

The Dual Nature as a Local Context to Explore Verbal Behaviour in Game Explanations

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Abstract

Little is known about the joint construction of context in everyday explanations of technical artifacts. Yet XAI systems are often expected to explain exactly such artifacts. In our study of 84 German dyadic game explanations, we investigate how the local context unfolds. We applied a threefold analysis of semantic content (nodes), explanation strategies (speaker moves) and the perspective of the game explanations. This approach revealed a detailed analysis of the development of context. We explored the connection between the nodes and the perspective from which they are addressed (either Architecture or Relevance) as well as how they are formulated (speaker move). Architecture and Relevance formed local contexts against which we explored the speaker moves. Our results reveal that some nodes and speaker moves are rather or exclusively addressed by Architecture than by Relevance.

1 Introduction

Game explanations are part of everyday explanations but how do we explain specifically? The dual nature theory, from philosophy of technology, argues that all technological artifacts – human made objects serving as means to ends – have a dual nature that needs explaining. On the one hand, one can use the perspective on its Architecture (A), by explaining the physical properties, material make-up, or mechanisms. On the other hand, the Relevance perspective (R) is useful to explain the function of the (parts of) the artifact, the intentions of the designer of the artifact (Kroes, 2010; Vermaas and Houkes, 2006; Winkelnkemper et al., 2024).

Taking this as a context (Rohlfing et al., 2025) we are interested in to what extent A and R influence the nodes and speaker moves in an explanation. The speaker moves are explanation strategies (Chi et al., 2008) and to differentiate those their semantics need to be considered. This content is systematically captured in nodes (Fisher

et al., 2023). By combining the dual nature perspectives and nodes together with a detailed analysis of speaker moves we aimed to answer the following research questions: (RQ1) Which nodes are predominantly addressed from either the A or R perspective? (RQ2) How are the interaction partner addressing the dual nature via their speaker moves?

2 Method

2.1 Participants:

We video recorded a corpus of 84 game explanations, which we collected in the projects A01 and A04 *TRR 318 Constructing Explainability*¹. These recording captured dyadic interactions between explainers (EX) and explainees (EE). This included 163 L1 and 5 L2 German speakers ($M=25$ years). The game explanations lasted 5:57 minutes ($SD = 1:49$ minutes). The data collection, part of a larger study, consisted of multiple phases, including questionnaires and an explanation task. EXs were asked to learn a strategic board game and then explain it to EEs, who were encouraged to participate actively. The explanations were spontaneous.

2.2 Coding:

We used qualitative content analysis to code the content of the explanations using different coding manuals. An inductive code category system developed in an earlier study was used to code the content of the explanation regarding which aspects of the games were explained (henceforth nodes). Additionally, we used a deductive code category system to categorise utterances that address the dual nature of the game (henceforth A and R). To enhance the analysis, the speaker moves were coded to get a better understanding of how the nodes and dual nature were addressed linguistically. Two independent coders coded 10% of the material: nodes

¹<https://trr318.uni-paderborn.de/en/projects>

($k = 0.86$), speaker moves ($k = 0.65$), and A and R ($k = 0.80$).

Nodes: A node relates to a specific piece of information about the domain. For the game Quarto, the nodes are as follows: 1 (name), 2 (players), 3 (board), 4 (game comparison), 5 (figure), 6 (turns), 7 (goal), 8 (tips) and 9 (features). Therefore, the node coding scheme developed by Fisher et al. (2023)² was used.

Speaker Moves: A speaker move is an explanation strategy by a speaker that is transporting a single idea within a turn (Chi et al., 2008). Fisher and Rohlfing (2025) developed a data-driven coding scheme³ which we will apply to our data set.

Dual Nature: The category Architecture roughly refers to what rules the game consists of and what the components are. Looking from an intentional perspective, the category Relevance asks what different components or rules are for or why they exist. Therefore, one can, for example, (1) explain how a Quarto! works on the level of its pieces, the board, or the game procedure (i.e., addressing A), or by explaining (2) how one may use certain rules to get advantages in the game (i.e., addressing R). The development of the coding manual is described in (Terfloeth et al., 2023).

3 Results

The examination of RQ1 is visualised in Figure 1. Nodes 1-3 and 5-7 are predominantly addressed from the A perspective with statistically significant differences ($p < 0.05$) reflected in the mentioning of the materials. Node 4, game comparisons, presents a balanced distribution between perspectives. Nodes 8 and 9 demonstrate a shift toward R with statistical significance. The findings indicate an explanatory structure with utterances addressing A explaining the foundations of the game, while utterances addressing R explain more complex information such as strategies.

Regarding RQ2, only a few speaker moves showed significant ($p < 0.05$) differences in the dual nature context. Overall, A was primarily addressed, ranging from 58% to 78% across moves. Looking at single moves, certain differences are identifiable. EE factual question and EX additional info had the lowest R orientation (~23%). In contrast, EX paraphrasing partner and EE summarising info showed relatively high R (~38%). The follow-

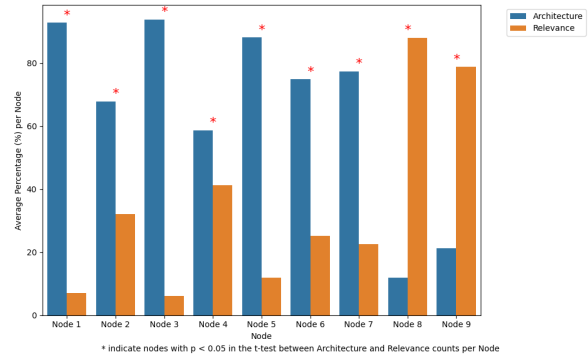


Figure 1: Node Addressing by Duality Perspective (Relative Percentages per Node)

ing moves only addressed A: EE label question, EX comprehension question, EX factual question and EX repeating self.

4 Discussion and Outlook

We set out to examine the nodes and speaker moves in the local context of A and R. RQ1 explored the connection of nodes and A and R. The results show that nodes 1-3, 5-7 are most frequently addressed from an A perspective. This is not surprising, as the different game elements are described by those nodes. Rather equally addressed from A and R is node 4 game comparisons displaying the multitude of aspects that can be addressed through this node. Nodes 8 and 9 are addressed in the context of R. The fact that the last two nodes also include some A supports findings that more complex content requires A as a foundation (Terfloeth et al., 2023). The A perspective appears to be particularly important regarding the questions of the interaction partners.

Further research needs to examine more carefully how local contexts evolve in explanations. Our findings suggest that speakers adapt their explanation strategy based on the content they aim to convey, which can be further characterised by the nodes, and A and R. To facilitate adaptive explanations, XAI systems need to be sensitive to contextual factors.

Limitations

It is crucial to note that the timing of the moves, nodes, and A & R was not taken into account. Also, the generalisability of our findings needs to be tested as we were only looking at game explanations.

²The node coding scheme can be found [here](#)

³The speaker move coding scheme can be found [here](#).

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Ethics Statement

The study with adult participants was approved by the Paderborn University Ethics Committee. All participants participated voluntarily and provided written informed consent prior to the studies.

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