PLAYFUL METADATA

Between Performance Careers and Affect Modulation

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ABSTRACT

In the field of specialized hardware for digital gaming, an increasing number of products not only promise ever-increasing precision, but also provide self-tracking functions intended to quantify the player's gaming activities and actions. We position these developments at the intersection between the Quantified Self movement and the tradition of playful self-measurement. Building on practice theory, we raise the following questions concerning the datafication of gaming practices and the use of what we call *playful metadata*: What do players and game developers do with data that is generated within, and in relation to, games? How does the emergence of playful metadata modify interactions, both between players and between the players and the game? By analyzing exemplary quantifying practices found in the contexts of speedrunning, competitive gaming and game streaming, we identify three central motives for quantified gaming: 1) the appropriation of games' spaces and goals by players who define their own parameters of success by quantifying their gameplay; 2) the production and communication of individual performance careers aimed at modulating the player's affects towards their own performance; 3) the production of data for competitive comparability and/or cooperative sharing of knowledge.

Keywords: self-tracking, quantified self, quantified play, practice theory

1. THE COMPUTERIZATION OF GAME PRACTICE

> "The Naos QG is a next generation gaming mouse that measures the user's biometric information and movement data. This allows the Naos QG to provide valuable, interesting and fun insights that creates a richer user experience."
>
> (Mionix 2020)

As the manufacturer's description suggests, the Naos QG mouse is a gadget for generating data about one's digital gaming activities. The input device, which comes in the shape of a conventional ergonomically designed computer mouse, measures in-game actions per minute based on click frequency and the distance travelled across the mousepad. Furthermore, it provides information about stress levels during gameplay via heart rate monitoring and skin conductivity measurements.

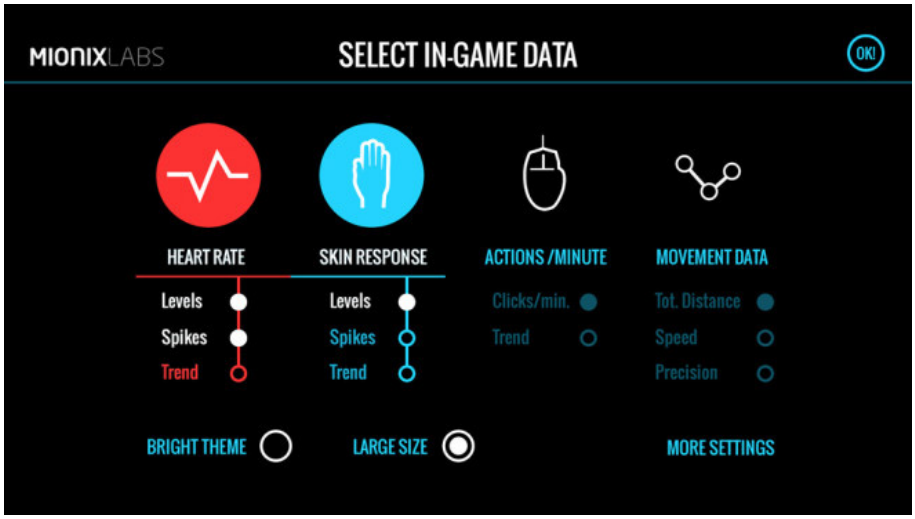

Fig. 1: Naos QG settings menu. (Source: Mionix, author's screenshot)

We posit that the Naos QG and its features are representative of a wider range of recently developed products that monitor and quantify digital gaming: At the hardware level, built-in sensors directly or indirectly measure physical reactions to the game or record eye movement.[1] At the software level, we see a proliferation of applications and platforms that collect, calculate and visualize data about the user's performance in the

[1] See interfaces like the SteelSeries Sentry or the Tobii EyeX.

game. While there are major differences in terms of functionality, all these technologies datafy the act of playing by translating the players' actions and physical reactions during the game into numerical and statistical form.

In this article, we will examine different practices and interfaces of quantified gaming and take a look at different forms of interaction that emerge in the context of datafied games. Following a media-as-practice (Couldry 2004) approach to games, we do not limit our analysis to a particular title or genre, but instead ask what players *do* with games and the data generated in and around them. In doing so, we hypothesize that distinct forms of interaction can be observed in the context of datafied games. In addition to the practices themselves, the necessary interfaces, the hard- and software as well as the wider network and platform infrastructures come to the fore. For as Schatzki points out, practices are by no means to be considered in isolation, but always in relation to the various "material arrangements" with which they maintain a reciprocal relationship. Neither is isolated; rather, practices and materialities form what Schatzki terms "bundles":

> "By 'material arrangements' I mean linked bodies, organisms, artifacts, and things of nature. [...] The idea that practices and arrangements form bundles implies that practices and arrangements interrelate. Practices and arrangements form bundles in that (1) practices affect, alter, use, and are directed toward or are inseparable from arrangements; while (2) arrangements channel, prefigure, and facilitate practices."
>
> (Schatzki 2016, 32)

This occurs first within a field of practice (Schatzki 2006) in which individual media use organizes itself into larger contexts. The analytical challenge here is the scaling: Which forms of use manage to imprint themselves on the larger context and for what reasons? According to Swidler (2006), there are "anchoring practices" that play a key role in the reproduction of larger systems of discourses and practices. Applied to quantified gaming, the question is consequently what significance this form of gaming practice has for digital gaming culture as a whole. To approach this question, it will not only be necessary to answer how individual actions and operations scale into practices, but also how these practices stabilize, how they

are enabled by material arrangements, and how they are involved in bringing forth further material arrangements. In order to accomplish this through a praxeological investigation, we will analyze three bundles with regard to their quantifying anchoring practices: speedrunning and its practices of timing and sequencing, competitive gaming and its practices of logging and stat tracking and game streaming and its practices of visualization.

