Designerly Ways of Analysing Gameplay and Player Experiences

Malay Dhamelia
IDC School of Design,
IIT Bombay, Mumbai, India
malay.dhamelia@iitb.ac.in,

Girish Dalvi
IDC School of Design,
IIT Bombay, Mumbai, India
girish.dalvi@iitb.ac.in

ABSTRACT
There is a fundamental contradiction in analysing experiences in games. Although players expect a game to be fun, fun as an experience is not directly designed by the game designer. This creates challenges for game designers and game design researchers. Game designers face a second-order design problem (Salen and Zimmerman 2004) as they can only design the game rules and broadly gauge the experiences from the designed rules. Similarly, game design researchers, aiming to find out design principles of experiences like fun, confront second-order analysis problem (Howell and Stevens 2019). They rely on player reportages of experiences; through interpretation, they arrive at the rules of that created them. Designers change the rules to create the required experiences, while game design researchers arrive at the principles that creates these experiences.

Given the second-order nature of experiences in games, these reportages are often delayed. From design research methods perspective, the designers and researchers are distanced from the gameplay. In this paper, we propose Gameplay Experience Sampling Protocol for data collection and analysis that reduces the distance of designers and researchers from the gameplay. Through this reduction, we aim to strengthen a researcher's interpretation. Game designers and game design researchers can use this method to record the gameplay and player experiences along with the rules that generate those experiences. Our protocol seeks to further the epistemological and ontological grounding of Howell and Stevens (Howell and Stevens 2019).

Keywords
Game Design Research, Methodology, Player experience, Player as designer, Abstract Strategy Board Games, Applied ludology, Perspectives, Analog Games

INTRODUCTION
Games are complex rule-based systems that aid players in deriving meaning in play and creating experiences (Salen and Zimmerman 2004; Dormans, n.d.). While they are not the game experience itself, rules create instances of a game's play. In this sense, game's formal structure is related to the player's experience. The epistemological scope of game design research has expanded from formal systems (Aarseth 2005) to the emergent game aesthetics (Howell and Stevens 2019; William and Alexander 2017). Of the several aesthetics created by games, one of the major interest of ludologists is gameplay aesthetics. Rules, have a significant function in creating gameplay aesthetics

Proceedings of DiGRA 2023

and gameplay experiences for players. Knowledge of gameplay aesthetics in relation to rules would benefit both—designers and game design researchers (Järvinen 2008, 243).

Game designers ensure that players experience fun when then follow the designed rules of the game. They conduct multiple playtesting sessions to ensure that game rules create the intended player experiences (Schell 2019, 390). Game design researchers too, in order to arrive at the working principles have to observe player experiences, affects, emotions, and aesthetics (Järvinen 2008, 243). Hence, during playtesting sessions, designers observe different aspects of the gameplay—emergent dynamics, play cultures, playing styles, and strategies. To further refine their observation of the gameplay, they collect gameplay and experiential data through interviews, surveys, gameplay logs, video recordings, and so on. Analysis of the gameplay observation and the collected data helps the designer to modify the rule set and achieve the desired experience.

The process of arriving at a rule set from the intended experience is complex because a designer first captures desired or undesired experience of the players through multiple methods, identify the imbalance in the gameplay and then attempts to arrive at the rule set necessary for the intended, balanced gameplay. A game designer's approach, thus, is to analyse multiple gameplays, get a broad sense of the emergence of player experience in the game and then modify rule sets. However, gameplay analysis does not necessarily yield insights into the player experience (Cook 2006; Howell and Stevens 2019). In order to understand how to analyse player experiences in relation to rule systems, the designers look up to literature on design research in game studies.

However, it is fairly established that there is a growing need to study experiences, gameplay and design are studied in relation to each other (Cowley et al. 2014; Järvinen 2007). Game design research identifies recurrent design problems and their solutions—game design patterns, ontologies, mechanics libraries, and so forth. On the other hand, experiences are analysed either in terms of psychophysiological data or are well-differentiated affects. This gap limits the practical applications of player experience research. The gap can be attributed to the challenges posed by the nature of player experience and the lack of methodological guidance to capture and analyse them.

THE NATURE OF PLAYER EXPERIENCES

Broadly, players interact with game components using the game rules to create gameplay. Through gameplay, players experience the game system (Salen and Zimmerman 2004). With each play, players create new gameplays and observing those gameplays creates novel player experiences with each gameplay. Players experience 'an instance' of emergence during their gameplay. This dimension, called emergence, is troublesome for design researchers. It is difficult to reduce aspects of emergence to a governing set of rules. Frameworks like machinations.io, based on Dormans's UML, aim to predict game economies in different conditions by simulating different gameplays (Dormans, n.d.; n.d.). Game designers use such tools to test the balance of mechanics in their game design. A valid shortcoming of such gameplay modelling is that it does not analyse gameplay from a player's perspective. Player experience is more than the complexity of rules and unpredictability of game states, especially as the player is involved.

To create knowledge about games through player experiences, it suggested studying 'in-moment' experiences to understand the *game as played* (Mallon and Webb 2000; Howell and Stevens 2019). Such experiences are inner, and 'pristine' (as termed in positive psychology); undergoing players understand the rules, follow them and create gameplays. Such experiences, termed idiopathic experiences, are not usually

measurable (Howell and Stevens 2019; Conner et al. 2009). However, they are sampled in relation to the time and context in which individuals create and experience them. In order to study how player experiences are created in relation to the game rules, players' inner experiences and the context in which they are created have to be studied.

