

A Qualitative Interview Analysis on a Computer Vision-Based Chess Training Tool

1st Lee Xerri

*Institute of Information, Communication & Technology
Malta College of Arts, Science & Technology
Paola, Malta
lee.xerri.e21932@mcast.edu.mt*

2nd Daren Scerri

*Institute of Information, Communication & Technology
Malta College of Arts, Science & Technology
Paola, Malta
daren.scerri@mcast.edu.mt*

Abstract—This study presents a qualitative analysis of chess players' perceptions of a computer vision-based training tool, focusing on differences based on skill level.

Index Terms—Computer Vision, Chess, Qualitative, Interview

OTB Over-The-Board
AI Artificial Intelligence

I. INTRODUCTION

This paper focuses on research methodologies relevant to qualitative interview studies and will apply the best-suited approach on chess players of varying levels. Followed by a qualitative analysis of player perceptions.

II. SECTION 1

A. Description of Theme and Topic Rationale

This research explores the opinions of chess players on a computer vision-based chess training tool that requires only a camera for in-game analysis and puzzle solving on a physical chessboard. Chess is a competitive game, in which the improvement of a player depends on the methods of which they learn it. However, most Artificial Intelligence (AI) driven chess assistants are only available through digital interfaces, which limits usability for players who prefer over-the-board (OTB) play. This study investigates how chess players at different skill levels respond to a computer vision-based tool, and whether they find it beneficial for learning and strategy development.

B. Hypothesis

This study is guided by the following central research question:

How do players of varying experience levels perceive the ease of use, accuracy, and training integration of the tool, and how do these perceptions influence their intention to adopt it?

C. Positioning and Research Onion

This research will fall under the interpretivist paradigm since it aims to explore the subjective experiences and perceptions of chess players regarding a computer-vision-based chess training tool. [1] describes Interpretivism as “an approach based on subjectivist ontological assumptions that entities are constituted of discourse, thus existing or socially constructed reality may be only researched through social constructions as consciousness or language”, which is a fitting description for this research.

This research will also follow an inductive approach, [2] describes inductive reasoning as a way of theory building that starts with a specific observation where a general rule is then formulated. Since this review seeks to develop insights from the qualitative data, the ‘general rule’, in this case the hypothesis, should be built after the result analysis. However, an interpretivist hypothesis was still made according to [3]’s guidelines on qualitative analysis.

Since this research will focus on a detailed interview with a small sample of chess players, the case study strategy has been chosen which are ideal for investigating situations within real-world settings, allowing researchers to gather rich, contextual insights. Furthermore, a two-case model will be applied since only two cases will be explored.

This study adopts a qualitative mono-method approach which utilizes either qualitative or quantitative research. This research utilizes only qualitative research, thus making it mono-method. This cross-sectional study collects data at a single point in time [4]. The techniques and procedures in this research will involve a qualitative data collection and thematic analysis. Thematic analysis is a method in qualitative research which involves identifying recurring themes, patterns, and insights from interview responses. This approach will help further uncover key factors which might influence how the tool can be improved. Some insights include perceived ease of use, accuracy, and overall usefulness in chess training.

D. Background to This Research Theme

In the present era of chess, chess engines are relied on by most digital implementations of chess. The most prominent examples of this are Chess.com and LiChess.com, which implement StockFish which is strongly considered the strongest

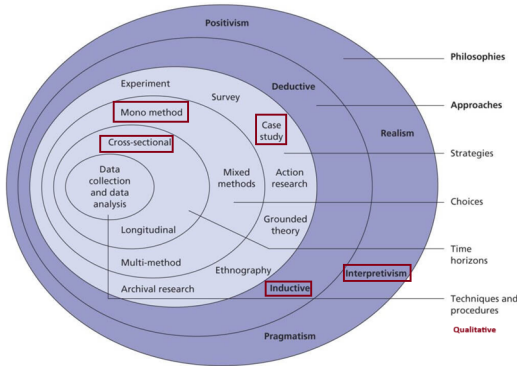


Fig. 1. Research Onion.

chess engine as of today ([5], [6], [7]). However, this strength is not applied over casual OTB chess games. The ability to recognize board positions and provide real-time feedback using only a camera presents a cheap and efficient way to integrate the strength of chess engines into OTB chess training without disrupting a player's natural learning process.