Commercially available self-monitoring tools can be expected to change both the meaning of play and the games themselves. Consequently, Ben Egliston employs the concept of "quantified play" (Egliston 2020) to shed light on how quantification transforms gameplay and what effects it has on users. From a phenomenological point of view, he asks what new ways of playing are created by self-monitoring and where traditional ways of playing are displaced or even prevented. (Egliston 2020, 3) In a similar fashion and also in relation to digital gaming, James Ash describes how technologies "recalibrate" the perception of the here and now through quantification. (Ash 2012) He illustrates this with the example of the fighting game Street Fighter IV, and observes that particularly skilled players break the game down into individual frames, measuring the time between animations in individual frames. In this way, the frame rate becomes a new way of dividing and measuring time, which historically should not and could not actually be perceived by the recipients. (Ash 2012, 193)

In this sense, quantified play introduces an additional layer of datafication between interface and body that renders previously inaccessible information about the player's actions visible. We propose to conceptualize the data that emerge from and feed back into ludic environments and situations in that fashion as *playful metadata*, with the prefix 'meta' denoting that it is additional data *about* the player's actions, both within and outside of the game, that are generated. In ascribing a certain kind of *playfulness* to these data, we build on Deborah Lupton's (2018) notion of "lively data" produced by self-tracking technologies:

> "The digital data that are generated by self-tracking may be conceptualised as 'lively' in various ways. First, these data are generated from life itself, in terms of documenting humans' bodies and selves. Second, as participants in the digital data economy they are labile and fluid, open to constant repurposing by a range of actors and agencies, often in ways in which the original generators of these data have little or no knowledge. Third, these data are lively by virtue of the advent of algorithmic authority and predictive analytics that use digital self-tracked data to make inferences and decisions about individuals and social groups. These data, therefore, have potential effects on the conduct of life and life opportunities. Fourth, by virtue of their growing value as commodities or research sources, the personal data that are derived from self-tracking practices have significant implications for livelihoods (those using these data in the data mining, insurance and data science industries, for instance)."
>
> (Lupton 2015, 563)

Likewise, the data we are concerned with in this article can be considered as 'playful' in three distinct ways. First of all, they emerge from within games. As they document the player's (re)actions, they open them up to practices of evaluation and spectatorship. Second, they inform playful practices of altering the rules of the game which can be carried out by both the developers and the players. Third, they relate to practices of ludic biography, that is, to the writing of individual performance careers that underpin real or perceived life opportunities connected to playing digital games.

Rendering the imperceptible perceivable via playful metadata often follows an economic impetus and can thus be theorized as part of the ongoing dissolution between the domains of work and leisure. As diagnosed by Rhee: "[...] work no longer happens just at work; it also happens whenever we engage our devices, when we look up restaurants online, stream a movie, send an email or play a video game." (Rhee 2018, 46) Specifically addressing the sphere of play and games, Abend et al. employ the interdependent concepts of "laborious play" and "playful work" in this context. (Abend et al. 2019; 2021)

Seen in light of professional streaming and the ever-growing esports scene, the industry's promise of increasing individual player performance through quantified gaming seems to suggest the possibility of a seamless professionalization of one's own gameplay. Thus, our thesis is that the

technologies used in quantified gaming serve as mediators between individual performance careers and a broader culture of the professionalization of gaming. In this sense, the quantification of individual performances is an important factor that contributes to the professionalization of a practice formerly understood as a leisure activity. (Guttmann 1978)

2. THE TAUTOLOGY OF QUANTIFIED PLAY

With regards to digital games, talk of quantified play is akin to a tautology. Digital games have always been quantifiers of human action. In order to function, they process the input of players by quantifying movements, thereby rendering them machine-readable. The machine then generates an interpretable output, which in turn serves as the basis for the next player input. This output often takes the form of unnecessary obstacles that players have to overcome in order to win the game. (Suits 2002, 55) The attraction of a game is that this process cannot be fully anticipated. Players find themselves within a situation of an artificially created contingency that nevertheless "generates interpretable outcomes." (Malaby 2007, 96) This "interpretable output," which Malaby considers central to the game definition, simultaneously acts as an indicator for success or failure and enables comparability between players. Thus, in order to render visible success and failure, victory and defeat, the input must be made measurable through the game.

