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Brock, TGJ and Fraser, E (2018) Is Computer Gaming a Craft? Prehension, Practice and Puzzle-Solving in Gaming Labour. *Information, Communication and Society*, 21 (9). pp. 1219-1233. ISSN 1369-118X

**DOI:** <https://doi.org/10.1080/1369118X.2018.1468920>

**Publisher:** Taylor & Francis (Routledge)

**Version:** Accepted Version

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# **Is Computer Gaming a Craft? Prehension, Practice and Puzzle-Solving in Gaming Labour**

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# Is Computer Gaming a Craft? Prehension,<sup>1</sup> Practice and Puzzle-Solving in Gaming Labour

## Abstract

This article applies sociological theories of ‘craft’ to computer gaming practices to conceptualise the relationship between play, games and labour. Using the example of the game *Dota 2*, as both a competitive esports title and a complex game based around a shared practice, this article examines the conditions under which the play of a computer game can be considered a ‘craft’. In particular, through the concept of ‘prehension’, we dissect the gameplay activity of *Dota 2*, identifying similarities with how the *hand* practices craft labour. We identify these practices as ‘contact’, ‘apprehension’, ‘language acquisition’ and ‘reflection’. We argue that players develop these practices of the hand to make sense of the game’s rules and controls. From this perspective, it is the hand that initiates experiences of craft within computer gameplay, and we offer examples of player creativity and experimentation to evidence its labour. The article concludes with a discussion on the need for future research to examine the quality of gaming labour in the context of esports.

**Keywords:** Play, Games, Craft, Labour, Sociology.

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<sup>1</sup> Sennett, R. *The Craftsman*. p.153-155

## Introduction

Craftsmanship may suggest a way of life that waned with the advent of industrial society - but this is misleading. Craftsmanship names an enduring, basic impulse, the desire to a job well for its own sake (Sennett, 2008, p. 9).

Richard Sennett's seminal work, *The Craftsman*, develops the argument that qualities of 'craftsmanship' cut far wider than what is traditionally conceived as skilled manual labour. He argues that aspects of craft can be found in all walks of life, from computer programming, to nursing, artistry, parenting, and citizenship. "In all these domains", argues Sennett (2008, p. 9), "craftsmanship focuses on objective standards, on the thing in itself", and it is this aspiration for quality that he highlights as evidence of truly rewarding work: that sense of excellence, pride, but also competitive pressure and frustration, that comes from doing "good work". This article considers whether Sennett's (and other's) analysis of craft is relevant to examining player motivation and what, if any, overlap exists between the act of computer gaming and the experience of craft labour. In particular, it seeks to challenge the claim that gaming is a 'distraction' from reality (Crawford, 2015) by bringing the rewarding aspects of skilled handwork (Tallis, 2003) into an analysis of gameplay practices. As such, the paper intends to add to our understanding of the relationship between work and play in the twentieth-first century by arguing that computer games offer a viable source of craft-like experiences.

In order to dissect these ideas, much of the following presents a close study of the game *Defence of the Ancients 2* (Dota 2), which links examples of computer gameplay to key aspects of craft and work found within Sennett's discussion of the hand. It is important to note that this approach may not apply to all computer games in a uniform way – as computer games are exceptionally diverse. Rather, this article seeks to address the claim that games are 'meaningless distractions' by initiating a discussion about the labour practices that go into playing games well.

To begin, it is necessary to detail some of the key conceptual points that underwrite the philosophical position of this article. Following Sennett (2008, p. 269-286), we intend to argue that there is a lot of common ground between those practices found at work and play. For example, citing the play theorist Friedrich von Schiller, Sennett argues that play teaches us some of the earliest attitudes needed for 'good work'. It was a playful attitude, Schiller believed, which helped humans to develop a sense of discovery and creativity alongside rigorous and repetitive working practices. Sennett (2008, p. 269-271) adopts Schiller's perspective to argue that play, in fact, inaugurates craftsmanship, and gives the example of children playing with blocks to show that play is critical in establishing our cognitive development towards skilled working practices. For instance he suggests that children, in learning to negotiate the rules of play, and the material limitations of its objects, establish the very 'rhythms of repetition' needed for skilled labour; they learn how to create a stable tower through practice and analytical judgment of the height and weight distribution of each block. Thus, by grasping, touching, and creatively positioning toy blocks, children produce a viable object by the rules of geometry. Here, Sennett makes an important claim: children must use their senses to initiate an understanding of the rules by which objects operate, such that, within this process, an enduring impulse towards quality work ('craft') emerges.