E. Research Aim and Purpose statement

The purpose of this qualitative study is to explore the perceptions of chess players at varying skill levels regarding the usability and effectiveness of a computer vision-based chess training tool. This study aims to:

- 1) Examine how chess players perceive the usability and effectiveness of the tool in their learning and training practices.
- 2) Identify key factors that influence the adoption of the tool, including ease of use, accuracy, and integration with traditional training methods.
- 3) Provide insights that inform the design and improvement of computer vision-based chess training tools for OTB play.

To achieve these objectives, this study will employ qualitative methods to analyse user perceptions and assess variations based on players' skill levels. Findings may contribute to the development of more effective technology-assisted training solutions for chess players.

III. SECTION 2

A. Research Methodology Review

In qualitative research, methodologies are adopted to collect and analyze data. These methodologies have their strengths and weaknesses; and one methodology might be stronger than the other depending on the situation. One example is Phenomenological Research which seeks to understand individuals' lived experiences through in-depth interviews and thematic analysis [8], making it a valuable methodology for exploring complex phenomena. A drawback of Phenomenological research is reliance on subjective interpretation which introduces an element of researcher bias. Findings from this methodology may also lack generalizability due to small sample sizes.

Grounded Theory involves data collection and analysis to develop theories grounded in empirical data in a continuous manner until either theoretical saturation is reached, or no more information can be retrieved from additional data [9]. The flexible implementation of this methodology allows researchers to adapt their approach as new patterns emerge. However, grounded theory is time-consuming and requires expertise to be applied effectively.

Case Study Research provides a detailed exploration of specific cases through the perspective of the participants. These specific cases can involve individuals, groups, or organizations [10]. This methodology is effective for understanding complex phenomena within real-life contexts. It is particularly useful to study unique or rare cases that cannot be captured by other methods. However, similarly to Phenomenological research, case studies also lack generalizability beyond the studied case/s.

Ethnography gathers rich contextual data by immersing the researcher in the environment of the study subjects. However, it is time-consuming and prone to bias [11].

Narrative research examines how individuals construct meaning from their experiences. However, narrative research is limited by its reliance on subjective accounts and struggles when comparing narratives across different contexts [12].

These academic sources provide credible and validated insights into research methodologies. In contrast, non-academic sources, including blogs, news articles, and opinion pieces, lack systematic peer review and may present biased or anecdotal evidence. While non-academic materials can provide contextual background, they should not be the primary basis for academic research. ([8], [9], [10], [11], [12]) provide insights into qualitative research methodologies and their applications.

Qualitative interview research and its various techniques have been thoroughly researched by scholars, including structured, semi-structured, and unstructured interviews. The choice of technique depends on research objectives. For instance, semi-structured interviews allow flexibility while ensuring consistency in questioning, making them ideal for studies exploring personal experiences [13]. Moreover, studies have demonstrated that qualitative interviews provide rich, in-depth insights that cannot be easily captured through quantitative methods [14].

[15] criticizes qualitative interviews for their subjectivity, this is because researchers' interpretations of the data retrieved may accidentally shape findings. [16] counters this by mentioning that interpretive flexibility allows for capturing nuances missed by quantitative methods; further highlighting the need for reflexivity in qualitative designs. A knowledge gap noticed from existing literature is limited exploration of the effects of interviewers on participant responses, and ethical considerations when retrieving data from named subjects, which warrants further investigation.