While the need for creating interpretable outputs also exists for analog board and card games, as well as for sports competitions, the practice of quantification is usually triggered by certain key events (e.g., goals in soccer). It is therefore possible to perform game actions that do not entail any immediate quantifiable output. In the case of digital games, however, any participation in the game means subjecting one's body – or at least the body parts acting on the interface – to a system of measurement and evaluation. The player operates within a feedback loop in which the machine continuously processes the inputs and generates corresponding outputs.

From this technology-centered perspective, the players of digital games have always been quantified. Playing digital games is thus always a datafied practice. However, this datafication does not necessarily result in a human-readable output of numerical values. Whether numbers are shown to the player and what meaning is ascribed to them in the context of the game strongly depends on the respective genre – from arcade titles, whose high score values signify success or failure without having an immediate effect on the player's actions, to simulation games whose gameplay centers around interpreting and manipulating numerical values displayed across a multitude of tables and charts.

Between the game's invisible underside and its visible surface, the output can take on a range of different forms. For example, success can also unfold spatially or narratively: a new area becomes unlocked, or the game's story progresses.

Whatever shape the output may take, the appeal of playing lies in overcoming the initial, artificially created contingency. This requires a) uncovering the operational logic of the game, that is the relation between input and output and b) adapting one's own play to the routines of the machine: One plays and is played. By directing one's input towards achieving desirable game states, playing becomes a permanent "accommodation to the machine" (Pias 2000, 232).

However, playing "in the form of adaptive action in the designed game space" (Hawranke 2018, 45) is not the only way to deal with digital games. Just as the rules of an analog game can be negotiated and changed during play, this also happens when playing on the computer. Such forms of appropriation in and through play can be called "transformative" (Salen/Zimmerman 2003) or "transgressive" (Aarseth 2007):

> "Transformative play is a special kind of play that occurs when the free movement of play alters the more rigid structure in which it takes shape. The play actually transforms the rigid structure in some way. Not all play is transformative, but all forms of play contain the potential for transformation."
>
> (Salen/Zimmerman 2003, 311)

Aarseth in particular sees transgressive play as the conflict between the "ideal type" of player assumed by the developers and the individual players who bring their own ideas and purposes into the game – as a "symbolic gesture of rebellion against the tyranny of the game" (Aarseth 2007, 132).

3. PRACTICES AND METRICS

While digital games have always been quantifying machines for human action, quantifying hardware and software ensure that additional game information that normally remains invisible and imperceptible to players is collected, sorted, and presented in discrete numerical and dominantly visual form. In terms of game actions, quantifying tools consequently enable the storage of fleeting interactions that can become action-guiding as predictions of future events. In the following sections we will introduce exemplary bundles of quantifying practices around which larger systems of discourse and practice have formed. We will specifically focus on the anchoring practices of sequencing, logging/accounting, and making visible, as well as their relationship to specific forms of play located between the poles of transgression and professionalization we have identified above.

SPEEDRUNNING

One bundle of playful practices particularly relevant to the subject matter of this article is *speedrunning*. In speedrunning, the players' goals substitute the criteria of success imposed by the original design. Speedrunning can thus be described as an appropriation of game space, in which even narrative-driven games are re-interpreted as sprint competitions (Knorr 2009, 223). During a speedrun, playing is no longer a matter of advancing the story, but rather of exploiting all possible means to traverse the game (ibid.) as quickly as possible and set a new record time:

> "Speedrunning is not about breaking down the general rules of the game, rather these are tested for their interpretative and configurational flexibility. [...] The original goal of the game is overwritten by the self-defined goal. The actual run is documented on video and shared within the community. On relevant Internet platforms, these videos serve as proof of the runner's masterful performance."
>
> (Hawranke 2018, 46, author's own translation)

TIMING AND SEQUENCING

Timing and (re-)sequencing here emerge as the anchoring practices around which other strands of the bundle, such as streaming, maintaining leaderboards and performing speedrun historiography and forensics, coalesce. Performing these anchoring practices requires the software equivalent of a stopwatch: applications like LiveSplit allow the users to determine split times for discrete game sections (splits) that constantly relate the ongoing speedrun to previous attempts and/or online leaderboards. To partition the game into sections, players first pick clearly identifiable measuring points like cutscenes or boss fights. This practice is usually part of a preparatory phase which can also involve mapping out the game and the fastest routes to its completion. Once a checkpoint is reached during the actual run, the player can stop the split times manually by pressing the corresponding key. The software then calculates the time lag or lead over the comparison run and outputs it on the screen. For the sake of better accountability, runners who play the same game usually choose the same partitioning, enacting a form of canonization that spreads from the fastest runners to the rest of the community. This practice is not only promoted by sharing runs via live streams or videos, but is now firmly embedded in the split software's functionality of downloading record holder's partitions and split times.

Not every run involves testing the rules for interpretative and configurative flexibility: especially in games that have been 'ran' for a long time, interpretative closure occurs, as individual runs approach the pre-stabilized ideal of the supposedly perfect, i.e. shortest possible run. Accordingly, new runners have to adopt the routes and techniques already worked out by the community in order to be able to participate in the competition at

all. They are still transgressive[2] when compared to the gameplay originally envisioned by the developers, but in terms of game style and interface configuration they are bound to the established conventions of the speedrun community. This homogenization of game actions primarily rests on what James Ash refers to as "spatialization of time" (2015, 67): the partitioning of the total distance one needs to cover to successfully complete the game into individual sequences, which are subsequently assigned numerical values.

