Undergraduate Thesis Prospectus

Chess Automation for Accessibility
(technical research project in Electrical Engineering)

Female Gamers and Their Struggles with Online Gaming
(sociotechnical research paper)

By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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General Research Problem

How can we modify competitive environments to be more inclusive?

"Competition seems to produce the greatest positive impact on performance when the competitors, although not equal, are not so far ahead of rivals that the outcome of the competition seems to be a foregone conclusion" (Worrell et al. 2016). Worrel et al. (2016) assessed competition's part in 'outstanding performance'. Because outstanding performance is generally desirable, competition can then be desirable too, as a tool to promote it. Thus when someone loses their ability to compete, they lose an opportunity to improve. Marginalization of entire social groups may then inhibit such groups from being able to achieve 'outstanding performance'. This also reduces the number of competitors in any given competitive domain (school, sports, business, etc.), negatively affecting performance of non marginalized groups as well. Conversely, inclusive competitive environments can promote outstanding performance for everyone.

Chess Automation for Accessibility

How can we make chess more accessible to people with disabilities?

In a literature review on correlation between chess and academics, Bart (2014) concludes that the research "provides evidence that chess training has salutary cognitive and education effects" for students. If more conclusive research is performed and schools decide to implement chess as a strategy for improving student cognition, children with physical disabilities could be at a disadvantage. An inclusive chess board could assist in mitigating such disadvantages. There exists an automated chess board from a company called SquareOff: it allows users to play against an AI opponent that moves individual pieces on its own. While it does provide fully automated

movements, it lacks the ability to assist the user in making moves.

My team's capstone project is a chess board that automatically resets the pieces at the end of each game. The project doesn't innately help people with disabilities, its goal is instead to demonstrate a proof of concept for future assistive chess devices, such as voice-controlled chess. The project is under strict budgetary and time constraints, which limits the design to a proof of concept. This project is mentored by professor Harry Powell in the Electrical Engineering department, and I am working with three partners: Bryam Ludovico, Selena Pham, and Bruce Bui.

Our methodology for completing the project is to break it into three parts: software, embedded systems, and hardware. This allows for parallel work through the duration of the project. The hardware is first designed in CAD to assure that the design will work, meanwhile the software is tested and embedded framework is being written. On completion of the individual project parts, everything will converge in full system testing. Once the project is complete, we will have a project that can robustly detect the state of a chess board, and move pieces automatically. Though the finished product won't have accessibility features, future iterations of the design could easily implement bluetooth audio/mobile controls.

Female Gamers and Their Struggles with Online Gaming

In the U.S., how do women gamers, their allies, and their antagonists compete to influence the online gaming climate for women?

Online gaming climates are diverse, and not all are hostile towards women gamers. Even where there is no harassment, however, implicit biases may make some women feel unwelcome; for example, male gamers may presume that gamers are necessarily male (Paaßen et al., 2016).

Nevertheless, more explicit apparent inequities in gaming are common, and include, for example, the underrepresentation of women in professional Esports. Kat Gunn, the most successful female esports competitor in America, doesn't even make the top 250 for overall tournament winnings (Esports Earnings, 2022).

Existing Literature

Researchers have studied sexism in video games. Fox and Tang (2014) argue that "Social Dominance Orientation" drives sexist men to assert their dominance over women to maintain male control over online gaming. This notion extends beyond gaming; studies in adolescent cycling in France highlight a reduction in female cyclists due to a male dominant presence in public areas (Sayagh, 2021). Another potential driving force for male domination is the enforcement of gender norms through gender policing, which is frequently associated with Western adolescents (Young & Sweeting, 2004). Given a bias by which gaming is perceived as a male activity, boys may engage in gender policing to bully girls out of online gaming.

Other researchers have looked at how depictions of female characters in games can influence the gaming climate for women. Henning et al. (2009) asked adolescents about stereotypes in video games, finding that increased gaming was associated with "greater acceptance and less critical evaluation of gender stereotypes," and that "boys were less critical about gender-stereotyped images" than girls. The researchers suggest that boys' greater acceptance of gender-stereotyped images may be due to greater total gameplay among boys.

Female Participants

Competitive gaming influencers are the most vocal and socially influential participant

group and play an active role in spreading awareness of harassment. A popular twitch streamer like Pokimane can spend 30 seconds writing a tweet and share their thoughts to hundreds of thousands of people (Anys, 2021). Spreading awareness is just one way influencers work to improve women's image. Streamers like Hafu lead by example: in an interview with Fusion TV (2016), she mentioned that she "Really wanted to be recognized by my [her] gameplay." She thereby challenges the stereotype that female streamers get viewers only because they are attractive.

Some women gamers that may not have the impact of an influencer instead elect to participate by forming groups in online forums such as reddit or discord. For example, the subreddit r/GirlGamers has almost 200,000 members (reddit, 2022). The forum strives to be "a community space for ladies to hang out, talk about gaming, and game together." Top posts often feature relatable memes or reposted tweets (fig. 1).

Figure 1. Reddit post featuring a satirical take on sexism in game character design (sqinky96, 2021)

The subreddit is mostly undirected and led by its users, so it functions like an unorganized union of gamers, giving the female gamer identity the strength of 200,000 women instead of just one.

Corporate Participants

Gaming organizations (orgs) are private corporations, so their primary motive is shareholder value. Nevertheless, some gaming orgs are allies of women gamers. Owning a gaming org is akin to owning a sports team in that decisions may be motivated by more than just profits. Orgs like misfits set up brand deals to generate publicity and monetary support for all-female teams (Lee, 2022). Other orgs such as Cloud9 and Counter Logic Gaming (CLG) provide a coach, team manager, and special tournament access not available to amateurs (Cloud9, 2022). Though some female esports players are discontent with their share of resources compared to their male counterparts (Zuo & Williams, 2021), women gamers who have official brand recognition and support enjoy an elevated status.

Game developers and publishers also influence women's image in the gaming climate. 62% of women in the U.S. and the U.K. believe that female characters are oversexualized in video games (Bryter, 2020). The oversexualization may simply be a ploy to appeal to majority male audiences, but incidental sexism still has the effects of intentional sexism. Corporate culture can also be an outlet for gender discrimination: in 2021, Riot Games lost an $80 Million dollar lawsuit to the California Department of Fair Employment and Housing (DFEH) because of gender discrimination (Riot Games, 2021). Riot admitted its responsibility in a statement: "despite our best intentions, we hadn't always lived up to our values," but no actions have been taken beyond their mandated punishments. Activision-Blizzard is also currently in litigation with

the DFEH over gender based discrimination (DFEH, 2021).

Antagonists

Perhaps the most prolific participants that fight against women's status in the online gaming climate are the anonymous users that women encounter in matchmaking, an online gaming process in which random users are assembled into temporary groups for games. Anonymity allows users to make comments (typically) without consequence. Antagonists use this to their advantage, making vitriolic comments such as "I just recorded your voice and I beat my d— to it" or "you're lucky I don't know your address or I'd f— r— you" (Kayayluh, 2021). Nothing unites such anonymous users beyond "queueing together" for matchmaking. Users have organized on unmoderated forums, as in the infamous GamerGate incident of 2014, but such incidents have subsided(Futrelle, 2014).

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