

Thesis Project Portfolio

C.H.E.S.S.B.O.A.R.D.: An Interactive Chess Learning Aid

(Technical Report)

The Effect of Game-Centered Socialization on Mental Health

(STS Research Paper)

An Undergraduate Thesis

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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

The mental health crisis poses a serious challenge for modern societies across the globe. The proposed causes are many and varied, ranging from economic volatility to digital device use. The most plausible cause is reduced face-to-face social interaction, stemming from societal shifts toward increased use of digital communication and entertainment.

In my STS research, I investigated this thesis, focusing specifically on entertainment through games. I began by exploring the various proposed causes and relevant psychological studies. A few unique study results led me to the thesis described above: that face-to-face social interaction is key to mental health. In the context of games, this suggests that online games would be less beneficial than offline games for the mental health of the players, as the primary mode of social interaction would be virtual rather than in-person. Through a survey of the available clinical research on the topic, I evaluated this claim. I found that digital games can be beneficial if played with in-person friends, but online games have minimal benefits at best, and more often turn addictive. Analog games (that is, board games and the like) tend to have overwhelmingly positive effects on the players. While the specifics of psychological research make any certain statement of causality impossible, plausible mechanisms are clear. I believe that in-person social interaction through offline games is highly beneficial to its participants, and that our society should work to lower the barrier to such interaction.

My technical project does just that: we built an interactive electronic chessboard that introduces beginner players to the rules of chess. Noting the popularity of online chess education tools like `chess.com`, we created a similar user interface. A grid of colored LEDs underneath the board communicates the legal moves available to a player when a piece is lifted. A system of magnetic sensors is able to detect exactly which piece type is on every square and measures the full board 50 times per second. Our system is able to notate the game automatically, provide the players with

hints, and validate moves. The entire system was designed with beginners in mind, to make it as easy as possible for players of any skill level to enjoy a chess game.

I believe that the prototype we produced of my technical project can be helpful in facilitating healthy, in-person social interaction around a chessboard. My STS research suggests that such interaction can be quite beneficial to the players' mental health. I am delighted to find that my team's project — originally intended as a technically impressive toy — can have such profound implications for the mental health of our society.