Returning to Aarseth's hopeful prospect of a revolution led by transgressive players, it may seem as if speedrunners have indeed broken the tyranny of their game's original metrics of success. But – as one might polemically add – that achievement comes at the cost of having installed a new and possibly even stricter ruler: the temporal regime produced by quantified gameplay.

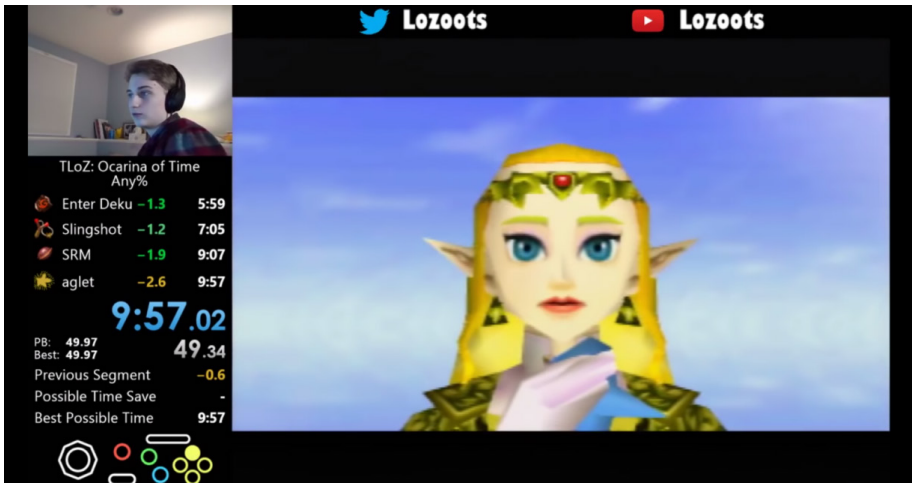

Fig. 2: Screenshot of a successful world record attempt by speedrunner Lozoots in the game OCARINA OF TIME (Nintendo, 1998).

2 Since a vivid community of speedrunners dramatically increases a game's longevity by attracting new players long after the initial release, some developers – especially in popular speedrunning genres runs such as jump & run – have started implementing speedrun modes into their games from the get-go. The interpretative flexibility of the rules thus gives birth to a new practice which in turn becomes a set of rules to be reincorporated into the software.

The display of split times generated by the split software (Fig. 2, top left) is part of the basic inventory of speedrun video aesthetics. It is not a mere visual recall to similar representations employed in televised racing, but a constitutive element of the practice, as the display of time is what allows the gameplay to be immediately perceived as a race at all: The running timer signifies a race against the clock; the split times are colored red or green depending on the gap or lead, signifying a race against an absent competitor.

In addition, runners usually show the gameplay in their videos or streams (Fig. 2, right), as well as their face, the input devices held in their hands, or an abstracted representation of the input commands (Fig. 2, bottom left). On the one hand, this configuration serves to substantiate the measured times, as viewers can verify for themselves whether reaching a checkpoint within the game actually corresponds with the time of measurement.[3] On the other hand, the visual arrangement allows for the communication of one's body and game knowledge to the community by revealing the inputs necessary to execute the virtuoso game action. While the splits, understood as an abstraction of these inputs, act as the central metric for competitive comparison, the gameplay visuals facilitate the cooperative advancement of routes and techniques, as they provide explanations akin to a live-video tutorial. Speedrunning's visual documentation far exceeds the singular value of traditional high scores, which serves to position one's own game performance within a field of (possibly absent) competitors but plays no role in knowledge transfer beyond pure proof of feasibility.

Understood as a form of transgressive play, speedrunning exhibits a disparity between the information displayed by the (unmodified) game and the information required to compete for the self-set goal. To employ Aarseth's terminology: The speedrunner is not the kind of player tacitly assumed by the developers, (Aarseth 2007, 132) therefore most games' interfaces are not designed to meet the needs of speedrunners. This deficiency is best illustrated by the *total time spent on the current play-through*,

[3] It thus enables practices of "speedrun forensics," which can identify cheating attempts by pointing out the fragmentation of the video material (Jobst 2020).

a metric that is rarely used – and seldom displayed – during normal gameplay, but which acts as the pivotal playful metadata underpinning the whole practice of speedrunning. Consequently, players took it unto themselves to time and quantify the progress of ongoing and recorded runs by developing their own software tools and the adherent interfacing practices.