Games of different genres, media, and formats have their own way of establishing rules. For example, in digital games, it is possible to embed rules programmatically whereas in board games, players must adhere to the rules. The goal of game designers and researchers remain the same — to design or develop understanding of gameplay aesthetics through rule systems. Thus, methods to study in-moment player experiences, affects, and aesthetics in relation to rule systems are inherent in the sorts of games. Methods of Games User Research (GUR) are an established standard to study player experiences in video games. Interviews, focus groups, questionnaires, and heuristic evaluation aid researchers to arrive at specific design insights about the game. Similarly, think-aloud protocols, behavioural observations, and game metrics aid researchers study in-moment emotions, experiences, thoughts, and decisions. Psycho-physiological measurements also aid in capturing moment-to-moment data in great detail. While these methods are sutiable for analysing digital games, owing to the nature of board games, these methods have serious shortcomings to capture in-moment experiences of players playing board games.

Players of board games have to adhere to the rules. Rules allow or confine their actions. Within the affordances and constraints of rules, players act. During the act, players experience cycles of emotions and affects. To study these affects, it is

METHODOLOGICAL CHALLENGES

In order to study them from a design perspective, the nature of player experiences poses methodological challenges. During an investigation, players have to reconstruct the experience of the gameplay from their memory; because the gameplay and its experience is in-moment, inner and pristine to the player. Reconstruction of experiences and events is conventionally captured through reportage. The fidelity of the reconstruction depends on the time-distance from the gameplay; based on time distance, Howell and Stevens articulate two types of reportages—delayed and immediate reportage (Howell and Stevens 2019). For accurate reconstruction of the experience, it is suggested to employ immediate reportage methods like think-aloud protocols. The suggestion of think-aloud protocol-based reconstruction might work for certain games, but it is pragmatically unsuitable for board games. While articulating the experience and the context to the researcher, players also reveal their play strategies to other players which are usually kept secret. The delayed reportage is susceptible to several cognitive biases like recall bias (Sedgwick 2012), peak-end effect (Fredrickson and Kahneman 1993; Warnaars 2009), and autobiographical memory bias (Walker, Vogl, and Thompson 1997).

A researcher interprets gameplay from the player's reported and reconstructed experiences. Game researchers actively try to make their interpretation rigorous by reducing the interpretative leaps. For this reason, Lankoski and Björk suggest researchers play the game for analysis ; it reduces the researcher's distance from the context in which she is studying, allowing her to make better-informed interpretations. Such biases distort the reconstruction of a player's experience and thus pose a challenge to the researcher's process of interpreting the gameplay and, subsequently, the game rules.

SUMMING UP

Thus, we need a method to help players accurately reconstruct their inner and in-moment experiences. The method should also capture the progression of such

experiences. Further, the method should capture these experiences in relation to rules. A researcher should be able to capture the player's inner and in-moment experiences, the gameplay at those moments, the rules creating that gameplay, and the relations among them through the method. Thus, the method needs to capture the player's inner experience in relation to the gameplay and gameplay in relation to the rules. Moreover, the method should also bring game design researchers closer to the context of gameplay. In this paper, we propose a protocol based on the experience sampling method to achieve the abovementioned two goals—accurate reconstruction of player's experience and improving researcher's interpretation of gameplay and game rules.

GAMEPLAY EXPERIENCE SAMPLING METHOD

Experience Sampling is a method to capture the subjective experiences of a person interacting with their environments. It is used where researchers want to study 'pristine' experiences (Hurlburt and Akhter 2006) in-situ and in contextual time. As an idiographic method, it focuses on patterns of behaviours of a single person across a population of experiences (Conner et al. 2009). The population of experiences is created in multiple ways.

Generally, in the experience sampling method, participants carry a beeper which beeps at specific times and a data collection instrument—Experience Sampling Forms (ESFs). The beeper notifies the participant to pause the activity and respond to the experience sampling form. Specifically, depending on the research design, the experience sampling method can be employed through three protocols—signal-contingent, interval-contingent, or event-contingent. In signal-contingent protocol, the beeper beeps at random times. Participants are not aware of the beep times and frequency. This protocol allows researchers to collect participants' subjective experiences in their natural context accurately. In the interval-contingent experience sampling protocol, beeper beeps at pre-defined intervals; for example, one sample at 8 a.m., another at 12 a.m., the next one at 4 a.m. and so forth. Through this protocol, researchers can identify fluctuations in moods over time. In these two methods, participants cannot choose when the sample is collected; they are passive, and the researcher instructs them through beepers. However, in event-contingent experience sampling protocol, the participant actively recognises the event under focus and decides when to report it. This protocol is appropriate for studying events that do not emerge at fixed intervals or are not likely to be present during the signal.

Christensen advises that a protocol can be chosen based on the following decision-making criteria (Christensen et al. 2003). The first is *the prevalence of target events under study*—how frequently or when do the events occur? The event-contingent protocol captures the antecedent and precedent events and the main event in focus. The second criterion is *the susceptibility of the phenomenon to memory bias*—how does the researcher want her participant to report? The farther the data collection from the event under study, the greater the chances of the participant forgetting experiences in the exact way they occur. It is well established in retrospective protocols participants have to reconstruct their experiences and in turn, lose experiences that are quick to decay—like emotions, subjective well-being, irrationalities, and so forth (Christensen et al. 2003). The burden on participants is the third criteria for deciding on experience sampling protocol. In signal-contingent protocol, a participant is interrupted seemingly arbitrarily to respond to the data collection instrument. This interruption increases the burden on participants as they have to externalise the experience and carry on with their tasks.

