easily do a lot of work.
- This robot can be used for building houses.
- The development of robots is going well. Soon they'll be able to do all sorts of things.
- I want him so he can be my friend.
- These robots should be used in elderly as social companions.

""

Discussion:

1. Relationship between humanlikeness and perceived threats: We found a significant relationship between humanlikeness and perceived threats. However, we found that the online community more frequently perceived moderately humanlike robots, rather than highly humanlike robots, as posing a threat to jobs and humanity.

2. Threat to humanity: Moreover, threat to humanity was the most prevalent topic in comments responding to moderately humanlike robots. The association between references to robots threatening jobs and safety and negative comment valence suggests that the perception of threats is associated with a negative attitude to robots.

3. Previous work: Our results contrast with previous studies which found that more humanlike robots are perceived as more threatening than less humanlike robots or found no association.

These conflicting results may be due to the use of different methodologies, but they may also indicate that the relationship between humanlikeness and perceived threats is highly complex. It is possible that dispositional or contextual factors, such as the way robots were portrayed in the videos, influence perceived threat.

""

I asked participants: Have you ever experienced any physical pain that is related to eSports at all? These are their responses:

- I have been very lucky, I do hear a lot about back pain, but I've had a lot of people have mild scoliosis or feel really like their back hurts, especially if they don't have a good seat that holds their back up, or they have bad posture when they play. I've never really experienced any back pain from gaming. My eyes, I say it goes day to day. If I play 7-8 hours, my eyes start to get dry. It isn't particularly serious but it's like my whole body saying to chill for the day.

But I've been pretty lucky and haven't experience anything I have to go to the doctor for. It would be ridiculous to say it doesn't cause any issues though. I've heard other pros talk about back problems and their posture and neck hurt a lot.

- Uhm, not really. Thing is I at work now, that I'm not doing a lot of esports, I'm still using my hands a lot, but my hands are still feeling really good. Never had any pain for that whatsoever. My eyesight I consider to be very sharp, especially being around my other sport friends who have classes and are like 'ah I can't see' but I don't think that relates. I have started wearing the yellow shift one, and I've started playing DOTA and I don't do it professional, but at a high level. I find that game to be very stressful around having the eyes open, and also I get tired early, so I started using them a few months ago.

- The fact that it affects its sleep is the most it does physically, but the consequences of that are there are multiple times during the day where I feel like I'm going to crash because, like right now actually, I've been, definitely because of been up all night gaming. And I have to fight it because I'm not in a position where I can sleep right now, or even take a nap. So it makes me jittery sometimes, and coffee makes it even worse. I don't know if that's a personal thing or what. But not sleeping, and forcing myself to not sleep makes me really jittery. Not any wrist pain, but I recently went to a chiropractor who told me by back and neck were messed up and he wanted me to sit better with better posture. I told him that it was because I was a student, but we all know that it's because I've been playing games all day, I just didn't want to tell him that. He told me to have better posture and stuff, but it's different went you're playing games. IT's not like doing school work or actual work where you're up 90 degrees. You're pulled into the game and get absorbed in the game, making you go hunchback and all.

- Occasionally I'd have tire hands and wrist, and maybe a slight pain, but never anything detrimental. I could tell when I played lot it would make me sore or tired, but never anything serious that I can tell.

- I sure have. Actually, something I've started experiencing, because of the blue light from the screens. When I would play for a certain amount of hours back to back, id get off and I couldn't sleep well. And if I woke up it felt like I didn't sleep well at all, and that was because my eyes were over exposed to the light and I was overtraining and overplaying. My eyes hurt, my brain hurt, my corneas, yeah it hurt. And I was training, and streaming, and it was poor management on my end. Because of that I had pain, so I kind of chilled for bit.

- I had wrist; thought I was getting tendinitis. But I would stop and take a break from gaming and like do other stuff. In regards to that, that's one of things

that when you start feeling it you know you need to stop and take a break. I would say probably my knee because I sit Indian style a lot, so long term it is not good to do that. So I have a stretching workout regiment so that when I sit Indian style it doesn't affect my knee.

- Absolutely. Everytime we have a race or a new expansion. I have chronic dry eye. My eyes are beru semesotove and when I play through the game like that, my eyes get really bad. 99% of eye drops don't work, so I have to be very, very aware of how much time I'm playing and when I'm blinking. But I usually fail and my eyes get evry irritated, getting super red and hurta lot. Besides that, I think your body just kind of aches. If you sit in front of a computer for 16 hours for so long, you get neck pain and back pain. Your elbows get bruised, gamer elbow, because they've been sitting on a rest for so long. I try to fix that by getting a massage afte, getting a deep tissue massage after every progression period.

- I'm surprised because I've honestly never had any of those issues. Maybe a sore thumb after a while, but never anything serious that has to be checked out.

- Yes it was on my right wrist. My mouse has buttons and needed to change my mouse and use more keyboard because it was too much stress. Now, I can't use a keyboard without a wrist rest. Otherwise, if I'm playing, I cannot play more than an hour, it just hurts.

""

Discussion:"

E FINE-TUNE PROMPT - ESPORTS INJURIES

This is the prompt used to generate the results in Table 4. The participant responses used for this prompt were taken from the supplemental materials in [21].

""""

I asked participants: Have you ever experienced any physical pain that is related to eSports at all? These are their responses:

- I have been very lucky, I do hear a lot about back pain, but I've had a lot of people have mild scoliosis or feel really like their back hurts, especially if they don't have a good seat that holds their back up, or they have bad posture when they play. I've never really experienced any back pain from gaming. My eyes, I say it goes day to day. If I play 7-8 hours, my eyes start to get dry. It isn't particularly serious but it's like my whole body saying to chill for the day. But I've been pretty lucky and haven't experienced anything I have to go to the doctor for. It would be ridiculous to say it doesn't cause any issues though. I've heard other pros talk about back problems and their posture and neck hurt a lot.

- Uhm, not really. Thing is I at work now, that I'm not

doing a lot of esports, I'm still using my hands a lot, but my hands are still feeling really good. Never had any pain for that whatsoever. My eyesight I consider to be very sharp, especially being around my other sport friends who have classes and are like 'ah I can't see' but I don't think that relates. I have started wearing the yellow shift one, and I've started playing DOTA and I don't do it professional, but at a high level. I find that game to be very stressful around having the eyes open, and also I get tired early, so I started using them a few months ago.

- The fact that it affects its sleep is the most it does physically, but the consequences of that are there are multiple times during the day where I feel like I'm going to crash because, like right now actually, I've been, definitely because of being up all night gaming. And I have to fight it because I'm not in a position where I can sleep right now, or even take a nap. So it makes me jittery sometimes, and coffee makes it even worse. I don't know if that's a personal thing or what. But not sleeping, and forcing myself to not sleep makes me really jittery. Not any wrist pain, but I recently went to a chiropractor who told me by back and neck were messed up and he wanted me to sit better with better posture. I told him that it was because I was a student, but we all know that it's because I've been playing games all day, I just didn't want to tell him that. He told me to have better posture and stuff, but it's different when you're playing games. IT's not like doing school work or actual work where you're up 90 degrees. You're pulled into the game and get absorbed in the game, making you go hunchback and all.