It turns out that here – in line with the bundling of practices and material arrangements described by Schatzki (2016, 33) – practices, goals and media emerge at the same time. Quantified play is not merely a tool to overcome the artificial contingency of play. Rather, quantification and the ensuing playful metadata ensure that practices which originally were not covered by the game's output can now stabilize. By logging ephemeral gameplay actions and generating meta-information about the actual practices of play, quantification creates the conditions for the emergence of specialized communities of practice (Lave/Wenger 1991; Wenger 1998) that cooperatively build and maintain assets of knowledge. Within the speedrunning community, the anchoring practices of sequencing and timing allow members to flexibly shift back and forth in an alternating mode between cooperation and competition. (Hawranke 2018, 46)[4]

COMPETITIVE GAMING

We consider competitive gaming to be another bundle that is constituted by and constitutes specific quantifying practices. While speedrunning's transgressive anchoring practices of timing and sequencing radically alter the nature of games, turning them into competitive races in the process, the quantifying practices found in competitive gaming are more closely aligned with the respective games' already competitive structure and oftentimes rely on built-in functionalities provided by the developers.

[4] Drawing on Huizinga, Schemer-Reinhard (2020, 103) likewise describes the relation between players who share the same game (or its components) while acting as opponents within the scope of the game as being connected in a "spirit of enmity and community." The production of cooperation and consensus by dividing a game into sections and sharing those sections within the community adds another layer to this dynamic.

Though there is significant overlap, both bundles form separate arrangements of practices and materialities as they differ in terms of their intended effect and purpose pursued. To illustrate this point, we will shed light on the anchoring practices of logging and stat tracking.

LOGGING

Especially in games that require fast reactions and complex input sequences, such as fighting games, competitive gamers and streamers often display additional information via a variety of interface layers. For example, STREET FIGHTER V's players can tap into the game's input log, a real-time record of all player commands that is available in training and replay modes.[5]

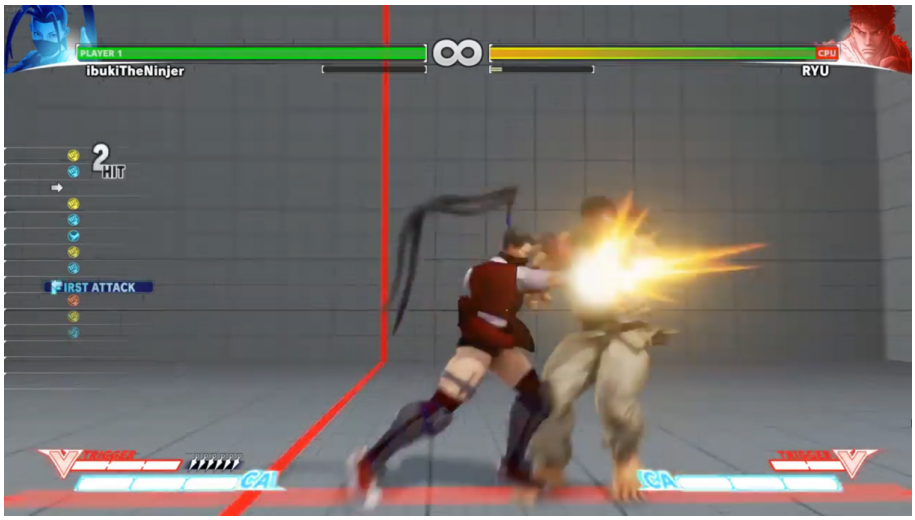

Fig. 3: Training mode in STREET FIGHTER V (Capcom 2016).

The input log represents player commands as symbols arranged in a sequence diagram, (Fig. 3) providing a visual link between the player's physical movements, the actions performed by the game character, and specialized knowledge about the game. The inputs, which usually are not rendered within the game image and have to be inferred from the gameplay actions, are thereby operationalized: Their visualization allows the players

5 Many fighting games provide the corresponding function themselves; external software solutions include the applications Gamepad Viewer and OBS Display Fightstick motions.

to relate them to the notational system used by the developers and the community to communicate certain techniques, such as 'special moves' and chains of commands that are deemed most effective. Accordingly, they play a central role both in checking one's own movement sequences for the sake of error analysis and in conveying input schemes to inexperienced players. The purpose here is to log physical actions and reactions that occur so quickly that they can be traced back to a form of embodied knowledge that operates in parts below the threshold of consciousness. (Ash 2012)

STAT AND MATCH TRACKING

In other competitive games, especially within the shooter and MOBA genres,[6] a more sophisticated form of logging can be found. Here, both the developer studios themselves – in the form of monetized add-on services – and third-party platforms offer the functionality of statistically processing data generated by the players' actions (Fig. 4), tracking various metrics throughout individual matches or lifetime careers.

Egliston sees this quantification of gaming practices as a form of "surveillance capitalism," (Zuboff 2019; Zuboff 2015) a way of exercising power and control based on the aggregation and circulation of data collected through surveillance technologies. He differentiates between three forms of surveillance practices enabled by statistics portals: "self-surveillance," meaning the control of one's own performance parameters for the purpose of self-optimization, "lateral surveillance," (Andrejevic 2004) meaning the mutual control and disciplining of competing players among each other, and "machine surveillance," the analysis of data material supported by machine learning algorithms that generate an ideal concept of good game actions, on the basis of which concrete suggestions for improvement are made to the players who pay for this service. (Egliston 2020a, 9-13) In this process, the data are also used to generate an ideal concept of "good" gameplay actions.