In our case, we wish to understand how players create gameplay and undergo experiences and how game allows players to create different experiences. Players may experience fun at any time during the gameplay, so it is impossible to capture using

signal or interval contingent experience sampling protocol. Our method is based on the event-contingent protocol of the experience sampling method.

PROTOCOL OF FOR DATA COLLECTION

In our protocol, to collect gameplay and player experience data coupled together, a participant goes through four phases: Gameplay, Sample collection, Elicitation, and Imaginary variation. In the first phase, the participant plays the game with the researcher (Gameplay). In case the participant does not know the game, a researcher explains the rules and a warm-up game is played. Warm-up game ensures that the participant plays the game as intended and gains the required confidence to play the game. The involvement of researcher in the study is necessary because of two reasons. First, the gameplay is shared between the players. To understand how the experience is generated, the researcher needs to reduce her distance from the context. In our case, the best possible way to reduce this distance is to play with the participant. The second reason is a reduction in the interpretative leap. The researcher needs to reduce the interpretations based on assumptions to improve the explanations and descriptions. Playing the game with the participant allows researchers to make grounded and informed interpretations about the players' experience of fun. The two reasons combined help make researchers reflexive in their analysis.

During the gameplay, players play the game as usual. The game board and hand movements of players are video recorded. An audio recorder is placed in the centre, and it captures verbal communications like expressions and in-play interactions throughout the game. Whenever either of the players experiences fun, they call a trigger (Sample collection phase). At that moment, both players pause playing and respond to the experience sampling form given to them. While responding to the ESF, the participant goes through a) a Likert scale, b) a mood meter and c) a set of five questions. The burden on players is usually high in event-contingent experience sampling protocols. This affects the quality of data in the experience sampling form. To improve the quality of articulation, players were first asked to rate the amount of fun on a Likert scale they were experiencing pertaining to the event. This Likert scale is not used for any statistical analysis but is only used as a mechanism for players to elicit their experience better. Secondly, a mood meter was provided to improve their articulation of their emotions. After these two priming questions, participants respond to the five questions: 1) what are you feeling at the moment? 2) What is motivating you to take the gameplay forward? 3) What are you thinking at the moment? 4) What is fun for you? 5) What is not fun for you?

The gameplay is resumed once both players have responded to the ESF. An important change from the conventional event-contingent protocol is that either of the players can trigger the sample collection. In other words, since the researcher is also the player, her triggers are also a part of the experience and hence, also a part of the experience sample. There are several implications of this change. First, this event-contingent sampling protocol allows us to capture the experience of fun of the player in relation to the other player. This is necessary as fun is interactional and needs the Other to emerge (Dhamelia and Dalvi 2022b). Second, it allows us to capture the same event as experienced by both players. Third, the agency to record their experiences rests with both players equally.

After the gameplay, both players—the researcher and the participant—discuss their experience samples (Elicitation phase). These samples guide the players in reconstructing their playing experience, thus reducing recall and memory bias. However, the purpose of the conversation is to dwell deeper into the experience. The researcher asks probing questions so the participant can elaborate on the experience; the participant can similarly ask a question. This conversation is audio recorded.

#	Phase	Purpose	Data source	Data Channel
1	Gameplay	To record the gameplay	Play	Video recording
		To record in-game conversations	Play	Audio recording
2	Trigger—When one of the players calls to collect experience samples	To capture details about the events when one of the players experiences fun.	Experience Sample Forms filled by both players. Each ESF contains the following: 1) Likert scale of fun 2) Mood meter 3) Five questions	1) Likert response 2) Mood selection 3) Experience samples
3	Discussing the Experience Sample forms	To elaborate on the details about the events and the experience of fun.	Semi-structured post-game interview	Audio recording
4	Modification exercise	Arrive at the player's notion of the event	Think-aloud protocol	Audio recording
		Derive conditions of fun	Modified rule sheets	Rule sheets
		To understand the notion of fun as a player experience.	Interviews	Audio recording

Table 1: Phases of the event-contingent experience sampling protocol to study the player experience of fun.

Modification exercises allow players to identify and articulate the context of their experiences (Dhamelia and Dalvi 2022b; Sotamaa, n.d.). In order to understand the relation of experience with the gameplay structure, players were given samples where they experienced the fun and asked to modify one game rule that would reduce the fun that she mentioned in that sample. Here, the balance of the rules is not in focus; the exercise captures the player's perceptions about the rules and the player experience. While attempting to modify, her process is recorded using a think-aloud protocol. After that modification, she is asked to decrease the fun that she has mentioned in the same sample. She performs this task through think-aloud protocol and is also recorded using a think-aloud protocol. The think-aloud protocol allows researchers to examine players' perceptions of the rule system and the fun that is anticipated in the process. The verbalisation is audio-recorded.

Deployment of protocol

In order to study player experiences in relation to rules, we chose the abstract strategy board game—*Pylos*. Abstract strategy games can be considered as pure rule systems who create gameplays solely on the basis of player interaction with rules. Unlike the narrative games whose gameplay and hence the affect is driven by plot of the story. Board games were chosen as the the rule-driven aesthetics are dominant in board games as compared to the immersion-based aesthetics.

This event-contingent protocol was applied to the game of *Pylos*, an abstract strategy game. *Pylos* is a two-player game played on a board with holes on a 4 × 4 matrix. Each player has a repository of 15 spheres of either colors—black or white. Players take turns placing a sphere of their colour from their repository on the board. There are following rules for placing a sphere on the board:

1. A player can place a sphere of her colour on any empty hole in the 4 × 4 matrix.
2. A player can place a sphere of her colour on top of a square formed by four spheres of any colour.
3. A player can place a sphere of her colour only where there is space—either an empty space on the board or on an upper level where four adjacent squares form a space.