IV. SECTION 3

A. Research Questions

The key research questions this study seeks to answer are:

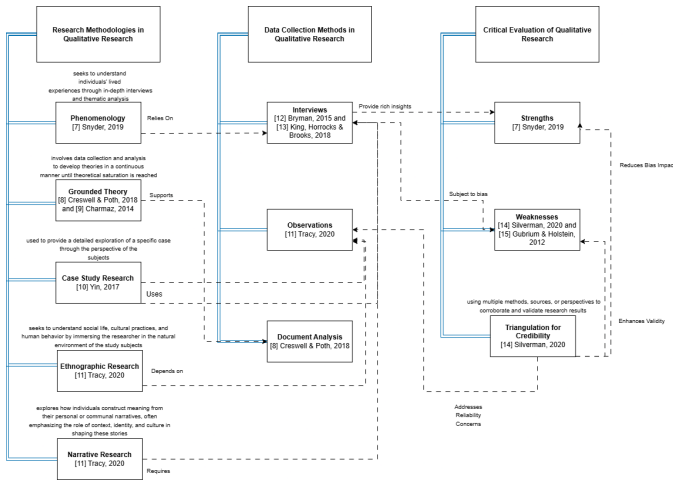


Fig. 2. Literature Map.

- 1) Do chess players perceive a computer vision-based chess training tool as useful and effective for their training?
- 2) What factors (ease of use, accuracy, integration) influence adoption of the tool into a players' training routine?
- 3) Are there skill-based differences in perception, where players with higher Elo rating are more critical of the effectiveness of the tool compared to those with a lower rating?

B. Research Objectives

To answer the previous research questions, this study will adopt the following:

- 1) Examine how chess players perceive the usability and effectiveness of the tool in their learning and training practices.
- 2) Identify key adoption factors, including ease of use, accuracy, and integration with traditional training methods.
- 3) Analyze the differences in perception and approaches to the tool between the higher rated and lower rated players.
- 4) Provide insights for improving computer vision-based chess training tools to support OTB play.

C. Philosophies, Approaches and Paradigms

The research employs an Inductive approach, whilst simultaneously supporting a defined hypothesis created specifically to guide the research focus. Therefore, it is possible that new hypothesis may emerge from the qualitative interviews and thematic analysis.

The chosen research strategy is a Case Study, allowing for an in-depth examination of each participants' observations of the training tool, whilst also going into depth of the perceptions unique to players of their skill level.

As mentioned before, the best suited paradigm for this study is the Interpretivist paradigm since the results achieved from the interview is the interpretation of the participants of the perceived chess training tool.

D. Chosen Methodology, Experiment Design, and Analysis

For this study, a qualitative, mono-method, and cross-sectional approach is most appropriate. This study will employ two semi-structured, case study style interviews on two chess players with significantly different skill levels; one beginner player (700 Elo, Chess.com username: skuwlisnotkuwl), and one experienced player (1600 Elo, also active in a chess club, FIDE ID: 5602459). A semi-structured interview will allow the flexibility needed to gather insights unique to the level of the player, whilst also ensuring consistency in key themes to further highlight the difference of perception between differently skilled players ([13], [14], [4]). Employing the case study strategy will enable an in-depth exploration of the chess players' opinions and perceptions of the tool, best fitting the requirements to answer the research questions of this study.

Since the focus of this study will be not only on the individual perceptions of the chess players, but also the differences of their perceptions, a thematic analysis will be applied to the collected data to identify any recurring patterns and themes [12]. Thematic analysis will also help uncover the perceptions of the tool's usability, effectiveness, and the key factors influencing its adoption. By categorizing these responses, a structured interpretation of the results will be retrieved from the semi-structured approach of the interview.

E. Validity, Reliability and Generalizability/Transferability

1) *Validity*: To ensure credibility, this study will involve careful review of interview transcripts to accurately reflect participant responses [15]. Given the different skill levels of the two participants, particular attention will be paid to identifying consistent or contrasting themes in their perspectives. Hopefully This approach will ensure that the findings genuinely capture their views without misinterpretation.

