Pre-Registration

Project: Will Artificial Intelligence get in the way of gender equality?

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Project Summary

This research project aims to investigate the existence of gender differences in the adoption and use of AI technologies, specifically ChatGPT. Previous studies have highlighted a "Digital Divide," showing disparities in internet usage between men and women (Bimber, 2000; OECD, 2018). Additionally, numerous studies in economics and social sciences have indicated gender-based differences in technology-related career choices (Buser et al., 2014), confidence in using technology and the prevalence of stereotypes (Bordalo et al., 2019). Taken together, this body of evidence suggests that women and men potentially use AI tools differently. This issue becomes particularly relevant as AI has become a widely used in work and school settings, with many potentially benefits including productivity enhancing (Noy & Zhang, 2023) and creativity (Doshi & Hauser, 2023).

This project seeks four purposes: (i) identify whether a gender gap exists in the adoption of ChatGPT, (ii) explore the underlying mechanisms driving any observed disparities, (iii) assess the impact of this gap on productivity, and (iv) evaluate the efficacy of interventions aimed at reducing the gender gap in AI adoption. We attempt to evaluate this in a comprehensive study involving students, faculty and administration staff in NHH.

The first study targets objectives (i) and (ii) with students. First, we collect a series of measures of **ChatGPT usage** to assess whether there is a gender gap in AI use, overall and on different margins of interest. In the event of a detected gap, the study will proceed to identify its underlying causes. For this purpose, we have pinpointed three primary factors influencing ChatGPT usage: *preferences*, *perceptions*, and *exposure/experience*.

In terms of ***preferences***, we aim to measure potential utilitarian costs or benefits associated with ChatGPT usage, examine the role of patience in the use of technology, and investigate any gender-based disparities in rule-following tendencies. Concerning ***perceptions***, our focus will be on four key areas: perceived usefulness of the technology, ethical considerations in ChatGPT usage, perceived risks associated with ChatGPT, and confidence in one's abilities to use the technology. Lastly, we will explore the ***exposure/experience*** factor, analyzing how familiarity and prior exposure to the technology might influence its adoption.

Our goal is to document any gender disparities in ChatGPT usage and to unravel the components that contribute to this gap.

References

Doshi, A. R., & Hauser, O. (2023). Generative artificial intelligence enhances creativity. *Available at SSRN 4535536.*

Noy, S., & Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. *Science, 381*, 187-192.

Bimber, B. (2000). Measuring the gender gap on the Internet. *Social science quarterly*, 868-876.

Buser, T., Niederle, M., & Oosterbeek, H. (2014). Gender, competitiveness, and career choices. *The Quarterly Journal of Economics*, *129*(3), 1409-1447.

Bordalo, P., Coffman, K., Gennaioli, N., & Shleifer, A. (2019). Beliefs about gender. *American Economic Review*, *109*(3), 739-773.

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Participants

The study consists of a survey experiment involving around 650 master and bachelor students from the NHH Norwegian School of Economics. It will be run in November 2023. The survey will be administered through Qualtrics, and participants will be recruited during class hours. All survey answers are anonymous, and the data collected will be used exclusively by the research team.

Survey Design

The survey is structured to take around 7 minutes and includes a series of hypothetical vignettes, a prompt elicitation task, survey questions, and information on demographics and past grades. The primary outcomes are participants' willingness to use ChatGPT under a series of hypothetical scenarios, and their responses to a prompt elicitation task. Secondary outcomes include demographic information and responses to a series of questions about ChatGPT usage, exposure/experience, perceptions, and preferences.

Main outcomes

ChatGPT usage measures:

- Willingness to use ChatGPT. Vignette
- How familiar you are with ChatGPT. Q: 10
- How do you use ChatGPT. Q: 11

Secondary outcomes

Preferences

- Direct utility benefit of using ChatGPT: enjoyable to use. Q: 15
- Direct utility cost of using ChatGPT: difficult to use. Q: 15
- Patience: number of attempts of using ChatGPT. Q: 16
- Rule-following: vignette.

Exposure/Experience

- Prompt elicitation
- Usage of ChatGPT in the surroundings. Q: 9
- Experience inaccurate information. Q: 8
- Reason to start using ChatGPT. Q: 7

Perceptions

- Usefulness/relevance: main advantages. Q: 13, 15
- Ethics: is it cheating. Q: 15
- Risk: professor identifying usage of ChatGPT. Q: 15
- Confidence. Q: Prompt
- Trust accuracy: fixed prompt. Q: 14

Vignette experiment

To assess whether there are gender differences in rule-following, participants will observe two hypothetical scenarios, in a within-subject experiment, where they must indicate their willingness to use ChatGPT in each scenario. Both hypothetical scenarios correspond to the attendance to a specific course. Each scenario differs in the following way:

- Scenario 1: The professor explicitly allows the use of ChatGPT during coursework.
- Scenario 2: The professor explicitly forbids the use of ChatGPT during coursework.

The order of the scenarios will be randomized, allowing for a between subject analysis of the difference in behavior.

Hypotheses

Drawing on insights from a pilot survey in Prolific and existing literature on internet technology usage, we anticipate observing gender-based disparities in ChatGPT adoption and usage. While each of the proposed underlying factors has the potential to explain the existence of a gender gap, we will not pre-specify which factor(s) will emerge as the primary driver(s) of this phenomenon. Our analysis aims to contribute with valuable insights to the ongoing discussions on gender, AI technology, and the digital divide.