It is surprising that, despite this deep connection between work and play, research continues to problematise computer gaming as a ‘distraction’ from reality. The theme of distraction has been at the heart of games research for decades (Gunter, 1998, Rigby and Ryan, 2011) and typically suggests that players use games to ‘withdraw’ from reality, albeit momentarily, by developing a sense of mastery or control over the machine (Grodal, 2000). In this regard, Matthew Crawford (2015) is a particularly vocal critic, suggesting that computer games are designed to facilitate repetitive, rhythmic and routine experiences that distract players into a ‘passive’ state of ‘absorbed automaticity’. He writes,

You are neither learning something about the world, as the blind man does with his cane, nor acquiring something that could properly be called a skill. Rather, you are acting within the perception-action circuits encoded in the narrow affordances of the game, learned in a few trials. This is a kind of autistic pseudo-action, based on exact repetition, and the feeling of efficacy that it offers evidently holds great appeal. (pp. 90-91).

In Crawford’s view, what makes gaming a distraction is that it requires minimal input from players, in the form of repetitive button-pressing actions, which deliver satisfying experiences of control through reliably produced effects. He holds this position out as something *qualitatively* different from craft labour, and argues that the experiences that typically accompany woodworking or automobile repair cannot be reproduced through games. Indeed, it is suggested that the predesigned or rule-bound nature of computer games forecloses on the possibility of craft-like experiences; a position that is echoed by David Gauntlett (2011, p. 174) who suggests that games are “more-or-less closed worlds which do not enable the users to make their mark on the system”.

We will argue that, in adopting Sennett (and others) to analyse gaming labour, we can begin to challenge this reasoning, and present an example which shows that gameplay is not qualitatively different from craft labour. Rather, it recognises that players have to establish technical skill to negotiate the increasingly demanding, complex puzzles that contemporary computer games offer. Assumptions about ‘distraction’ tend to overlook the role of the gaming interface as a mediator of human agency, skill, and thought processes (Eichner, 2014, p. 170), as well as the embodied subjectivities (Farro et al, 2012) that follow from gameplay. For instance, we can understand the complexity of games through what Clark calls “body-and-world-involving cycles”, in which activities like putting pen to paper reveal a loop between embodied human experience, agency, and subjectivity, via our interactions with the “physical machinery” of the world (2008, pp. xxv-xxvi). Rather than empty clicks or taps, the engagement with the keyboard, which plugs into the gaming interface, can thus be understood as “extending the machinery of mind out into the world” (Clarke, 2008, pp. xxv-xxvi). This can be related to Calleja’s assertion that kinaesthetic encounters with games, and the mastery of the controls, relate closely to the agency afforded by the game itself (2011, p. 11 and pp. 55-59). In other words, as we will discuss, the embodied encounter with a game is not always a ‘distraction’ or ‘escape’ for the automaton, so much as the thoughtful and engaged practice of a craftsman.

In the next section we further unpack this claim by examining the nature of puzzle-solving within computer games. In particular, we look to the complexity of games rules to question the idea that they are rudimentary systems that afford narrow learning experiences through exact repetition. On the contrary, we suggest that feelings of efficacy emerge by way of the ambiguity and obscurity of gaming challenges.

## Games are Hard Puzzles

Games are puzzles that can be challenging to solve. Computer game theorist Jesper Juul makes this point when discussing the nature of player interaction with computer game rules. He writes, “Game rules are designed to be easy to learn, to work without requiring any ingenuity from the players, but they also provide challenges that *require* ingenuity to overcome” (Juul, 2011, p. 55). For most games, the strategies needed to play them well are more complex than the rules that govern them. For Juul, the rules of computer games are no different from the rules of sport: players use the pre-existing systems of the world (physical or otherwise) to develop playing strategies. A game as a closed system nevertheless provides the player with the *scope* and *choice* to find a more efficient means of reaching the same goal.