2) *Reliability*: Since this study involves only two participants, the small sample size will definitely limit the reliability of the findings. It is worth appreciating that the perspectives of a single 1600-rated player will not necessarily represent the opinions of all experienced chess players, just as the beginner's perspectives cannot encapsulate the views of all lower-rated players. While a structured coding framework can ensure consistency in analyzing responses ([16], the limited number of participants means that results should be interpreted as individual perspectives rather than broadly applicable insights.

3) *Generalizability/Transferability*: Although this study cannot necessarily aim for statistical generalizability due to the small sample size. The case study strategy will provide in-depth, contextual insights rather than broad, universally applicable conclusions. Therefore whilst having reduced generalizability, transferability can still be achieved by providing thick descriptions of the study context, methodology, and findings. This will allow future researchers to determine whether the insights gained could still be applicable to their own research, therefore not completely voiding the results achieved.

F. Ethical Considerations

1) *Informed Consent*: Participants will be fully informed about the study’s purpose, their voluntary participation, and their right to withdraw at any time. Explicit consent will be obtained for using their Elo ratings, ensuring they understand how their data will be presented.

2) *Privacy and Data Protection*: While Elo ratings on a digital platform such as Chess.com may be publicly available, their inclusion in this study will require participant approval. If preferred, data can be anonymized, and all collected information, including interview transcripts, will be securely stored and accessed only by authorized individuals.

3) *Accuracy and Representation*: Elo ratings fluctuate and may not fully represent a player’s skill. This study will verify and report ratings accurately while acknowledging their limitations, ensuring that conclusions are not misrepresented.

4) *Ethical Publishing and Reporting*: Findings will be presented respectfully, avoiding any potential harm, misrepresentation, or embarrassment to participants. If a participant decides to retract their shared data, their request will be honored.

5) *Institutional and Legal Compliance*: If required, ethical approval will be obtained from relevant academic bodies, and all data handling will comply with applicable data protection regulations.

V. SECTION 4

A. Results, analysis, and discussion

From the two interviews conducted on the beginner and the advanced players, recurring themes and key details were extracted and counted for comparison using a two-case-model. This approach is consistent with the case study methodology, which is well-suited for exploring participant perspectives within their real-world context [11]. Figure 4 presents the frequencies of major thematic codes for the beginner and advanced case.

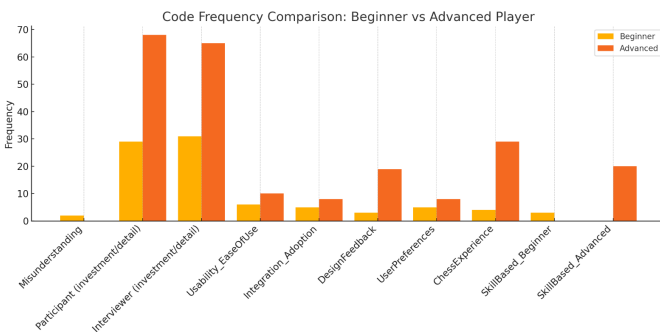


Fig. 3. Comparison of thematic code frequencies between beginner and advanced chess players.

Several clear patterns emerge from comparing our two cases:

1) Ease-of-Use & Beginner Adoption

The beginner discussed ease-of-use in six distinct instances, focusing entirely on their personal experience: “It sounds easy to set up, to be honest.” The advanced

Code System	AdvancedInterview...	BeginnerInterview
PersonalExperience	10	
UserPreferences	8	5
ChessExperience	29	4
DesignFeedback	19	3
Integration_Adoption	11	4
Interviewer	65	31
Misunderstanding		2
Participant	68	29
SkillBased_Advanced	20	
SkillBased_Beginner		3
Usability_EaseOfUse	10	6

Fig. 4. Comparison of thematic code frequencies between beginner and advanced chess players.

player mentioned ease-of-use ten times but contextualized it for a wider audience: “For me, no, but for a person who’s not really conversant. Possibly. But from what I see it shouldn’t be a hurdle, you know?”