In this way, eventually, a pyramid is formed by the two players as the game progresses. A player wins the game when she puts a sphere of her on top. To achieve this, players need to save their spheres. There are three rules to save spheres.

1. A player can choose to use the sphere already placed on the board and place it on a higher level. Thus, making it 'jump up' to a higher level. However, the sphere has to be free—there should be no sphere on top of it. This rule enables a player to save one sphere by re-using spheres on the board.
2. Upon the formation of a row of the same color—a row of four spheres of the same colour on the first level and a row of three spheres on the second level, that player can pick up any two free spheres from the game board. The spheres are returned to her repository, improving her repository.
3. Upon the formation of a square of the same color, that player can pick up any two free spheres from the game board.

Researcher played *Pylos* with three players—a player who does not play many board games (novice), a player who is a board gamer, but has not played *Pylos*, a player who has played *Pylos* and is a board gamer. Ethics approval for the experiment was taken from the Institute Review Board (IRB) for the study.

QUALITY OF DATA OBTAINED THROUGH PROTOCOL

The protocol collects the gameplay data coupled with the player's experiential data from six data sources in six channels. Each data channel captures one or more aspects of the gameplay-experience coupled data. This implies that each aspect is captured by one or more data sources. Such many-to-many mapping of aspects and data sources (Table 3) affords 1) the researcher to view an aspect through multiple views and 2) triangulate data sources to validate their theories (Howell and Stevens 2019; Bekker and Clark 2018).

Data collection from Gameplay (Phase 1)

In the first phase, the gameplay is the data source. It is captured via two data channels—audio and video recording. Video recording captures the game board and players' hand

movements. Capturing of gameplay enables researchers to reconstruct the gameplay during different phases of analysis. The audio recording of the gameplay captures spontaneous affective in-game markers like exclamations as well as the in-game conversations. Audio recording and hand movements captured through the video channel capture markers of players' cognitive and affective processes. These markers sometimes act as supporting data to understand the player's experiences in relation to the gameplay.

Data collection from Experience Sampling Form (Phase 2)

The experience sampling form (ESF) is the data source for the second phase. The ESF has three parts—a likert scale, a mood meter, and a set of five questions. When a player experiences fun, she calls a trigger for sample collection. For that moment, players have to step out of the game world and respond to the questions about their thoughts and feelings. At this point, a player is eager to return back to the game. Moreover, depending on her emotional literacy, a player might not be able to articulate her thoughts and feelings related to her gameplay experience. To ensure that a player is able to articulately respond to the ESF, first, she responds to a factual question—who has called the trigger? After that, she responds to the Likert scale question—how much fun are you having? The question makes the player compare the amount of fun she has with previous samples or previously played games. Clarification of this response is elicited in during the sample explanation. However, as a player's experience, fun is not a monolithic construct. In order to dwell further into the emotional aspects of player experience, a player is asked to respond to the mood meter. Conventionally, the mood meter is used in the domain of social-emotional learning to measure and improve emotional literacy. Our protocol involves a mood meter to improve participation articulation and understand her feelings at the moment of sample collection.

Now that the player is in the frame to articulate their experiences, she responds to the sample questions in the following sequence. 1) What are you feeling about the gameplay at the moment? 2) What is motivating you to take the gameplay forward? 3) What are you thinking at the moment? 4) What is fun for you? 5) What is not fun for you? The first question attempts to capture the player's feelings with respect to the gameplay. Here participants responded like "Intrigued by what [opponent] just played" (sample #2, player) and "Relieved that my 'good' move wasn't actually stupid" (sample #6, player) when she was not sure about her move only to realise in this sample that it was indeed, a good move; thus feeling relaxed. The second question asks players about their motivation to take the gameplay forward. While the previous question asks about their current state, the second question asks about their expectation further in the gameplay. It is established that gameplay is inherently motivating; however, this question attempts to capture the experience of a motivated player. For instance, players responded like:

At the beginning of the game, the player triggered the sample. She identified a strategy that might work. This realisation excited her, and hence she triggered to write "Discovering whether my strategy works out and how does he counter it…" (sample #2, player). Later in the game, researcher triggered the sample collection. She saw through player's strategy and played offense. To capture this fun moment, she triggered and wrote "Overcoming the challenge against my strategy. Challenge has suddenly increased. Not sure how the game will move forward" (sample #4, player).

The third question captures the thought processes pertaining to the gameplay. Here, we found responses like "Thinking about what [opponent]'s strategy is to counter my move, which balls should I withdraw. Found a very interesting move that I did not know was possible -- when you pick two balls, you can pick the ball under the first ball too" (sample #6, player).

Lastly, through the last two questions, players try to articulate why they experienced or did not experience fun in that event. These questions help us in deriving the analysis of conditions of fun. While the ESF helps collect the data close to real-time while maintaining the context, they are condensed with many players' experiential information, which needs to be unpacked.

Sample elicitation (Phase 3)

At the end of the game, players place all the ESFs face up. The researcher and the participant go through each sample together. Each player (the researcher and the participant) picks up the ESF and speaks aloud their responses, one item at a time. For example, they begin by comparing what the amount of fun each of them had for a particular sample. Such a comparison has the strength to strike in-depth conversations about the gameplay they just experienced. In the above section, sample 2 was triggered in order to expand upon what the player thought in "Discovering whether my strategy works out and how does he counter it…" (sample #2, player); researchers asked about what did she feel when she thought about working out a new strategy. She expands during this phase, "The fact that I can see if I have understood the rules correctly during the game itself is fun. If it works, I will get some kind of validation, of which I do not know what to do. But I do like to feel validated. And then there is, of course, this fun in testing you… do you see what I see? Or do you just play your game? I like to act smart and test you."