Even the data of players who do not make use of statistical services themselves eventually become the basis of the statistical evaluation, since

6 Short for "Multiplayer Online Battle Arena."

statements about the efficiency of concrete game actions (such as the selection of items or abilities) can only be made if the largest possible basis of comparison of games is available. Accordingly, one could speak of a permanent "cooperation without consensus," (Star/Griesemer 1989) in the context of which a community of practice that is heterogeneous with respect to its own playful ambitions jointly creates a database of played games. In concrete terms, this means that even players who show no interest in the practices of self-monitoring and external monitoring (or who are not even aware of their existence) can participate in the project of quantifying or optimizing game actions.

Fig. 4: An excerpt of the guides section of the statistics portal Dotabuff (author's own screenshot).

The goal of the survey is the automatic formulation of game instructions or guides (Fig. 4), which are supposed to relieve the players of pivotal game decisions. The form of these guides, as well as the aesthetics of the sequence of item and ability symbols attached to them, can be traced back to the early MOBA prototypes, which were still modifications of the game WARCRAFT 3 (Blizzard 2002). Based on "build orders"[7] that originated within the strategy game genre, players communicated their game knowledge in the form of so-called "skill and item builds," sequences of game decisions formulated in the style of illustrated guides akin to cooking recipes, which were shared and discussed in community forums. Ac-

7 This is the optimal order in which one's foundation should be built in the context of a certain strategy.

cordingly, the statistical platforms under consideration are to be understood as material arrangements that support (or at least promise to support) pre-existing practices of gameplay quantification carried out with the explicit purpose of generating and sharing game knowledge – only this time in a fully automated fashion.

When players try to improve their performance via quantification and logging, they are confronted with two fundamental problems: First, data sets are usually incomplete, distributed across many players and platforms, and may already be outdated by the time of analysis. These difficulties, summarized by Pink et al. under the term "broken data," (Pink et al. 2018) occur especially in games whose ideal gameplay[8] is in a state of constant flux due to frequent updates. While updating a game's ruleset is a strategy purposefully employed by the developer studio to keep players interested over long periods of time, it also undermines the community's efforts to "figure out the game," as both the data that has already been collected and the optimization strategies derived from it become unusable in regular intervals. Data evaluation and the appropriate (and timely!) adjustment of input thus become a substantial part of maintaining one's relative "skill" within the ever-changing landscapes of continuously updated games.

Second, isolating the parameters that are relevant for (self-)optimization from the amount of collected data is no trivial task. In the context of complex games – and especially for inexperienced players – it is not immediately obvious which recorded parameters correspond to "good" game actions, that is, those that lead to victory. Hardware and software manufacturers take advantage of this circumstance by promoting the simplistic formula "the more data, the better", while remaining intentionally vague about the actual relationship between data and skill. This approach, which addresses the potential customers' desire for improvement by promising a utility value that could – but it is no way guaranteed to –

8 Often referred to as "metagame," which denotes strategic decisions or certain styles of play that are temporarily considered optimal.

emerge from the captured data, is characteristic for the commodity aesthetics (Haug 1971) that hardware manufacturers and platform operators employ in the field of quantified play.

Let us now return to the Naos GQ mouse for a moment. While its capability of measuring the distance covered by and with the mouse initially seemed pointless, we can now see that it exhibits the same logic outlined above. The manufacturer's ability to tap into the player's fundamental desire for self-optimization and advancement within the gaming competition hinges on hinting at a relationship – one that may or may not exist – between actual skillful playing practices and the supposedly useful metrics provided by their product.

LIVE STREAMING

In the context of our investigation, live streaming could be considered a 'meta bundle', as speedrunning, competitive gaming and a plethora of other gaming-related activities share the same material structures, common live streaming practices, and overlapping communities. Nevertheless, it is possible to differentiate between these bundles by acknowledging the intent behind their quantifying practices, as we will show in the following section.

HEART RATE VISUALIZATION

In the context of live streaming, the practice of heart rate measurement and visualization focuses on the numerical abstraction of physical exertion.[9] When combined with a Bluetooth heart rate monitor, the PULSOID application allows the heart rate to be displayed in real time during gameplay. Even though this is reminiscent of monitoring vital functions with fitness wristbands and watches, it does not involve evaluating data for training purposes. While sharing stats online is part of many practices of self-

[9] Data obtained by measuring heart rate and skin conductance is also increasingly used as an argument within a discourse of nobilitation: Here, an equation of sports and esports is to be achieved via the common factor of physical exertion. (Krell 2019; Wolmarans 2016)

quantification, here the feature is exclusively directed at an audience. Accordingly, the app is primarily intended to appeal to streamers and uses the advertising slogan "Add your live heart rate to your broadcast. Be closer to your viewers!" (Pulsoid 2020) The measurement of vital signs is correspondingly linked to the promise of taking the parasocial relationship between streamer and stream viewers to a level of physical proximity. The FAQ pages also state:

> "Our approach gives the best accuracy, wide customization and simple interface for users. At the same time, Heart Rate Widget is a great way to make your broadcast more interesting and interactive, you can use it to increase viewer engagement or make the stream more realistic."
>
> (Pulsoid 2020a)