This contrast is an example benefit of semi-structured interviews, which aided in highlighting experience-based feedback across diverse skill levels [14]. Both responses indicate perceived ease of use, which aligns with the central hypothesis.

2) Adoption Factors

Also aligning with the central hypothesis, both participants referenced ease of use, integration into training, and assumed system accuracy. Their responses demonstrate how interpretive analysis can surface meaning beyond literal responses—critical for understanding technology adoption in personal contexts [15].

3) Advanced Accuracy Emphasis

Although the central hypothesis anticipates that the advanced player will be more concerned with system accuracy, this could not be tested robustly due to the absence of a working prototype. Instead, assumptions about accuracy were inferred. This is a limitation typical in exploratory, hypothetical-based interviews [16].

4) Usefulness & Effectiveness

Both participants found the tool useful in concept and usable in practice. Usability refers to ease of setup and interface.. Usefulness refers to the tool’s potential training value. (Beginner - Usability) “It sounds easy to set up, to be honest.” (Advanced - Usefulness) “I think it’s a good tool to get people... up and running.” These responses support the idea that usability encourages initial adoption, while perceived usefulness may determine sustained integration.

5) Influencing Factors

The advanced participant provided richer and more critical feedback. This outcome supports earlier findings that semi-structured interviews allow experienced participants to elaborate, especially when supported by open-ended questions [13].

6) Design Feedback

One of the objectives for this research was to retrieve insightful improvements for computer vision based chess training tools. The participants offered concrete enhancement ideas, including:

- A human-vs-engine mode for direct practice against Stockfish-level bots.
- Accessibility features (e.g. text-to-speech, voice control).
- A custom, lightweight tripod to simplify setup and improve portability.

7) Skill-Based Differences

The observed differences in “skill-based” and “chess experience” codes reinforce that player expertise shaped their expectations and interpretation of the tool. This reflects the interpretivist paradigm of this study, which prioritizes the participant’s meaning-making process [9]. The advanced player’s higher count of “Participant (investment/detail)” codes further supports this, indicating deeper critical engagement—something commonly seen in higher-knowledge participants within qualitative studies [1].

To illustrate these cross-case linkages, Figure 5 reproduces our MAXQDA Two-Case MAXMap, where edge weights equal the segment counts from Figure 4.

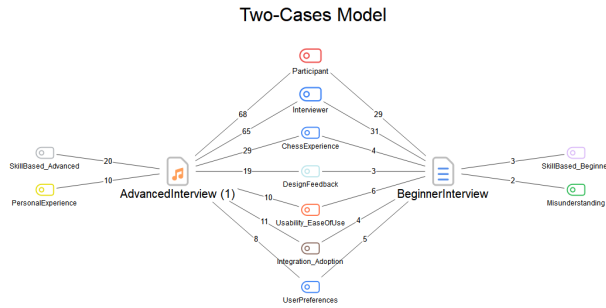


Fig. 5. Two-Case Model: thematic link weights for Beginner vs. Advanced interviews.

Together, these findings provide preliminary answers to the three research questions, highlighting a complex interplay of experience, perception, and design expectations.

B. Critiques and Limitations

While the two-case analysis yielded clear patterns, there were a few limitations which may have indirectly tempered the findings:

- **Prototype Description Only:** The tool was still a conceptual prototype, so participants had no live demo or screenshots and were limited to only a verbal summary. This may have reduced clarity and led to divergent models in the participants’ mind of how it actually works.
- **Small Sample:** With only two participants, this study is exploratory and not statistically generalizable.