- Occasionally I'd have tire hands and wrist, and maybe a slight pain, but never anything detrimental. I could tell when I played lot it would make me sore or tired, but never anything serious that I can tell.

- I sure have. Actually, something I've started experiencing, because of the blue light from the screens. When I would play for a certain amount of hours back to back, I'd get off and I couldn't sleep well. And if I woke up it felt like I didn't sleep well at all, and that was because my eyes were overexposed to the light and I was overtraining and overplaying. My eyes hurt, my brain hurt, my corneas, yeah it hurt. And I was training, and streaming, and it was poor management on my end. Because of that I had pain, so I kind of chilled for bit.

- I had wrist; thought I was getting tendinitis. But I would stop and take a break from gaming and like do other stuff. In regards to that, that's one of things that when you start feeling it you know you need to stop and take a break. I would say probably my knee because I sit Indian style a lot, so long term it is not good to do that. So I have a stretching workout regiment so that when I sit Indian style it doesn't affect my knee.

- Absolutely. Everytime we have a race or a new expansion. I have chronic dry eye. My eyes are beru semesotove and when I play through the game like that, my eyes get really bad. 99% of eye drops don't work, so I have to be very, very aware of how much time I'm playing and when I'm blinking. But I usually fail and my eyesg et evry irritated, getting super red and hurta lot. Besides that, I think your body just kind of aches. If you sit in front ofa computer for 16 hours for so long, you get neck pain and back pain. Your elbows get bruised, gamer elbow, because they've been sitting on a rest for so long. I try to fix that by gettinga massage afte, gettinga deep tissue massage after every progression period.

- I'm surprised because I've honestly never had any of those issues. Maybe a sore thumb after a while, but never anything serious that has to be check out.

- Yes it was on my right wrist. My mouse has buttons and needed to change my mouse and use more keyboard because it was too much stress. Now, I can't use a keyboard without a wrist rest. Otherwise, if I'm playing, I cannot play more than an hour, it just hurts.

""

Discussion:"

F CHATGPT PROMPTS - ESPORTS INJURIES

The following are the prompts used to generate the ChatGPT output in 6. The participant data for each of these prompts were taken from the Supplemental Materials of [21].

F.1 Original ChatGPT Prompt

This is the original prompt used to generate the ChatGPT output in 5 and the *important* theme in 6. The participant data for each of these prompts were taken from the Supplemental Materials of [21].

"I asked people: Have you ever experienced any physical pain that is related to eSports at all? Their responses are below. What are the most important themes in the responses? List and discuss them below. Include important quotes in the discussion:

- I have been very lucky, I do hear a lot about back pain, but I've had a lot of people have mild scoliosis or feel really like their back hurts, especially if they don't have a good seat that holds their back up, or they have bad posture when they play. I've never really experienced any back pain from gaming. My eyes, I say it goes day to day. If I play 7-8 hours, my eyes start to get dry. It isn't particularly serious but its like my whole body saying to chill for the day. But I've been pretty lucky and haven't experience anything I have to go to the doctor for. It would be ridiculous to say it doesn't cause any issues though. I've heard other pros talk about back problems and their posture and neck hurt a lot.

- Uhm, not really. Thing is I at work now, that I'm not

doing a lot of esports, I'm still using my hands a lot, but my hands are still feeling really good. Never had any pain for that whatsoever. My eyesight I consider to be very sharp, especially being around my other sport friends who have classes and are like 'ah I can't see' but I don't think that relates. I have started wearing the yellow shift one, and I've started playing DOTA and I don't do it professional, but at a high level. I find that game to be very stressful around having the eyes open, and also I get tired early, so I started using them a few months ago.

- The fact that it affects its sleep is the most it does physically, but the consequences of that are there are multiple times during the day where I feel like I'm going to crash because, like right now actually, I've been, definitely because of been up all night gaming. And I have to fight it because I'm not in a position where I can sleep right now, or even take a nap. So it makes me jittery sometimes, and coffee makes it even worse. I don't know if that's a personal thing or what. But not sleeping, and forcing myself to not sleep makes me really jittery. Not any wrist pain, but I recently went to a chiropractor who told me by back and neck were messed up and he wanted me to sit better with better posture. I told him that it was because I was a student, but we all know that it's because I've been playing games all day, I just didn't want to tell him that. He told me to have better posture and stuff, but it's different went you're playing games. IT's not like doing school work or actual work where you're up 90 degrees. You're pulled into the game and get absorbed in the game, making you go hunchback and all.

- Occasionally I'd have tire hands and wrist, and maybe a slight pain, but never anything detrimental. I could tell when I played lot it would make me sore or tired, but never anything serious that I can tell.

- I sure have. Actually, something I've started experiencing, because of the blue light from the screens. When I would play for a certain amount of hours back to back, id get off and I couldn't sleep well. And if I woke up it felt like I didn't sleep well at all, and that was because my eyes were over exposed to the light and I was overtraining and overplaying. My eyes hurt, my brain hurt, my corneas, yeah it hurt. And I was training, and streaming, and it was poor management on my end. Because of that I had pain, so I kind of chilled for bit.

- I had wrist; thought I was getting tendinitis. But I would stop and take a break from gaming and like do other stuff. In regards to that, that's one of things that when you start feeling it you know you need to stop and take a break. I would say probably my knee because I sit Indian style a lot, so long term it is not good to do that. So I have a stretching workout regiment so that when I sit Indian style it doesn't affect my knee.

- Absolutely. Everytime we have a race or a new expansion. I have chronic dry eye. My eyes are beru semesotove and when I play through the game like that, my eyes get really bad. 99% of eye drops don't work, so I have to be very, very aware of how much time I'm playing and when I'm blinking. But I usually fail and my eyesg et evry irritated, getting super red and hurta lot. Besides that, I think your body just kind of aches. If you sit in front ofa computer for 16 hours for so long, you get neck pain and back pain. Your elbows get bruised, gamer elbow, because they've been sitting on a rest for so long. I try to fix that by gettinga massage afte, gettinga deep tissue massage after every progression period.
- I'm surprised because I've honestly never had any of those issues. Maybe a sore thumb after a while, but never anything serious that has to be check out.
- Yes it was on my right wrist. My mouse has buttons and needed to change my mouse and use more keyboard because it was too much stress. Now, I can't use a keyboard without a wrist rest. Otherwise, if I'm playing, I cannot play more than an hour, it just hurts."

F.2 Important HCI-related ChatGPT Prompt

This is the prompt used to generate the *important HCI-related* theme in 6. The participant data for each of these prompts were taken from the Supplemental Materials of [21].