Heart Rate Widget's purpose is not to monitor one's health while gaming, but to increase the engagement of potential spectators. The audience should be able to read within the data how the players are affected during gameplay (Egliston 2020) It is therefore a matter of rendering the player's affective involvement visible to increase the entertainment value of the stream. Depending on the context, different patterns of effect and evaluation can be identified. In an esports environment, a lower heart rate is valorized, as it seemingly shows that players can keep calm in stressful situations.[10] In contrast, a higher heart rate shows the wearer's tension and involvement, thereby communicating which game situations are perceived as crucial by the participating players. Here, the heart rate, which is usually tracked in a chart, becomes playful metadata for structuring the viewing experience by accentuating individual 'plays' or situations. Horror game streams exhibit a different dynamic, in which the heart rate monitor renders the player's fear tangible and attests to the visceral effect of the game.

In the context of live streaming, the notion of entertainment value cannot be separated from the competitive dynamics inscribed into the streaming platforms themselves, as the streamers reveal data about their

10 Following this logic, the rofessional league for battle royale game H1Z1 made their players wear heart rate monitors. (Cameron 2018)

own body in the hope of gaining an advantage in the competition for the streaming audience's attention.

EYE TRACKING

In the case of eye-tracking interfaces, two possible use cases are advertised by manufacturing companies: the recording of eye movements for demonstration, analysis and training purposes, and the use of the eye-tracking hardware as a supposedly efficient input interface that can be operated intuitively and at a high speed. (Amazon 2020; Amazon 2020a)

Fig. 5: Use of eye tracking during game review of a COUNTER STRIKE match.

Following this pattern, the use of the technology in the context of esports commentaries can be interpreted as a way of simultaneously offering credibility to the players' skill, which is rendered visible by the device, and to the measuring apparatus itself; the latter being usually provided by a manufacturer of gaming hardware who also acts as the event's sponsor. However, insights gained from the eye tracking data rarely go beyond what the transmitted game image already conveys to the audience[11]: The measured player's focal point (see Fig. 5, light blue area at the bottom of the screen) usually jumps to the enemy characters during moments of

11 This finding seems trivial when one considers that the speed and precision of eye movements are reflected in the game actions that immediately follow them, meaning the movement and aiming processes.

confrontation, and otherwise moves back and forth between the interface elements relevant for gameplay, those being the counters for ammunition and health points. Eye tracking thus advertises an ideal of technically mediated visualizations of embodied knowledge as well as the hard- and software products brought to bear for this purpose. Crucially, it cannot deliver on the promise of visualizing concrete decision-making patterns and thus fails to improve the audience's understanding of the game.[12]

Fundamentally, the practices of visualizing and optimizing movement patterns can be seen in the tradition of scientific management's movement studies: For example, the eye movements depicted as ghostly traces are reminiscent of Frank Bunker Gilbreth's long-exposure film recordings for the analysis of work processes. (Hoof 2015) In the context of competitive gaming commentary, however, the practices of making bodily states and bodies of knowledge visible do not follow the telos of sequence optimization usually found in movement studies. Instead, they are employed in the service of an economically motivated affect modulation aimed at gaining and maintaining viewership numbers.

4. QUANTIFIED GAMEPLAY BETWEEN SELF-MEASUREMENT AND AFFECT MODULATION

It seems obvious to relate the quantification of gameplay to the overarching practices of a data-based lifestyle. The purposes also seem to be similar at first sight. Especially the sensors involved are comparable to those used in the Quantified Self movement (motto: "Self-Knowledge Through Numbers") and in the field of so-called personal informatics, (Lupton 2016; Abend/Fuchs 2016). Self-measurement activities with the help of digital sensors and mobile technologies such as smart watches can be considered modern, i.e. digital techniques of the self. (Foucault 1993, 26) These techniques of the self have a history that can be told along the

12 It is fair to say, however, that the shooter genre offers little room for surprising eye movements due to the focal point (the crosshairs in the center of the screen) being firmly inscribed in the game image. The situation is different in the strategy game, where a larger space, which is doubled once again by the mini-map, must be captured with the gaze.

changing ways we take care of ourselves and the media practices we employ to that end. In this context, self-observation through quantifying technologies is not to be seen so much in the tradition of (technologically supported) observations of consciousness and the mind but rather of medical practices that monitor vital functions and bodily responses. What most forms of self-measurement have in common is that this monitoring of vital functions is supposed to lead to an optimization of everyday routines in the sense of a healthier life.

Such somatization of everyday practices, where introspection refers not to work on the inner mental life but to self-engineering aimed at the body, can also be observed in quantified play. Consequently, the add-ons and peripherals used to computerize the game are primarily presented and marketed as performance-enhancing. In addition, monitoring is supposed to offer an unspecified enrichment of the gaming experience, which presumably appeals to the ideals of total control and efficiency commonly associated with the accumulation of data. At the same time, it promises a component of generating entertaining insights about one's own game – insights whose appeal might be grounded precisely in the fact that the game itself does not provide this kind of information.