- **Sequential Interview Learning:** The beginner session was run first, and refinements from its notes were carried forward into the advanced interview. This likely reduced misunderstandings for the second participant and may bias skill-level comparisons.
- **Coding Subjectivity:** All thematic coding was done by a single researcher. Without inter-coder reliability checks or triangulation, there is a risk of confirmation bias in how segments were assigned to codes.
- **Varying participant expertise:** The advanced player’s background in AI and technology may have influenced their understanding, unlike the beginner.
- **Hypothetical Bias:** Because the tool does not yet exist, responses reflect anticipated reactions rather than lived experience. Actual usability or trust issues could differ once a working version is tested.
- **Saturation not reached:** Patterns are indicative but should be validated with broader participant groups and iterative testing.

VI. CONCLUSION

The participants considered the tool easy to set up and potentially effective, mostly supporting the central hypothesis that these variables influence willingness to adopt the tool. Their responses highlighted perceived benefits in training integration and usability. However, it was anticipated that advanced player might place greater emphasis on accuracy, and this could not be explored without a working prototype.

In terms of research questions, participants perceived the tool as useful and effective in theory (Research Question 1), and consistently cited usability, integration, and accuracy as influential factors in its adoption (Research Question 2). Skill-based differences were evident, with the advanced player offering more critical feedback and context-driven insights, suggesting deeper analytical engagement when compared to the beginner player (Research Question 3).

This study showed that perceived ease of use and integration into training are key adoption factors across both beginner and advanced chess players. Although skill-based differences were observed, findings are limited by the lack of a working prototype and a small sample size. Future studies should include a functional tool and a wider participant base to enhance generalizability and insight.

REFERENCES

- [1] M. D. Myers, *Qualitative Research in Business & Management*. London, U.K.: SAGE Publications, 2008.
- [2] M. Saunders, P. Lewis, and A. Thornhill, *Research Methods for Business Students*. England: Pearson Education Limited, 2016.
- [3] J. W. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 4th ed. Thousand Oaks, CA: SAGE Publications, 2014.
- [4] A. Melnikovas, “Towards an explicit research methodology: Adapting research onion model for futures studies,” *Journal of Futures Studies*, vol. 23, no. 2, 2018.
- [5] A. Ruoss, G. Deletang, S. Medapati, J. Grau-Moya, L. K. Wenliang, E. Catt, J. Reid, and T. Genewein, “Grandmaster-level chess without search,” <https://arxiv.org/abs/2402.04494>, 2024, february 7, 2024.

- [6] S. Maharaj, N. Polson, and A. Turk, "Chess ai: Competing paradigms for machine intelligence," <https://arxiv.org/pdf/2109.11602>, 2021, september 27, 2021.
- [7] D. Klein, "Neural networks for chess: The magic of deep and reinforcement learning revealed," <https://arxiv.org/abs/2209.01506>, June 2022.
- [8] H. Snyder, "Literature review as a research methodology: An overview and guidelines," *Journal of Business Research*, vol. 104, pp. 333–339, 2019.
- [9] J. W. Creswell and C. N. Poth, *Qualitative inquiry and research design: Choosing among five approaches*. SAGE Publications, 2018.
- [10] K. Charmaz, *Constructing grounded theory*. SAGE Publications, 2014.
- [11] R. K. Yin, *Case study research and applications: Design and methods*. SAGE Publications, 2017.
- [12] S. J. Tracy, *Qualitative research methods: Collecting evidence, crafting analysis, communicating impact*. Wiley-Blackwell, 2020.
- [13] A. Bryman, *Social research methods*. Oxford University Press, 2015.
- [14] N. King, C. Horrocks, and J. Brooks, *Interviews in qualitative research*. SAGE Publications, 2018.
- [15] D. Silverman, *Interpreting qualitative data*. SAGE Publications, 2020.
- [16] J. F. Gubrium and J. A. Holstein, *Handbook of interview research: Context and method*. SAGE Publications, 2012.