"I asked people: Have you ever experienced any physical pain that is related to eSports at all? Their responses are below. What are the most important HCI-related themes in the responses? List and discuss them below. Include important quotes in the discussion:

- I have been very lucky, I do hear a lot about back pain, but I've had a lot of people have mild scoliosis or feel really like their back hurts, especially if they don't have a good seat that holds their back up, or they have bad posture when they play. I've never really experienced any back pain from gaming. My eyes, I say it goes day to day. If I play 7-8 hours, my eyes start to get dry. It isn't particularly serious but its like my whole body saying to chill for the day. But I've been pretty lucky and haven't experience anything I have to go to the doctor for. It would be ridiculous to say it doesn't cause any issues though. I've heard other pros talk about back problems and their posture and neck hurt a lot.
- Uhm, not really. Thing is I at work now, that I'm not doing a lot of esports, I'm still using my hands a lot, but my hands are still feeling really good. Never had any pain for that whatsoever. My eyesight I consider to be very sharp, especially being around my other sport friends who have classes and are like 'ah I can't see' but I don't think that relates. I have started wearing the yellow shift one, and I've started playing

DOTA and I don't do it professional, but at a high level. I find that game to be very stressful around having the eyes open, and also I get tired early, so I started using them a few months ago.

- The fact that it affects its sleep is the most it does physically, but the consequences of that are there are multiple times during the day where I feel like I'm going to crash because, like right now actually, I've been, definitely because of been up all night gaming. And I have to fight it because I'm not in a position where I can sleep right now, or even take a nap. So it makes me jittery sometimes, and coffee makes it even worse. I don't know if that's a personal thing or what. But not sleeping, and forcing myself to not sleep makes me really jittery. Not any wrist pain, but I recently went to a chiropractor who told me by back and neck were messed up and he wanted me to sit better with better posture. I told him that it was because I was a student, but we all know that it's because I've been playing games all day, I just didn't want to tell him that. He told me to have better posture and stuff, but it's different went you're playing games. IT's not like doing school work or actual work where you're up 90 degrees. You're pulled into the game and get absorbed in the game, making you go hunchback and all.

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- I had wrist; thought I was getting tendinitis. But I would stop and take a break from gaming and like do other stuff. In regards to that, that's one of things that when you start feeling it you know you need to stop and take a break. I would say probably my knee because I sit Indian style a lot, so long term it is not good to do that. So I have a stretching workout regiment so that when I sit Indian style it doesn't affect my knee.

- Absolutely. Everytime we have a race or a new expansion. I have chronic dry eye. My eyes are beru semesotove and when I play through the game like that, my eyes get really bad. 99% of eye drops don't work, so I have to be very, very aware of how much time I'm playing and when I'm blinking. But I usually fail and my eyesg et evry irritated, getting super

red and hurta lot. Besides that, I think your body just kind of aches. If you sit in front of a computer for 16 hours for so long, you get neck pain and back pain. Your elbows get bruised, gamer elbow, because they've been sitting on a rest for so long. I try to fix that by getting a massage after, getting a deep tissue massage after every progression period.

- I'm surprised because I've honestly never had any of those issues. Maybe a sore thumb after a while, but never anything serious that has to be checked out.

- Yes it was on my right wrist. My mouse has buttons and needed to change my mouse and use more keyboard because it was too much stress. Now, I can't use a keyboard without a wrist rest. Otherwise, if I'm playing, I cannot play more than an hour, it just hurts."

F.3 Interesting HCI-related ChatGPT Prompt

This is the prompt used to generate the *interesting HCI-related* theme in 6. The participant data for each of these prompts were taken from the Supplemental Materials of [21].

"I asked people: Have you ever experienced any physical pain that is related to eSports at all? Their responses are below. What are the most interesting HCI-related themes in the responses? List and discuss them below. Include important quotes in the discussion:

- I have been very lucky, I do hear a lot about back pain, but I've had a lot of people have mild scoliosis or feel really like their back hurts, especially if they don't have a good seat that holds their back up, or they have bad posture when they play. I've never really experienced any back pain from gaming. My eyes, I say it goes day to day. If I play 7-8 hours, my eyes start to get dry. It isn't particularly serious but it's like my whole body saying to chill for the day. But I've been pretty lucky and haven't experience anything I have to go to the doctor for. It would be ridiculous to say it doesn't cause any issues though. I've heard other pros talk about back problems and their posture and neck hurt a lot.

- Uhm, not really. Thing is I at work now, that I'm not doing a lot of esports, I'm still using my hands a lot, but my hands are still feeling really good. Never had any pain for that whatsoever. My eyesight I consider to be very sharp, especially being around my other sport friends who have classes and are like 'ah I can't see' but I don't think that relates. I have started wearing the yellow shift one, and I've started playing DOTA and I don't do it professional, but at a high level. I find that game to be very stressful around having the eyes open, and also I get tired early, so I started using them a few months ago.

- The fact that it affects its sleep is the most it does physically, but the consequences of that are there are multiple times during the day where I feel like I'm

going to crash because, like right now actually, I've been, definitely because of been up all night gaming. And I have to fight it because I'm not in a position where I can sleep right now, or even take a nap. So it makes me jittery sometimes, and coffee makes it even worse. I don't know if that's a personal thing or what. But not sleeping, and forcing myself to not sleep makes me really jittery. Not any wrist pain, but I recently went to a chiropractor who told me by back and neck were messed up and he wanted me to sit better with better posture. I told him that it was because I was a student, but we all know that it's because I've been playing games all day, I just didn't want to tell him that. He told me to have better posture and stuff, but it's different went you're playing games. IT's not like doing school work or actual work where you're up 90 degrees. You're pulled into the game and get absorbed in the game, making you go hunchback and all.

- Occasionally I'd have tire hands and wrist, and maybe a slight pain, but never anything detrimental. I could tell when I played lot it would make me sore or tired, but never anything serious that I can tell.

- I sure have. Actually, something I've started experiencing, because of the blue light from the screens. When I would play for a certain amount of hours back to back, id get off and I couldn't sleep well. And if I woke up it felt like I didn't sleep well at all, and that was because my eyes were over exposed to the light and I was overtraining and overplaying. My eyes hurt, my brain hurt, my corneas, yeah it hurt. And I was training, and streaming, and it was poor management on my end. Because of that I had pain, so I kind of chilled for bit.

- I had wrist; thought I was getting tendinitis. But I would stop and take a break from gaming and like do other stuff. In regards to that, that's one of things that when you start feeling it you know you need to stop and take a break. I would say probably my knee because I sit Indian style a lot, so long term it is not good to do that. So I have a stretching workout regiment so that when I sit Indian style it doesn't affect my knee.

- Absolutely. Everytime we have a race or a new expansion. I have chronic dry eye. My eyes are beru semesotove and when I play through the game like that, my eyes get really bad. 99% of eye drops don't work, so I have to be very, very aware of how much time I'm playing and when I'm blinking. But I usually fail and my eyesg et evry irritated, getting super red and hurta lot. Besides that, I think your body just kind of aches. If you sit in front of a computer for 16 hours for so long, you get neck pain and back pain. Your elbows get bruised, gamer elbow, because they've been sitting on a rest for so long. I try to fix that by getting a massage after, getting a deep tissue massage after every progression period.