Another commonality shared between the practices of quantified play and Quantified Self is the transformation from a "technology of the self" to a "technology of the social," (Lemke 2011) from self-measurement as an individual action to the sharing of acquired data with others (a functionality supported by the majority of commercially available tracking and tracing technologies). While terms such as self-tracking and personal informatics attribute self-monitoring to the sphere of private media use, the insights gained do not remain tied to the individual: Data is shared locally (with other members of the QA scene or with friends on social media) or circulates (semi-)publicly on digital platforms, some of which are provided by the technology providers.

Quantifying gaming also initially seemed a practice taking place exclusively between the user, the game, and the quantifying interface. However, since increasing one's own performance is also about creating comparability with other players, it is not surprising that practices of self-

measurement can be found in well-networked communities, especially in the field of competitive gaming. On streaming platforms such as Twitch, but also on statistics pages like Dotabuff, individual self-observation becomes a social technique of the body and can thus be understood as a form of dressage of the body. (Mauss 1974, 208)

Technologies of quantified play, such as the Naos QG mouse mentioned at the beginning of the text, represent a trend in digital gaming culture to monitor one's own performance on a small scale and to optimize it in order to increase efficiency. The manufacturers of quantifying hardware propagate that this is a way of reflecting on one's own gaming and thus also improving it. (Egliston 2020, 2) As a rule, this is done by means of visualizations that are displayed during gameplay or that can be accessed afterwards. This creates a second feedback loop to the game that adds further parameters to its output, allowing one's own playing to be adjusted to the displayed values. Depending on the genre and type of quantification, this adaptation can be done in quasi real-time or in a subsequent reflection phase. Ash speaks of an exteriorization of gameplay through proprietary tracking platforms. (Ash 2015, 109) According to him, the quantification of gameplay provides contextualization within an initially individual performance career. To exaggerate, one could say that by providing the tools to describe such careers, the corresponding measurement, documentation, and comparison technologies and practices make their existence possible in the first place. The decisive factor here are automatic documentation mechanisms that draw statistical connections between matches that exist separate from each other on a gameplay level. The selection and visual representation of the displayed data decisively influence how individual performance careers - and by extension one's own relationship to the games played - are perceived. The manufacturing companies exploit this connection in various ways. In the simplest case, absolute numerical values, which necessarily increase over time (e.g., the total number of games won), are placed prominently on the player's profile, while other – potentially demotivating – relative values (such as the percentage of games won) remain "hidden" in submenus. Here we can speak of targeted affect modulation on the part of the developers and

platform operators: The data is used as material to generate positive affective states, highlighting one's own skill development in particular, in order to encourage the continuation of one's gaming career. At the same time, negative affective states associated with personal mistakes and losses are cushioned by a narrative of long-term improvement against which failures take the shape of temporary set-backs.[13]

5. CONCLUSION

Quantification makes it possible to connect individual performance careers to larger digital economic contexts: The measurement data of quantified gameplay does not remain in the feedback loop between the game and the player but is displayed and adapted for (affective) economic purposes of players, manufacturers, and platform operators.

Fig. 6: Statistics banner in APEX LEGENDS showing the leading player. (Respawn Entertainment 2019)

In this regard, the collected playful metadata contribute in various ways to the formation and development of the material arrangements from which they emerge and in which they are embedded. For example, they can form the basis for adjustments to game balance or – visualized as a

13 Ben Egliston describes these mechanisms with the conceptual pair of proximity and distance. (Egliston 2020a, 10)

hybrid of in-game scoreboard and player profile – reinforce competition among players (see Figure 6).

By offering a trajectory for the professionalization of play, playful metadata undermine established notions of a strict separation of play and labor, (Huizinga 1956) contributing to the increasing diffusion of both spheres that is expressed in hybrid concepts such as "playbor" (Küklich 2005) and "laborious play" (Abend et al. 2016). Accordingly, the professionalization of play can be related to the gamification of work processes since both are underpinned by infrastructures and practices of measurement, quantification, and calculation. The permeability between private play-as-leisure and professional play-as-income that is inscribed into both streaming and professional play ensures that players become part of potentially exploitative structures of data aggregation from the get-go.

However, as the analysis of speedrunning practices has shown, playful metadata can also become an instrument for transgressive or transformative play, as provides metrics and goals not envisioned by the original developers.

By investigating the anchoring practices of sequencing, logging/calculating and visualizing, we have shown that the player's appropriation, development and refinement of gameplay actions and goals is mutually dependent on the (re-)formation of material arrangements. It is characteristic that the playful metadata collected by the players is simultaneously used for cooperative knowledge transfer (e.g., in speedrunning or in the fighting game community), but also for competitive comparison. Playful metadata enables communities of practice to jointly undertake the project of approaching their ideal of good gameplay, while it allows the players to compete more effectively with each other in individual games or races.

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GAMES

APEX LEGENDS (RESPAWN ENTERTAINMENT, 2019)

COUNTER-STRIKE: GLOBAL OFFENSIVE (Valve/Hidden Path Entertainment, 2012)

DOTA 2 (Valve, 2013)

THE LEGEND OF ZELDA: OCARINA OF TIME (Nintendo, 1998)

STREET FIGHTER V (Capcom, 2016)

WARCRAFT III (Blizzard 2002)

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