In this phase, the researcher experiences two roles, one that of a player and that of a researcher. As the player, she has to articulate her experiences so that the participant can relate to her experience. To continue the same discussion on sample #2 triggered by the player, the researcher at the time felt curious about the move. She explained in the same conversation that "this indeed was a good move. The researcher felt challenged as she was not expecting this kind of advanced game. She furthers this conversation by "You understood the game fairly quickly; I could see through that move. Honestly, I was surprised". She also has to ask questions about the player's experience of the game. These questions help players articulate their experience in relation to the gameplay.

Throughout the ESF, players are asked to articulate the experience. The questions in ESF suggest players think about their experiences in relation to the game rules. Moreover, the simultaneous responses of players allow the researcher to compare the experiences and how a single event creates different experiences for both players. Such a comparison of experiences with an event being constant allows us to interpret the conditions of fun for players. To strengthen this interpretation of the conditions of fun offered by the game rules, we perform modification exercises as suggested by (Dhamelia and Dalvi 2022b).

To interpret	**Data source**	**Phase**
Gameplay	Gameplay video*	Gameplay (Phase 1)
	experience sample form (Questions 2 and 3)**	Sample Collection (Phase 2)
	Gameplay video**	Gameplay (Phase 1)
	Sample elicitation**	Sample Elicitation (Phase 3)

Experience	Gameplay audio**	Gameplay (Phase 1)
	Trigger***	Sample Collection (Phase 2)
	Mood meter***	Sample Collection (Phase 2)
	Experience Sample Form (Questions 1, 2, 4, and 5)**	Sample Collection (Phase 2)
	Sample elicitation*	Sample Elicitation (Phase 3)
Rules	Sample elicitation*	Sample Elicitation (Phase 3)
	Think aloud protocol of modification exercise**	Imaginary Variation (Phase 4)
	Interview on the modification exercise***	Imaginary Variation (Phase 4)

Table 3: Data sources for capturing the three aspects. * indicates that it is a primary source for that aspect, ** indicates a secondary source, And *** indicates tertiary sources.

The strength of the protocol lies in 1) triangulated data collection, 2) reconstruction of the experience and 3) preservation of the context for the researcher. At least three data channels capture one aspect for each interpretation of each aspect—experience, gameplay, and rules. One of them is the primary data source, while the rest act as secondary data sources, which complement the main source. The primary sources are experience samples to capture and reconstruct gameplay, while the experience sample form and the sample elicitation at that moment help reconstruct the gameplay for analysis. Such a triangulated data collection also helps the preservation of context and the researcher's reconstruction of experience. Table 3 shows data sources for other aspects and their role in interpretation.

ANALYSIS PROTOCOL

The gameplay length of *Pylos* is approximately 35 minutes. Thus gameplay video and audio will be 35 minutes per participant. The researcher played with three such participants, and the video and audio data of 105 minutes had to be analysed. Regarding ESFs, each player generated approximately 14 samples in gameplay. Thus, each two player game generates 24 experience samples. Playing *Pylos* with three such participants results in 72 samples (24 samples × 3 gameplays). Post-gameplay interviews were approximately 45 minutes in length per participant. Three such gameplays lead to 153 minutes. Lastly, a think-aloud protocol for the modification exercise resulted in 15 minutes of verbal protocol per participant, resulting in 45 minutes of verbal protocols on redesigning the game to reduce the fun. The audio recordings of the gameplay, sample elicitation, and verbal protocols were transcribed.

In order to analyse this large quantity of qualitative data, we first descriptively coded experience samples as they are common sources across the aspects, as suggested by (Martínez-Sierra et al. 2019; Hurlburt and Akhter 2006; Adu 2019). The process of

coding a sample is shown in table 4. For brevity, we demonstrate the analysis method through one sample from the mid-game, sample #6 out of the 12 samples. They are shown in table 4 and table 5, respectively.

Sample #6		
	Player Sample	**Researcher Sample**
Triggered by	Player	Player
How much are fun you having	9 out of 10	8 out of 10
Mood meter	Curious, hopeful, relaxed, chill	Proud, Excited, calm, observant
What are you feeling at the moment?	Intrigued by the expressions [opponent] had when he made the move. Relieved that my 'good' move wasn't actually stupid	A bit proud because although I was thinking that both the available saving spots are equivalent, one is more advantageous
What is motivating you to drive the gameplay forward?	I feel like I am getting good at it a little. Writing is helping me articulate my learnings	Hoping to save more
What are you thinking at the moment?	Thinking about what [opponent] 's strategy is to counter my move, which balls should I withdraw Found a very interesting move that I did not know was possible -- when you pick two balls, you can pick the ball under the first ball too This is making me think whether the fact that I find the move new means it is better	Although the two spots were the same, I still saw one potential advantage. One spot was better than the other. To form my saving structure. I think I will form one more saving structure after this. That will make save 4 more spheres than him. I think I am doing good. Like really good.
What is fun for you?	Finding a new possibility that I did not know and that my previous move not that stupid	Finding a better move of the seeming equivalent moves
What is not fun for you?	Nothing, everything is fun	Waiting for him to make the move

Table 4: Sample #6 as responded by the player and the researcher

Above sample of the player can be descriptively coded as follows:

Sample #6		
	Player Sample	**Descriptive Codes**
Triggered by	Player	
How much are fun you having	7 out of 10	
Mood meter	Curious, hopeful, relaxed, chill	