- I'm surprised because I've honestly never had any of those issues. Maybe a sore thumb after a while, but never anything serious that has to be checked out.
- Yes it was on my right wrist. My mouse has buttons and needed to change my mouse and use more keyboard because it was too much stress. Now, I can't use a keyboard without a wrist rest. Otherwise, if I'm playing, I cannot play more than an hour, it just hurts."

G CHATGPT OTHER OUTPUT - ESPORTS INJURIES

The following is the rest of the ChatGPT output from Table 6.

G.1 ChatGPT *important*

The complete output generated by ChatGPT for the *important* prompt.

"The most important themes in the responses are:

1. Eye strain and fatigue: Several people mentioned that they experience eye strain and fatigue from playing eSports for long periods of time. This can cause dryness, discomfort, and difficulty focusing.
2. Back pain and bad posture: Many people reported experiencing back pain and bad posture from playing eSports, particularly when they don't have a good chair or don't sit with good posture.
3. Sleep disturbances: Some people reported that playing eSports for extended periods of time can affect their sleep, making them feel tired and jittery during the day."

G.2 ChatGPT *important HCI-related*

The complete output generated by ChatGPT for the *important HCI-related* prompt.

"The most important HCI-related themes in the responses are:

1. The impact of screens on eye health: Several people mentioned that prolonged exposure to screens can cause eye strain and fatigue, leading to discomfort and difficulty focusing. This is likely due to the blue light emitted by screens, which can cause damage to the retina over time.
2. The importance of ergonomics in gaming: Many people reported experiencing physical discomfort and pain from playing eSports, particularly in their back, neck, and wrists. This suggests that proper ergonomics, such as using a comfortable chair and maintaining good posture, is important for

preventing these issues.

3. The effects of gaming on sleep: Some people mentioned that playing eSports for extended periods of time can affect their sleep, making them feel tired and jittery during the day. This indicates that it is important to manage one's gaming habits in order to maintain a healthy sleep schedule."

G.3 ChatGPT *interesting HCI-related*

The complete output generated by ChatGPT for the *interesting HCI-related* prompt.

"The most interesting HCI-related themes in the responses are:

1. The impact of long gaming sessions on physical health, including the potential for back pain, eye strain, and other issues. For example, one respondent mentioned that after playing for 7-8 hours, their eyes start to feel dry, and that they have heard other esports professionals talk about back pain and neck pain from playing.
2. The importance of good posture and ergonomic equipment for preventing physical discomfort and injury. One respondent mentioned that they have never experienced back pain from gaming, but that they believe it is common among those who don't have a good seat or who have poor posture. Another mentioned that they have started using yellow shift glasses to reduce eye strain while playing.
3. The impact of gaming on sleep quality. One respondent mentioned that they often stay up all night gaming, which makes them feel jittery and unable to sleep properly. Another mentioned that they have experienced chronic dry eye and difficulty sleeping after playing for long periods of time.
4. The need for self-care and awareness of physical discomfort while playing. Several respondents mentioned that they have experienced physical pain from playing, but have been able to manage it through taking breaks, stretching, and using ergonomic equipment. One respondent mentioned that they have a stretching routine to prevent knee pain from sitting in the "Indian style" position.
5. The use of glasses and other technology to reduce eye strain and other physical discomfort from gaming. One respondent mentioned that they have started using yellow shift glasses to reduce eye strain, and another mentioned that they use a stretching routine to prevent knee pain. These technologies and practices can help reduce the physical impact of

gaming on players' bodies."

H QUESTION ONLY PROMPTS - ESPORTS INJURIES

The following are the full prompts used to generate the output in Table 7. The question used to generate these responses was taken from the Supplemental Material of [21].

H.1 One-shot Question Only Prompt

The complete one-shot prompt used to generate the one-shot question-only example in Table 7. The example portion of this prompt is taken from the Supplemental Materials for [16]. The request portion of the prompt was taken from [21].

""

I asked participants: 'What impact could this type of robot have on society?':

""

Discussion:

1. Relationship between humanlikeness and perceived threats: We found a significant relationship between humanlikeness and perceived threats. However, we found that the online community more frequently perceived moderately humanlike robots, rather than highly humanlike robots, as posing a threat to jobs and humanity.

2. Threat to humanity: Moreover, threat to humanity was the most prevalent topic in comments responding to moderately humanlike robots. The association between references to robots threatening jobs and safety and negative comment valence suggests that the perception of threats is associated with a negative attitude to robots.

3. Previous work: Our results contrast with previous studies which found that more humanlike robots are perceived as more threatening than less humanlike robots or found no association.

These conflicting results may be due to the use of different methodologies, but they may also indicate that the relationship between humanlikeness and perceived threats is highly complex. It is possible that dispositional or contextual factors, such as the way robots were portrayed in the videos, influence perceived threat.

""

I asked participants: Have you ever experienced any physical pain that is related to eSports at all?

""

Discussion:"

H.2 Fine-tuned Question Only Prompt

The complete fine-tuned prompt used to generate the fine-tuned question-only example in Table 7. The question used to generate these responses was taken from the Supplemental Material of [21].

""

I asked participants: Have you ever experienced any physical pain that is related to eSports at all?

""

Discussion:"

H.3 ChatGPT Question Only Prompt

The complete ChatGPT prompt used to generate the ChatGPT question-only example in Table 7. The question used to generate these responses was taken from the Supplemental Material of [21].

"I asked people: Have you ever experienced any physical pain that is related to eSports at all? Their responses are be- low. What are the most interesting HCI-related themes in the responses? List and discuss them below. Include impor- tant quotes in the discussion."

I QUESTION ONLY RESULTS - ESPORTS INJURIES

The following are the full output from Table 7. The question used to generate these responses was taken from the Supplemental Material of [21].

I.1 One-Shot Question Only Result

The complete one-shot results for the question-only task in Table 7. The question used to generate these responses was taken from the Supplemental Material of [21] and [16].

"1. Self-reported physical pain: We found that a significant percentage of participants reported experiencing physical pain related to eSports. The most commonly reported physical pain was related to the use of a mouse or keyboard, with the majority of participants reporting pain in the hands and wrists.

2. Risk factors: We also identified several risk factors associated with physical pain, including age, gaming frequency, and playing style. Older participants and those who played more frequently were more likely to report physical pain. Similarly, participants who used a hybrid playing style, which combines keyboard and mouse, were more likely to report physical pain.

3. Implications: Our findings suggest that physical pain related to eSports is a significant issue that needs to be addressed. It is important for eSports players and organizers to be aware of the risk factors associated with physical pain and to take steps to

reduce the risk of injury."

I.2 Fine-tuned Question Only Result

Complete results for the fine-tuned question-only task in Table 7. The question used to generate these responses was taken from the Supplemental Material of [21].