Consider the complexity of game rules. Aloupis et al. (2014) show that classic Nintendo games, like *Super Mario Bros.*, or the *Legend of Zelda*, belong to a class of mathematical problems known as ‘NP-hard’. P is the class of ‘easy’ problems that can be solved by an algorithm relatively swiftly. NP is the class of problems that are easy to check - if you are given an answer, you can verify it quickly. NP-hard problems cannot be solved by a computer algorithm in polynomial (feasible) time. Aloupis et al. show that many games fall within the class of NP-hardness because there are so many variables, clauses and checks that must be completed if a certain state is to be reached. Without the answer, it can take an algorithm an exponential amount of time to check all these variables required to complete the level or game tree.

It is this mixture of complexity and uncertainty that makes computer gameplay a series of what game designer Sid Meier calls ‘interesting choices’ (Meier in Alexander, 2012). Meier’s description recognises that gaming is a mentally challenging, strategic phenomenon. Similarly, Danesi (2002) suggests that puzzles are pleasurable because players must exercise insight to resolve them in non-routine ways. Juul (2011, p. 5) agrees, and argues that the rules of games provide players with challenges that cannot be trivially overcome. Whilst the rules of games themselves are definite, unambiguous, and easy to use, the enjoyment of the games depends on the complexity of obscure challenges.

### *Practice makes perfect*

An alternative way of understanding the nature of computer game puzzles, is to suggest that they are *oblique* objects (Kay, 2010): players have to negotiate incomplete information and ‘muddle through’ complex objectives indirectly to achieve their goals. According to Kay, most of the problems that we face in business, politics and our personal lives follow an oblique trajectory where we recognise that our goals are often imprecisely defined and contain elements that are not necessarily or obviously compatible. Through obliquity, games represent more open systems, in which we learn about the nature of our objectives and the

means to achieve them via a process of experience and discovery. It is through oblique methods and constant adaptation that players reach for higher-level goals, and meaningfully engage with games, often through iterative mental processes including flow (the sensation that people derive from demanding activities (Csikszentmihalyi, 1996)). This is ultimately a learning experience.

Citing Newell and Rosenbloom, Juul argues that players must practice in order to bring about improvements in their performance, building skills, through play, over time. Juul offers an account of *chunking* to make sense of how players improve their practices - combining a number of primitive elements of the environment into high-level 'chunks', which are processed faster than it would take to process every primitive element (Juul 2011 p. 96). For example, Grandmaster Chess players can memorise and understand chess positions at great speed, because they obtained a large collection of chunks. Juul argues that computer game players establish a specific repertoire of skills and methods similar to chunking to solve challenges. Thus, Juul argues that *a game changes the player that plays it* through the largely cognitive negotiation of its challenges. Players will navigate well-designed puzzles by learning refined strategies.

What is important is that the work of Juul, Kay and others show that the mental challenges of computer gaming are more complex than Crawford and others assume. Yet, games still appear as a largely cognitive process. We will now look to the embodied nature of game-play to show that solutions to puzzles require our hands to develop skills of their own.

## Skilled Hands

### *Prehension*

Practice is not only a mental exercise: the knowledge required to solve puzzles is personal or 'tacit' insofar as it is developed through practical experience (Dormer, 1997; also see Toft-Nielsen, Nøgaard, 2015). Sennett argues that this knowledge emerges from the way that people use their hands to establish skill:

Every good craftsman conducts a dialogue between concrete practices and thinking; this dialogue evolves into sustaining habits, and these habits establish a rhythm between problem solving and problem finding. The relation between hand and head appears in domains seemingly as different as bricklaying, cooking, designing a playground, or playing the cello... (2008, p. 9).