What are you feeling at the moment?	Intrigued by the expressions [opponent] had when he made the move. Relieved that my 'good' move wasn't actually stupid.	Observation of opponent's expressions, validation of move, validation from opponent, non-verbal validation, observation of opponent's reactions
What is motivating you to drive the gameplay forward?	I feel like I am getting good at it a little. Writing is helping me articulate my learnings.	Self-validation, sense of improvement
What are you thinking at the moment?	Thinking about what [opponent] 's strategy is to counter my move. Which balls should I withdraw. Found a very interesting move that I did not know was possible -- when you pick two balls, you can pick the ball under the first ball too. This is making me think whether the fact that I find the move new means it is better.	Recognising opponent's possible moves, decision based on opponent moves, realising a new possibility, finding a novel situation gives good feeling, new possibility of making a new type of move, evaluating choices, going towards reason, referencing to rules
What is fun for you?	Finding a new possibility that I did not know and that my previous move not that stupid	Finding a new possibility is fun
What is not fun for you?	Nothing, everything is fun	

Table 5. Employing descriptive coding strategy on player's response

Similarly, the researcher's experience sample can be coded likewise. A comparison of descriptive codes of the player and researcher is shown side by side in table 6.

Sample #6 Triggered by: Player	
Player	**Researcher**
Observation of opponent's expressions, validation of move, validation from opponent, non-verbal validation, observation of opponent's reactions	evaluation of choices, finding a better choice,
Self-validation, sense of improvement	improving further position in the game
Recognising opponent's possible moves, decision based on opponent moves, realising a new possibility, finding a novel situation gives good feeling, *new possibility of making a new type of move*, evaluating choices, going towards reason, referencing to rules	identification of choices, observation of choices, evaluation of choices, evaluation to better the position, projection of future game states, and gauging progress in terms of position

Finding a new possibility is fun, *new type of move can be used to surprise opponent*.	Finding a better move out of the available moves is fun
	Waiting in not fun

Table 6: Codes of researcher and player side by side (for sample #6)

The sample collection was triggered by the player; she is having fun. From the sample, we know that the player is having fun because she found a new possibility of picking up the spheres. Upon elicitation during phase 3, the researcher had the following conversation with her:

Researcher: "Why was finding a new possibility fun?"

Participant: "It is a possibility that I had not imagined till now. I think it can be used to further surprise the opponent."

Researcher: "Why do you think it is tough to imagine?"

Participant: "It is not tough to imagine generally, you know that a ball can be picked after the ball on top is picked. I mean, picking is usually like that. But here, the rule says that you can pick up free spheres. The idea that you can make the spheres free was novel to me because I still follow the rules, but also pick up the sphere that was not free… in some way. This helped me when I had only a few good choices to play with."

Along with the information about who triggered the sample, the sample elicitation helped the researcher know better what the participant thought was fun in this sample. Here, fun is in being in constraint, yet being able to find new ways to surprise the opponent. Here, the participant enjoys the possibility of an interaction where she has something on board which is visible yet invisible to the opponent. The rules allow the player to hide a possibility in plain sight, thus allowing players to create ambiguity for the opponent. The creation of ambiguity momentarily expands their agency in the given rule-constrained game environment (Nguyen 2019). Through such informed interpretation, we can arrive that the creation of ambiguity is a condition of fun which is offered by rules. Creating ambiguity is only possible when a rule partially disallows a player to perform an action.

Theme:	Finding a new possibility
Properties:	In terms of a new available move, in terms of the opponent's limited available moves;
Created by:	Self
Experienced by:	Self
Conditions:	Constraints players in a consistent manner
	Provides agency partially
	Allow creation of ambiguity
	Possibility of reframing

Antecedent event*	Exhaustion of choices

Table 7. Structuring the themes with respect to properties and conditions that give rise to that theme (for sample #6, player's response)

Similarly, the researcher sample can be analysed as follows:

In the researcher's sample (table 6), fun for the researcher is in finding a better move out of available moves was fun. To do so, the researcher evaluates the current game state and future game states to choose one. The researcher feels proud that she was able to find the difference by projecting future states. She is so excited about the game that "waiting is not fun for her". Her ability to differentiate between the available choices gives her joy. This informed discrimination contains a voluntary creation of difference between the two seemingly equal choices. She creates a difference to improve her game position with respect to her intermediate goal of saving more spheres.

Here the antecedent and precedent themes arrive from a complete analysis of such samples. For example, the researcher identified two choices and evaluated their choices to be similar according to her game plan in her previous (sample #5). However, only later was she able to create a difference between the two choices, one of them allowing her to improve her position with respect to her intermediate goal of saving more spheres during the gameplay. Later sample from the researcher (sample #7) showed that she achieved the intermediate goal after creating this difference. The player's ability to reframe the similarity of choices into disproportionate value allows them to derive player experiences.

Theme:	Creating a difference in choices
Properties:	For overall gameplan; For creating immediate advantage of self; For creating immediate disadvantage of opponents
Created by:	Self
Experienced by:	Self and Opponent
Conditions:	Reframing similarity to difference
Precedent theme:	Identifying choices, Evaluation of choices, Setting personal goal, adherence to goal, setting intermediate goals, comparing game states with opponents
Antecedent theme:	Achieving intermediate goals

Table 8. Structuring the themes with respect to properties and conditions that give rise to that theme (for sample #6, player's response)

The verbal protocols of the modification exercise to reduce fun are analysed through thematic analysis to identify the player's intentions behind the rule change. To increase the fun in *Pylos*, through conversations, the player and researcher arrived at the following rule for the experience captured in sample #6—Players can pull out spheres from anywhere once a pattern is formed, even when they are locked. To do so, they have to replace their sphere with an opponent sphere. Here, they attempted to increase the amount of surprise they could give to the opponent. Through the interpretative phenomenological method suggested in (Dhamelia and Dalvi 2022a) paper, we arrived at the condition of agency expansion of players in the game along with curbing of agency of their opponent, thus making the experience starker.