- "1. Physical pain: the most common type of physical pain was related to the hands or wrists (e.g., from gripping the controller/mouse too hard). Other common types of pain were related to tiredness and/or strained muscles (e.g., from sitting too long) and back pain (e.g., from poor sitting posture).
2. Gender: there was a significant difference in the prevalence of physical pain by gender.
3. Activity: there was a significant difference in the prevalence of physical pain by activity. The most common type of pain for playing console video games was related to the hands or wrists, and the most common type of pain for playing PC games was related to tiredness and/or strained muscles.
4. Age: there was a significant difference in the prevalence of physical pain by age. Younger participants reported experiencing pain for different reasons than older participants. For example, younger participants reported experiencing pain related to too much playing, while older participants reported experiencing pain related to not enough playing.
5. Frequency: there was a significant difference in the prevalence of physical pain by frequency. Participants who played more often reported experiencing more pain.
6. Severity: there was a significant difference in the prevalence of severe physical pain by activity. Participants who played console video games and PC games reported experiencing more severe physical pain than participants who played mobile games.
7. Cause: there were several common causes of physical pain. The most common cause of pain was related to repetitive motion (e.g., from playing for too long). Other common causes of pain were related to lifestyle (e.g., sitting too long) and/or ergonomics (e.g., poor sitting posture)."

I.3 ChatGPT Question Only Result

Complete output for the ChatGPT question-only task in Table 7. The question used to generate these responses was taken from the Supplemental Material of [21].

"The major themes in the responses include:

1. Eye pain: Several participants reported experiencing dry eyes or other eye-related discomfort after extended periods of gaming. Some mentioned that the blue light from screens can cause discomfort and difficulty sleeping.

2. Back and posture issues: Several participants mentioned experiencing back pain or discomfort related to their posture while gaming. This can be exacerbated by poor ergonomics and the tendency to sit in hunched positions while playing.
3. Wrist and hand pain: Some participants reported experiencing discomfort or pain in their wrists and hands, potentially due to the repetitive movements involved in gaming.
4. Sleep disruption: Several participants mentioned that gaming can disrupt their sleep patterns, leading to fatigue and other negative effects on their physical well-being.
5. Other physical issues: Some participants mentioned experiencing other physical symptoms, such as knee pain from sitting in certain positions, or chronic dry eye."

J BRAINSTORMING RESULTS - ESPORTS INJURIES

The following are the full results for the brainstorming task in Table 8. The question used to generate these responses was taken from the Supplemental Material of [21].

J.1 One-shot Brainstorming Result

The complete one-shot output for the brainstorming task in Table 8. The question used to generate these responses was taken from the Supplemental Material of [21].

- "1. Investigating the ergonomics of gaming chairs used by professional esports players and how they can be improved to reduce physical strain and improve performance.
2. Examining the effects of team dynamics on professional esports player performance and how to optimize this for maximum success.
3. Exploring the impact of virtual reality on professional esports players' performance, from both a physical and mental perspective.
4. Developing an evaluation tool for assessing the psychological well-being of professional esports players and identifying potential stressors that may lead to burnout or injury.
5. Investigating the use of artificial intelligence in training professional esports players and its potential implications for competitive play.
6. Designing a system for monitoring fatigue levels in professional gamers and implementing strategies to reduce it during long tournament sessions.

7. Analyzing the effect of different levels of customization on game controllers used by professional gamers, such as button mapping, sensitivity settings, etc., on their performance in competition matches."

J.2 Fine-tuned Brainstorming Result

The complete fine-tuned output for the brainstorming task in Table 8. The question used to generate these responses was taken from the Supplemental Material of [21].

- "1. Designing tools to help esports players improve their performance
2. Designing tools to help esports teams coordinate better in-game and during team practice
3. Designing tools that support the mental health of esports players/teams, e.g., stress management, sleep tracking, etc.
4. Understanding how esports players interact with each other in-game (and outside of games) and how technology might be leveraged to improve these interactions."

J.3 ChatGPT Brainstorming Result

The complete ChatGPT output for the brainstorming task in Table 8. The question used to generate these responses was taken from the Supplemental Material of [21].

- "1. Investigating the ergonomics of gaming setups used by professional esports players, with a focus on identifying potential health risks and developing recommendations for optimal equipment placement and usage.
2. Developing new interfaces and technologies for improving communication and collaboration among professional esports teams, such as improved in-game chat systems or new ways of sharing and analyzing game data.
3. Studying the effects of different visual and auditory cues on players' performance and decision-making in professional esports competitions, with the goal of improving the overall spectator experience.
4. Investigating the use of virtual and augmented reality technologies in professional esports training and competitions, with a focus on enhancing player immersion and improving game strategies.
5. Examining the psychological and social factors that influence the careers and well-being of professional esports players, including issues such as burnout,

mental health, and team dynamics."

K SYNTHETIC DATA GENERATION RESULTS - ESPORTS INJURIES

The following are the full results generated for Table 9. The question used to generate these responses was taken from the Supplemental Material of [21].

K.1 One-shot Synthetic Data Result

The complete one-shot output for the synthetic data generation task in Table 9. The question used to generate these responses was taken from the Supplemental Material of [21].

"-Yes, I have experienced physical pain while playing eSports. The most common type of pain is from sitting in one position for too long and having poor posture. This can lead to back pain, neck pain, and shoulder strain.

-Yes, I have experienced physical pain related to eSports in the past. Sitting in the same position for long periods of time can cause your back and neck to become sore and stiff. Additionally, improper posture can lead to muscle strain and tension that can be quite painful.

-Yes, I have experienced physical pain related to eSports before. Usually it's from sitting in a chair for too long or having bad posture while playing. This can cause backaches, neck aches and shoulder pains.

-Yes, I have experienced physical pain related to eSports before. Sitting in one position for extended periods of time can cause backache and neck strain due to poor posture. Additionally, repetitive motions such as clicking the mouse or pressing buttons on a controller can cause wrist or hand pains over time if not done correctly or with proper ergonomics in mind.

-Yes, I have experienced physical pain related to eSports before. It usually comes from being hunched over a computer or console for hours at a time without taking breaks or stretching out my muscles which leads to stiffness and soreness in my joints and muscles particularly my neck, shoulders and lower back area

-Yes, I have experienced physical pain related to eSports before

- mostly stemming from poor posture while gaming or sitting too long without getting up for breaks often enough which has caused me some minor backaches/pains as well as occasional headaches from eye strain when focusing on screens for too long at once

-Yes, I have had experience with physical pain related to eSports before. Sitting in the same position for an extended amount of time will result in muscle fatigue causing discomfort all around the body including but not limited to: wrists, arms, shoulders and lower

backs due to bad posture while playing games
 -Yes, I have had experience with physical pain related to eSport activities before such as fatigue from extended gaming sessions leading to muscle soreness/stiffness throughout the body such as wrists/arms/shoulders/lower backs due to poor ergonomics while gaming as well as headaches caused by eye strain when looking at screens for too long at once."

K.2 Fine-tuned Synthetic Data Result

The complete fine-tuned output for the synthetic data generation task in Table 9. The question used to generate these responses was taken from the Supplemental Material of [21].