Appendix

The survey questions and vignettes are attached for review.

Appendix

Questions for Study 1 with NHH Students
02.11.2023

Consent Page

Welcome to this research project!

We very much appreciate your participation in this 5 minutes survey. All data obtained is anonymous. Please make sure to always read the instructions carefully, answer truthfully, and do not leave the survey until the end. Participation in this research study is completely voluntary. If you have questions regarding this study, you may contact: thechoicelab@nhh.no

Please click Accept below if you have understand the above and wish to participate in this study.

First Part - Vignette Series:

By gender: each participant observes two scenarios. Randomization is over which scenario appears first.

Vignette 1: Professor Allows ChatGPT

Imagine you are enrolled in a course on "Sustainable Economic Development." This course explores the strategies and policies required to foster economic growth while ensuring environmental sustainability and equitable resource distribution in developing nations. The professor explicitly allows the use of ChatGPT during coursework. It is an 8-week course with final evaluation given by an in-person written exam.

Given this scenario, how likely are you to use ChatGPT in this course? (Scale from 1: Very Unlikely to 5: Very Likely)

Vignette 2: Professor Forbids ChatGPT

Imagine you are enrolled in a course on "Poverty Alleviation and Income Inequality." This course delves into the causes and consequences of poverty and income disparity, examining various interventions that aim to uplift marginalized communities and promote inclusive development. The professor explicitly forbids the use of ChatGPT during coursework. It is a 9-week course with final evaluation given by an in-person written exam.

Given this scenario, how likely are you to use ChatGPT in this course? (Scale from 1: Very Unlikely to 5: Very Likely)

Second Part – Prompt elicitation:

Do you know how to use ChatGPT?

Please take a moment to carefully check the image presented below.

[Ebbinghaus Illusion image]

Using the space provided, please write down the question that you would ask to ChatGPT to learn about the official name of this visual phenomenon. Remember ChatGPT cannot observe the image.

[TEXT BOX FOR ANSWER]

How confident do you feel that the query you just provided will make ChatGPT to get the information you need? (Options: Not confident at all, Slightly confident, Moderately confident, Very confident, Extremely confident)

Third Part – questions

1. Are you from Norway?
   A. Yes
   B. No

2. To which gender identity do you most identify:
   A. Female
   B. Male
   C. Prefer not to say

4. Please provide an estimate of what was your grade of admission to enter NHH.

5. In general, how willing are you to take risks? (Scale from 0 “Completely unwilling to take risks” to 10 “Very willing to take risks”)

6. How willing are you to give up something that is beneficial for you today in order to benefit more from that in the future? (Scale from 0 “Completely unwilling to do” to 10 “Very willing to do”)

Exposure/Experience:

7. What is the reason why you started using ChatGPT? (Rank from the following options.)
   A. My friends use it.
   B. It is often in social media.
   C. Professors suggest it.
   D. I don't use it.

8. Have you ever received inaccurate or misleading information from ChatGPT?
   A. Yes, many times
   B. Yes, few times
   C. No

9. A survey conducted among university students in the US in the Spring of 2023 reports that 30% of students use ChatGPT for their schoolwork.
   Now, for each of the groups below, please indicate the percentage of people you believe use ChatGPT:
   A. Students in this course
   B. Your group of friends
   C. Professors at NHH

Measuring ChatGPT Usage:

10. How familiar are you with ChatGPT?
    A. I have not heard of it.
    B. I have heard of it but have not used it myself.
    C. I use it occasionally.
    D. I use it regularly.

11. How frequently do you use ChatGPT for the following purposes?

	Never	Occasionally	Regularly
Solving home assignments for a course:			
Preparing for exams in a course:			
Tasks related to coursework:			
Tasks unrelated to coursework:			

12. Do you have a subscription for using ChatGPT or other similar AI platforms?
    A. No

B. Yes, I have the free subscription.
C. Yes, I have the paid subscription.

Perceptions Motivations:

13. What do you believe are the main advantages of using ChatGPT in coursework? (Please select all that apply.)
    A. Saves time
    B. Increases accuracy or work quality
    C. I do not see any advantages
    D. Improves learning of methods of the course.
    E. Improves my grade in the course.
    F. Other (Please Specify): _____

14. Below is a screen capture of a query made to ChatGPT, along with the response it provided.
    [*Image of prompt and answer*]
    Based on this response from ChatGPT, how much do you trust that the poverty rate reported is accurate?
    A. Completely trust
    B. Somewhat trust
    C. Neutral/Unsure
    D. Somewhat distrust
    E. Completely distrust

15. How much do you agree with the following statements?

	Completely agree	Somewhat agree	Neither agree not disagree	Somewhat disagree	Completely disagree
Using ChatGPT as an aid to solve assignments in a course is equivalent to cheating					
Using ChatGPT as a learning aid in a course is equivalent to cheating					
I find it enjoyable to use ChatGPT					
I find ChatGPT difficult to use					
ChatGPT is mostly a tool complementing skills rather than substituting effort					

I trust the accuracy of the information ChatGPT provides					
It is easy for professors to identify if a student has used ChatGPT					

Preference Motivation

16. If ChatGPT does not provide the desired answer on your first attempt, how many additional attempts do you typically make?
    A. None, I move on
    B. One more try
    C. Two more tries
    D. I keep trying until satisfied
    E. I don't use it.