DISCUSSION

Our protocol studies the player's process of creating gameplay and undergoing experiences while doing so. It attempts to reduce the inaccuracies of reconstruction for players and improves researchers' interpretation, as shown in the section on an analysis method. It does so by bringing the player and researcher closer to the context of gameplay.

Gameplay as the player created context

In games, the context of the experience is provided by the gameplay; since the gameplay is a structure of interactions (Bjork and Holopainen 2005) and a way to experience the system (Salen and Zimmerman 2004). Gameplay as a context is dynamic in nature and changes significantly during the process of play. Hence, it becomes critical to gain player experience qualitative data from as close to context as possible. Thus, we need to study gameplay in relation to players. A ludological view of gameplay postulates that gameplay can be imagined as a series of events (Järvinen 2008; Cowley et al. 2014; Anthropy and Clark 2014). Players craft these events by following rules; hence they contain information about the rules as well as players. Events can aid in conducting a form analysis of gameplay (Guardiola, n.d.; Dhamelia and Dalvi 2022a). Hence, players can be seen as designers of gameplay, called player-designers, which they craft through events (de Mosselaer and Gualeni, n.d.; Sotamaa, n.d.; Dhamelia and Dalvi 2022a).

Distance of the player from the context

Player undergoes experiences in the context set by the gameplay. Schön articulates that a designer, in order to practice, converses with the context (Schön 2017). In this sense, a designer is suggested to remain close to the context. Considering players as designers, in order to converse and articulate with the context, a player has to be in the context while articulating. ESM, like immediate reportage of in-moment experiences, can give accurate and realistic information about the player experience (Howell and Stevens 2019). By bringing players and design researchers closer to the context, the method captures the "situatedness" of the player-designer.

Situatedness

Clancey describes situatedness as "where you are when you do what you do matters" (Clancey 1997). Several scholars describe the issue to capture a designer's situatedness in her context (Gero 1998; Goldschmidt 2014; Schön 2017). In game design research, capturing a player's situatedness is a recently well-articulated epistemological problem (Howell and Stevens 2019). Our proposed method attempts to capture the "situatedness" of players and researchers. The player's sample (table 4) articulates her situaded dialogue with the gameplay context as "Writing samples is helping me articulate my learnings". During sample elicitation, she expands upon this statement as follows—"Writing about why I am experiencing fun is putting me in a virtuous cycle. I am playing, then when I am writing, I am able to understand the game better and hence the gameplay, which in turn is helping me articulate my experiences better".

CONCLUSION

Howell and Stevens have established the epistemological and ontological approaches for addressing second-order design and analysis problems (Howell and Stevens 2019). Our method expands its framework by providing empirical methodical grounding. Through it, researcher can collect and analyse data to study experiences from player's perspective and rule system. In this paper, players are considered designers. Furthering this imagination, we place the player-designers in the context where they converse with the context and with each other to create gameplay. This view reduces a player's distance from the context and improves the accuracy of the player's reconstruction of

the experience. This, in turn, improves the researcher's interpretation about the formal structure of the game.

The method, although similar to those in Game User Research (GUR), has a different aim. While goal of GUR methods is to develop player experience models and provide better user experience in games, goal of this method to develop game design principles pertaining to the formal structure of the games. Goal and function of this method is similar to the Applied Ludology methods—to bridge the design analytical gap between the formal structures and player experiences. While the method, in its current form might have limitations of scaling for digital games, it was derived primarily for board games. In future, the ontological elements empirically derived from the method, can have the capabilities to capture qualitative gameplay data at scale.

BIBLIOGRAPHY

Aarseth, Espen. 2005. "Game Studies: What Is It Good For." *The International Digital Media & Arts Association Journal* 2 (1): 3.

Adu, Philip. 2019. "A Step-by-Step Guide to Qualitative Data Coding - 1st Edition - Philip." 2019. https://www.routledge.com/A-Step-by-Step-Guide-to-Qualitative-Data-Coding/Adu/p/book/9781138486874.

Anthropy, Anna, and Naomi Clark. 2014. *A Game Design Vocabulary: Exploring the Foundational Principles behind Good Game Design*. Pearson Education.

Bekker, Sheree, and Alexander M. Clark. 2018. "Improving Qualitative Research Findings Presentations." *International Journal of Qualitative Methods* 17 (1): 160940691878633. https://doi.org/10.1177/1609406918786335.

Bjork, Staffan, and Jussi Holopainen. 2005. *Patterns in Game Design*. 1st ed. Charles River Media Game Development Series. Hingham, Mass: Charles River Media.

Christensen, Tamlin Conner, Lisa Feldman Barrett, Eliza Bliss-Moreau, Kirsten Lebo, and Tamlin Conner Christensen. 2003. "A Practical Guide to Experience-Sampling Procedures." *Journal of Happiness Studies* 4 (1): 53–78. https://doi.org/10.1023/A:1023609306024.

Clancey, William J. 1997. *Situated Cognition: On Human Knowledge and Computer Representations*. Cambridge: Cambridge University Press.

Conner, Tamlin S., Howard Tennen, William Fleeson, and Lisa Feldman Barrett. 2009. "Experience Sampling Methods: A Modern Idiographic Approach to Personality Research." *Social and Personality Psychology Compass* 3 (3): 292–313. https://doi.org/10.1111/j.1751-9004.2009.00170.x.