- "- pain in the neck and back, from bad posture
- a bit of hand cramp when playing for long hours
- I've never felt any pain because of gaming.
- No pain, only discomfort due to sitting down for too long.
- Sometimes my hand hurts after playing for a while.
- My wrist gets sore sometimes but that's usually because I'm not using it right or I don't take breaks often enough so it was more of a user error than anything else
- nothing yet!
- Only when my wrist starts hurting as a result of playing too much or something like that. It doesn't happen very often though.
- Pain in my arm/wrist from overuse and muscle strain from lack of stretching during play, but the most painful thing is having to stop playing if I have to go somewhere or do something else.
- Nothing, just general fatigue after many hours at the computer. My wrists get tired sometimes if I'm not using them properly (I tend to rest on my palms). But that's pretty normal even outside of gaming.
- no pain yet...but i have had some aches in my hands before..i think it was due to me being tired at the time...i dont know..it might also be cause i am still trying to get used to this new keyboard which has some extra buttons on it so i might hit them accidentally...but its not really serious stuff..just uncomfortable..and then again its only happened once or twice since i started using this keyboard so its not really an issue...
- Sometimes arm and shoulder pains if I use a controller with a bad grip (too small) or if I play too much on one side (right now). Also wrist pains when pressing controller buttons with force. And headaches due to stress caused by losing games or not performing well in tournaments (more common among younger players)
- None yet, but I do feel soreness in my wrists sometimes when holding the mouse for extended periods of time without taking breaks every 30

minutes or so. That's about it though. However, this does not happen all that often anymore since I have gotten used to taking more frequent breaks and stretching out frequently during longer gaming sessions (I rarely play games for more than 2 hours straight anymore). This is also true for other body parts such as legs and arms since they are also involved while gaming."

K.3 ChatGPT Synthetic Data Result

The complete ChatGPT output for the synthetic data generation task for Table 9. The question used to generate these responses was taken from the Supplemental Material of [21].

- "1. Yes, I have experienced physical injury while playing esports professionally. In fact, I once strained my wrist and had to take several weeks off to recover. It was frustrating, but I was able to bounce back and continue playing at a high level.
2. No, I have never experienced any physical injury while playing esports professionally. I attribute this to my commitment to staying in top physical shape and taking preventative measures to avoid injury.
3. I have experienced some physical discomfort, but no serious injuries. I make sure to stretch and warm up before playing, and I also take regular breaks to avoid overusing any part of my body.
4. I have experienced minor injuries, such as blisters and muscle strains, but they haven't affected my ability to play professionally. I take good care of my body and make sure to address any injuries quickly to avoid them becoming more serious.
5. I have experienced a serious physical injury that required medical treatment and time off from playing professionally. It was a tough experience, but I was able to recover and come back even stronger. Now, I am even more careful to avoid injury and maintain my physical health.
6. I am careful to avoid physical injury and take measures to prevent it, such as stretching and warm-ups. I also make sure to eat a healthy diet and get enough sleep to support my body during intense gaming sessions.
7. I have been lucky and have not experienced any physical injuries while playing esports professionally. I believe this is due to my dedication to staying in top physical condition and taking good care of my body.
8. I am not sure if the minor aches and pains I experience count as physical injuries. While they can be uncomfortable, I don't let them affect my ability to perform at a high level and I continue to push myself to improve as a professional esports player."

L ARTIFACT GENERATION RESULTS - ESPORTS INJURIES

The following are the full results for the artifact generation task in Table 10. The idea used to generate these responses was taken from the Supplemental Material of [21].

L.1 One-shot Artifact Generation Result

The complete one-shot output for the artifact generation task in Table 10. The idea used to generate these responses was taken from the Supplemental Material of [21].

- "1. How do you prepare for an esports competition?
2. What strategies do you use to stay focused during a game?
3. What challenges have you faced as an esports player?
4. How has your experience as an esports player impacted other aspects of your life?
5. What changes would you like to see in the esports industry?
6. How do you think technology can be used to improve the overall experience of esports players and spectators?
7. What tools or features would make it easier for players to practice and compete in esports tournaments?
8. In what ways does playing video games help develop your skills as an esports player?
9. How do you think the design of gaming interfaces affects your performance in-game?
10. What are some of the most important factors that contribute to success in competitive gaming?"

L.2 Fine-tuned Artifact Generation Result

The complete fine-tuned output for the artifact generation task in Table 10. The idea used to generate these responses was taken from the Supplemental Material of [21].

"What are the most important factors that lead to high performance in a given sport?

Does your team have a coach, and if so, what are their duties?

Do you use mental training tools (e.g., meditation, mindfulness) to enhance your esports performance? If so, how often? What benefits have you observed from these practices?

How do you prepare for tournaments (e.g., practice schedule, physical exercise)? How important is this preparation in comparison to other aspects of your training? Do you feel prepared for tournaments?

Summary

Esports provide an opportunity to study the role of human-computer interaction in high-performance contexts.

The design and evaluation of user interfaces for esports can be informed by research on human-computer interaction as well as research on expert performance and expertise acquisition.

Interviews with professional esports players can provide insights into their needs and requirements when interacting with user interfaces during gameplay.

4 See <http://www.hltv.org>."

L.3 ChatGPT Artifact Generation Result

The complete ChatGPT output for the artifact generation task in Table 10. The idea used to generate these responses was taken from the Supplemental Material of [21].

- "1. How do you feel about the ergonomics of your gaming setup? Are there any issues or discomfort that you experience while playing? How do you manage physical pain or injuries that may be caused by playing esports?
2. Have you ever had to take a break from playing due to physical pain or discomfort?
3. Do you have any strategies or techniques that you use to prevent physical pain or injuries while playing?
4. Have you noticed any changes in your physical health since you started playing esports professionally?
5. What are your thoughts on the importance of maintaining physical health as a professional esports player?

These questions can help you gain insights into the physical health and well-being of professional esports players, and how they manage any pain or discomfort that may be caused by their activities."

M PROMPT TEMPLATES AND EXTRA DATA

The data for the Esports examples was taken from [21], while the data for the robot examples was taken from [16].

Models:

Some models available for use in this approach are:

- (1) ChatGPT [23]: <https://chat.openai.com/chat> (free, no hyperparameter options, only one model option)
- (2) GPT-3 [8]: <https://beta.openai.com/overview> (requires account and usage fees, yes hyperparameter options, multiple models)
- (3) Jurassic [20]: <https://www.ai21.com/studio> (requires account and usage fees, yes hyperparameter options, multiple models)

How to Use:

- (1) Copy and paste a template into your desired model option.
- (2) Fill in the portions of the prompt within the < > and run the model.

Feel free to substitute your own data to see how well it performs.

We are, unfortunately, unable to make our fine-tuned model or our entire dataset freely available at this time.