Cook, Daniel. 2006. "Creating a System of Game Play Notation." *LOSTGARDEN* (blog). January 16, 2006. https://lostgarden.home.blog/2006/01/16/creating-a-system-of-game-play-notation/.

Cowley, Benjamin, Ilkka Kosunen, Petri Lankoski, J. Matias Kivikangas, Simo Järvelä, Inger Ekman, Jaakko Kemppainen, and Niklas Ravaja. 2014. "Experience Assessment and Design in the Analysis of Gameplay." *Simulation & Gaming* 45 (1): 41–69. https://doi.org/10.1177/1046878113513936.

Dhamelia, Malay, and Girish Dalvi. 2022a. "Designing Fun Game Rules: A Formal Game Analysis Method." *Digital Games Research Association, DiGRA 2022*, 21.

———. 2022b. "Pleasures in Games: Conceptual Analysis of Fun and Its Constructs." In *Gaming, Simulation and Innovations: Challenges and Opportunities*, edited by Upinder Dhar, Jigyasu Dubey, Vinod Dumblekar, Sebastiaan Meijer, and Heide Lukosch, 197–210. Lecture Notes in Computer Science. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-09959-5_17.

Dormans. n.d. "Machination 2009 Paper." Gist. Accessed July 16, 2021. https://gist.github.com/kengonakajima/5073347.

Dormans, Joris. n.d. "Integrating Emergence and Progression," 15.

Fredrickson, Barbara L., and Daniel Kahneman. 1993. “Duration Neglect in Retrospective Evaluations of Affective Episodes.” *Journal of Personality and Social Psychology* 65: 45–55. https://doi.org/10.1037/0022-3514.65.1.45.

Gero, John S. 1998. “Conceptual Designing as a Sequence of Situated Acts.” In *Artificial Intelligence in Structural Engineering: Information Technology for Design, Collaboration, Maintenance, and Monitoring*, edited by Ian Smith, 165–77. Lecture Notes in Computer Science. Berlin, Heidelberg: Springer. https://doi.org/10.1007/BFb0030450.

Goldschmidt, Gabriela. 2014. *Linkography: Unfolding the Design Process*. 1st edition. Bloomington: The MIT Press.

Guardiola, Emmanuel. n.d. “GAMEPLAY DEFINITION: A GAME DESIGN PERSPECTIVE.” www.mobygames.com.

Howell, Peter, and Brett Stevens. 2019. “Epistemological Issues in Understanding Games Design, Play-Experience, and Reportage.”

Hurlburt, Russell T., and Sarah A. Akhter. 2006. “The Descriptive Experience Sampling Method.” *Phenomenology and the Cognitive Sciences* 5 (3–4): 271–301. https://doi.org/10.1007/s11097-006-9024-0.

Järvinen, Aki. 2007. “Introducing Applied Ludology: Hands-on Methods for Game Studies.” In *DiGRA Conference*. Citeseer.

———. 2008. *Games without Frontiers: Theories and Methods for Game Studies and Design*. Tampere University Press.

Mallon, Bride, and Brian Webb. 2000. “Structure, Causality, Visibility and Interaction: Propositions for Evaluating Engagement in Narrative Multimedia.” *International Journal of Human Computer Studies* 53 (2): 269–87. https://doi.org/10.1006/ijhc.2000.0387.

Martínez-Sierra, Gustavo, Yurdia Arellano-García, Antonia Hernández-Moreno, and Cristian Nava-Guzmán. 2019. “Daily Emotional Experiences of a High School Mathematics Teacher in the Classroom: A Qualitative Experience-Sampling Method.” *International Journal of Science and Mathematics Education* 17 (3): 591–611. https://doi.org/10.1007/s10763-018-9879-x.

Mosselaer, Nele Van de, and Stefano Gualeni. n.d. “The Implied Designer and the Experience of Gameworlds,” 16.

Nguyen, C. 2019. “Games and the Art of Agency.” *Philosophical Review* 128 (May). https://doi.org/10.1215/00318108-7697863.

Salen, Katie, and Eric Zimmerman. 2004. “Rules of Play: Game Design Fundamentals -.” 2004.

Schell, Jesse. 2019. *The Art of Game Design: A Book of Lenses, 3rd Edition*. *The Art of Game Design: A Book of Lenses, 3rd Edition*. https://doi.org/10.1201/b22101.

Schön, Donald A. 2017. *The Reflective Practitioner: How Professionals Think in Action*. London: Routledge. https://doi.org/10.4324/9781315237473.

Sedgwick, Philip. 2012. “What Is Recall Bias?” *BMJ* 344 (May): e3519. https://doi.org/10.1136/bmj.e3519.

Sotamaa, Olli. n.d. “Perceptions of Player in Game Design.”

Walker, W. Richard, Rodney J. Vogl, and Charles P. Thompson. 1997. “Autobiographical Memory: Unpleasantness Fades Faster than Pleasantness over Time.” *Applied Cognitive Psychology* 11 (5): 399–413. https://doi.org/10.1002/(SICI)1099-0720(199710)11:5<399::AID-ACP462>3.0.CO;2-E.

Warnaars, S. G. F. 2009. “Event Experience : A Qualitative Study on the Impact of the Peak/End Rule in Event Experiences.” Info:eu-repo/semantics/masterThesis. University of Twente. February 13, 2009. http://essay.utwente.nl/59594/.

William, Goddard, and Muscat Alexander. 2017. “Towards Genre as a Game Design Research Approach.”

David G. Royffe. 1993. *Pylos*. Gigamic