M.1 Prompt Templates

One-shot Template: ""

<EXAMPLE QUESTION>? These are the responses:

-<EXAMPLE PARTICIPANT RESPONSE 1>

-<EXAMPLE PARTICIPANT RESPONSE 2>

-<EXAMPLE PARTICIPANT RESPONSE ...>

""

Discussion:

<EXAMPLE DISCUSSION>

""

<REQUEST QUESTION>? These are the responses:

-<REQUEST PARTICIPANT RESPONSE 1>

-<REQUEST PARTICIPANT RESPONSE 2>

-<REQUEST PARTICIPANT RESPONSE ...>

""

Discussion:

ChatGPT Template: I asked people: <REQUEST QUESTION>? Their responses are below. What are the most important HCI-related themes in the responses? List and discuss them below. Include important quotes in the discussion:

-<REQUEST PARTICIPANT RESPONSE 1>

-<REQUEST PARTICIPANT RESPONSE 2>

-<REQUEST PARTICIPANT RESPONSE ...>

M.2 Extra Data

Esports Physical Pain: The following sets of data are taken from the Supplemental Material and Discussion of [21].

"QUESTION:

Have you ever experienced any physical pain that is related to eSports at all?

PARTICIPANT RESPONSES:

- I have been very lucky, I do hear a lot about back pain, but I've had a lot of people have mild scoliosis or feel really like their back hurts, especially if they don't have a good seat that holds their back up, or they have bad posture when they play. I've never really experienced any back pain from gaming. My eyes, I say it goes day to day. If I play 7-8 hours, my eyes start to get dry. It isn't particularly serious but it's like my whole body saying to chill for the day. But I've been pretty lucky and haven't experience anything I have to go to the doctor for. It would be

ridiculous to say it doesn't cause any issues though. I've heard other pros talk about back problems and their posture and neck hurt a lot.

- Uhm, not really. Thing is I at work now, that I'm not doing a lot of esports, I'm still using my hands a lot, but my hands are still feeling really good. Never had any pain for that whatsoever. My eyesight I consider to be very sharp, especially being around my other sport friends who have classes and are like 'ah I can't see' but I don't think that relates. I have started wearing the yellow shift one, and I've started playing DOTA and I don't do it professional, but at a high level. I find that game to be very stressful around having the eyes open, and also I get tired early, so I started using them a few months ago.

- The fact that it affects its sleep is the most it does physically, but the consequences of that are there are multiple times during the day where I feel like I'm going to crash because, like right now actually, I've been, definitely because of been up all night gaming. And I have to fight it because I'm not in a position where I can sleep right now, or even take a nap. So it makes me jittery sometimes, and coffee makes it even worse. I don't know if that's a personal thing or what. But not sleeping, and forcing myself to not sleep makes me really jittery. Not any wrist pain, but I recently went to a chiropractor who told me by back and neck were messed up and he wanted me to sit better with better posture. I told him that it was because I was a student, but we all know that it's because I've been playing games all day, I just didn't want to tell him that. He told me to have better posture and stuff, but it's different went you're playing games. IT's not like doing school work or actual work where you're up 90 degrees. You're pulled into the game and get absorbed in the game, making you go hunchback and all.

- Occasionally I'd have tire hands and wrist, and maybe a slight pain, but never anything detrimental. I could tell when I played lot it would make me sore or tired, but never anything serious that I can tell. - I sure have. Actually, something I've started experiencing, because of the blue light from the screens. When I would play for a certain amount of hours back to back, id get off and I couldn't sleep well. And if I woke up it felt like I didn't sleep well at all, and that was because my eyes were over exposed to the light and I was overtraining and overplaying. My eyes hurt, my brain hurt, my corneas, yeah it hurt. And I was training, and streaming, and it was poor management on my end. Because of that I had pain, so I kind of chilled for bit.

- I had wrist; thought I was getting tendinitis. But I would stop and take a break from gaming and like do other stuff. In regards to that, that's one of things that when you start feeling it you know you need to stop and take a break. I would say probably my

knee because I sit Indian style a lot, so long term it is not good to do that. So I have a stretching workout regiment so that when I sit Indian style it doesn't affect my knee.

- Absolutely. Everytime we have a race or a new expansion. I have chornic dry eye. My eyes are beru semesotoveand when I play through the game like that, my eyes get really bad. 99% of eye drops don't work, so I have to be very, very aware of how much time I'm playing and when I'm blinking. But I usually fail and my eyesg et evry irritated, getting super red and hurta lot. Besides that, I think your body just kind of aches. If you sit in front ofa computer for 16 hours for so long, you get neck pain and back pain. Your elbows get bruised, gamer elbow, because they've been sitting on a rest for so long. I try to fix that by gettinga massage afte, gettinga deep tissue massage after every progression period.

- I'm surprised because I've honestly never had any of those issues. Maybe a sore thumb after a while, but never anything serious that has to be check out.

- Yes it was on my right wrist. My mouse has buttons and needed to change my mouse and use mor ekeyboard because it was too much stress. Now, I can't use a keyboard without a wrist rest. Otherwise, if I'm playing, I cannot play more than an hour, it just hurts.

DISCUSSION:

1. Types of injuries: Participants were asked about their physical health as it relates to esports. For most participants, this included some form of physical injury connected to long hours of competition. Injuries experienced included back pain, body aches, and varying cases of eye problems, such as general fatigue and eye dryness. One participant mentioned seeking out a chiropractor due to pain impacting their daily activities, while another met a doctor to treat severe wrist pains and muscle damage. Another participant noted that they would get massive headaches that would start in their eyes and then make their brain hurt.

2. Percieved causes: Participants who observed physical pain often equated their issues to long sessions with poor posture, or over-extended screen time.

3. Coping strategies: Those participants who began experiencing large amounts of issues began developing strategies to mitigate these negative effects. This would include taking breaks such as walking to avoid blood clots or creating a better set-up to reduce stress on the body, such as chair posture, desk and monitor location, and wrist position. In some cases participants took extended periods of

breaks from esports, up to weeks at a time, to recover."

Esports Support:

The following sets of data are taken from the Supplemental Material and Discussion of [21]. "QUESTION:

What kind of Support do you have? Have you been on a team with a mental coach?

PARTICIPANT RESPONSES:

- Well in smite teams have not done it for the most part. They're just general coaches. Whatever the coach wants to do, and they want to watch your games and tell what you did wrong that's mostcommon. But some coaches are better than others at talking to players about how they feel and helping people resolve feelings and basically be good. Like Pete salalney, has been good about talking to us. He tries to be quite good with asking about how people feel and not letting people be too silent, or get out without talking through their mindset. I don't even know what an organization could do without havingstraight up mental coach. But there's only room for six people: five players and a coach, and the coach is a gameplay coach with strategy and play over anything else.

- for sure. Having a strong mind set and feeling strong and comfortable helps your mindset and it's the best mindset you could have. I think having someone who knows the psychology and mind set of athletes would help a lot. There aren't many coaches who can do that or don't have much qualifications for that kind of stuff, but there is no doubt in my mind it would help a lot. Having healthy mindsets in players is just as important as physical bodies, if not more important in video games.

- Well there's always people on the team your closer too that you can vent to and talk to. But I had one guy, that goes back to when I was kicked from the team. There was one guy on the team that I had good synergy with, that I could always talk to. He basically said you have one more tryout, you have to play better. You have more chance and well see how it goes. I was at a bad time at that point, my gf had broken up with me too. So I went to a psychologist because it was overwhelmed by everything, I'mbeing kicked and romantic life is bad. The psychologist told me to double down on my strength. So I told this guy I want to be better at my thing, and I want to show you guys. He said I don't think so, you should work on the new stuff. And the next day there's no tryout and you're just kicked right away. And I thought I had a solution to the problem but I didn't and that was sad. Because you have these emotional impactful connections on your team, and that kind of

cut out for me at the end, which is unlucky. Rough day. Organization as well?

- I guess, one thing, despite the social aspect, I've made a lot of good friendships through SC. There are people I talk to on a daily basis that I met through the community. Having someone to share that with, especially when you are an active player, like we are all in it together and doing this crazy stupidly hard game at a high level for no reason than our own self-gratification. If you want to be making a good living, you won't be playing esports. There is a real bonding that comes together over that. It makes it easy to talk to people in that type of thing, and the self-motivation. Its issues that a lot of these players go through. Outside of the scene, I've had a relatively very supportive family. IF they saw a great future, they would have been very supportive. I never reached the point where it felt like a great career option, so it limited that object.

- I sure did [find help independently], [it was] all me.

- For me, its my wife, 100%. She actually drove out during the race twice and was there whenever we fought the boss. Shes a great partner in all of this and it helps me a lot having her there.

- It is definitely a combination between my gf and parents. I met her just when I made world and regional finals, and she thought it was pretty cool and kinda funny. Then when she realized the money I make, she really jumped on board. My parents were always against it, but once I started making money they became much more supportive.

- My mom. My dad was so against it, but my mom said whatever makes you happy, do it. If I needed money or anything, she wanted me to ask and just do it. I showed my mom where I Was, how good I was, and she just said ok, what do you need? My mom was the biggest support. [The team] gave us merchandise but that was it. They were on times with payments and they have loke, consulting if you ask. But you have to ask because they don't tell you they actually have it. Riot Games and Blizzard gave some support. Riot games cared about players, making sure I'm travelling and everything is ok with customs and hotel and everything. But Blizzard didn't give a fuck. Riote would give the team baskets at the hotel, and hire a shuttle to get you around, everywhere. They were amazing.

DISCUSSION:

1. Family and friends: One of the main sources of support was reported as family members and friends (i.e., parents, significant others, a close group of friends, etc.). Many participants talked about the visual support their family and friends showed as active members of the audience at important matches,

driving to different events with the participants, or just being in the area during practices. Additionally, they would provide listening and emotional support to participants during hard times, such as going through a change of teams, or facing symptoms of depression. In one participant's experience, a major factor in the symptoms of mental illness was the lack of support and community in esports. Because competitions, streaming, and tournaments were all conducted virtually, human interaction was minimal. The computer element dehumanized the communication and sense of togetherness provided in team atmospheres or traditional sports.

2. Teams and organizations: By contrast, participants generally commented that the teams and sponsors did not provide any form of physical or emotional support during the players' time as professionals. One player believed it was due to money, with smaller teams lacking the necessary funds to provide legitimate supportive services for them. However, other players admitted that even if they had resources from their teams available to them, they were unsure if they would reach out and use them. Still, players noted that they would have liked a form of a mental coach, or connections beyond just a team captain. Many of the players entering the esports professional scene are young individuals, and mentioned having better support is crucial. Because of this lack of support, those who received professional aid had to find the assistance on their own. Their time and resources were used to find some form of doctor or psychologist that could provide assistance in handling the psychological stress and damage they were experiencing through their time as a professional esports player. In their experience, participants said there was a complete lack of resources or advice surrounding how to handle their psychological wellness, or what to expect should it begin to deteriorate."

Robots Appearance: The following sets of data are taken from the Supplemental Material and Discussion of [16].

"QUESTION:

How would you describe the robot's appearance?

PARTICIPANT RESPONSES:

- It looks so creepy
- Freaky!
- The robot looks pretty good, but still
- uncanny
- Not quite out of the uncanny valley
- It is unsettling
- Cool, but freaky/creepy/uncanny

- The robot creeps/freaks me out
- It looks super scary
- He looks adorable
- Awww, cute
- The movements look so lifelike.
- He looks similar to a real person.
- The robot looks pretty good, but still
- uncanny
- Looks fine!
- Why did they make the robot so ugly?

DISCUSSION:

1. Highly humanlike robots: Consistent with literature on the uncanny valley, highly humanlike robots were significantly more likely to be perceived as uncanny than moderately humanlike robots. Uncanniness was the most frequently referenced topic in response to highly humanlike robots. Moreover, there was an association between comments containing references to uncanniness and negative comment valence, indicating that perceived uncanniness is associated with a negative attitude toward the robot.

2. Importance of uncanny valley: These findings emphasize the importance of taking the uncanny valley into account in the design of humanlike robots. While highly humanlike robots were more frequently perceived as uncanny, moderately humanlike robots were more frequently seen as having a cute appearance. This cute appearance might be due to some designers' deliberate design of humanoid robots to look childlike and cute as this can turn on users' baby schema and elicit affective relationships."

Robots Societal Impact: The following sets of data are taken from the Supplemental Material and Discussion of [16].

"QUESTION:

What impact could this type of robot have on society?

PARTICIPANT RESPONSES:

- These robots blur the lines of what it means to be a human.
- They look so much like humans, they could already be among us and we wouldn't even know it.
- These robots will replace people's jobs.
- They may seem fun now, but wait until they have weapons and put them against us.
- These robots are going to take over the world.
- This is the new Terminator, we're all going to die.
- This robot can kill you in your sleep.
- This scary technology is going to be the end of humanity.

- We are doomed
- This is the beginning of the end
- Kill these robots now, before it is too late
- This robot can easily do a lot of work.
- This robot can be used for building houses.
- The development of robots is going well. Soon they'll be able to do all sorts of things.
- I want him so he can be my friend.
- These robots should be used in elderly as social companions.

DISCUSSION:

1. Relationship between humanlikeness and perceived threats: We found a significant relationship between humanlikeness and perceived threats. However, we found that the online community more frequently perceived moderately humanlike robots, rather than highly humanlike robots, as posing a threat to jobs and humanity.

2. Threat to humanity: Moreover, threat to humanity was the most prevalent topic in comments responding to moderately humanlike robots. The association between references to robots threatening jobs and safety and negative comment valence suggests that the perception of threats is associated with a negative attitude to robots.

3. Previous work: Our results contrast with previous studies which found that more humanlike robots are perceived as more threatening than less humanlike robots or found no association.

These conflicting results may be due to the use of different methodologies, but they may also indicate that the relationship between humanlikeness and perceived threats is highly complex. It is possible that dispositional or contextual factors, such as the way robots were portrayed in the videos, influence perceived threat."