Skill is a developmental process that begins with *prehension*: the way our hands make contact with an object. Sennett (2008, pp. 153-154) defines prehension as to 'grasp something', which implies that we physically reach for it, prior to the development of repetition and practice. The body anticipates and acts in advance of sense data; it creates a particular physical and mental cast of the object to interrogate its meaning (2008, pp. 153-154). For Sennett, the idea of prehension has its origins in the work of Raymond Tallis. Tallis (2003) organises the phenomenon into four dimensions: *contact*, when the brain acquires sense data through touch; *apprehension*, of the sort that shapes the hand reaching for the object; *language acquisition*, in the naming of what one holds, and lastly, *reflection* on what one has done.

## *Defense of the Ancients (Dota 2)*

We can see these four aspects of prehension in the skilled play of the computer game *Defense of the Ancients 2 (Dota 2)*, a team-based Multiplayer Online Battle Arena (MOBA), which has 13 million unique players (Valve Corporation, 2013, 2017). The objective of the game is to collectively destroy the opposing team's 'Ancient', whilst defending your own. Two teams of five players battle using one of 113 playable characters known as 'heroes', each designed with specific benefits and weaknesses. Heroes are divided into two primary roles, 'carry' and 'support' (with a number of other roles, that vary depending on the team). Carries begin each match weak, but gain power throughout the game, thereby 'carrying' their team to victory. Supports rarely deal heavy damage, instead possessing functionality and utility that provide assistance for their carries. This arrangement means that *Dota 2* has a highly emergent rule-set - players are provided with a map scenario, a selection of heroes, abilities and items, and must develop their own strategies to win. In this regard, *Dota 2* is similar to popular titles like *League of Legends* (Riot Games) and *Heroes of the Storm* (Blizzard Entertainment) and is considered amongst them as a popular title for the wider professionalised context of competitive gaming known as 'electronic sports' (see Taylor, 2012).

### *Contact*

One way to answer the question 'is computer gaming a craft?' is to trace its meaning back to the manner in which the player makes *contact* with the controls of the game. It is only through touch, particularly of the controls, such as the keyboard and mouse, that a player can begin to make sense of the rules of the game and quite literally *grasp* the concept of 'winning' and 'losing'.

In *Dota 2*, the player acquires sense data about the game through a series of tutorials. The player learns about moving their hero by right clicking the desired location on the landscape or mini-map with the mouse. The mouse is used to scroll across the landscape, and the spacebar is used to center the view back onto the hero. These basic mechanics of right clicking, scrolling, and re-centering are the first skills that must be practised by the novice player in order to progress through the tutorial. For example, the player learns to perform swift, sweeping movements with the mouse using their wrists, shoulders, and elbows to track and target heroes and the basic units. Simultaneously, the player learns how to conduct move-attack commands through the manipulation of the left and right-click mouse buttons, and a selection of keyboard commands. A single right click on an enemy will initiate a basic move-attack, but left-clicks are required to deploy spells and use items. Specific keys are used to ready these abilities (QWER), while alt and/or ZXCB ready items (such as healing potions) for use.

To manipulate the controls, and practice the basic mechanics of *Dota 2*, the player grips and applies pressure to the keyboard and mouse in specific ways. A right-handed player will rest the pointer, ring, and middle fingers of the left hand on QWE, with the small fingers on CTRL/SHIFT. The pointer finger will move to R when that skill needs to be readied. The thumb rests on Space, but can also be positioned towards ALT, allowing the player to auto-toggle skills and access custom keybinds. To access the inventory, the player moves the left hand downwards, across the keyboard, into a second position, with their fingers on ZXCB. The right-hand is arched over the mouse in a 'fingertip' position with the pointer and middle



finger on the left and right click buttons. From this position, the pointer can also access the middle mouse or ‘scroll’ button, and the right thumb can access two additional buttons (typical of modern gaming setups).

It is this grip over the mouse and keyboard that initiates the earliest experiences of human agency within gameplay. Tallis argues that this process of contact is a defining aspect of human agency: to customise our grip to an object is a developmental moment wherein dexterity and intelligence must come together to help us understand an object. In his own words,

My precise grip that prehends the object - conforming to its outlines, taking account of its texture, varying the pressure in response to perception of its weight and its fragility - in a sense also apprehends it. This apprehension is alert to the distinctive otherness of the object (2003 p. 329).

Learning to grip the mouse and keyboard, the *Dota 2* player begins to apprehend the mechanics of the game. The combination of hand movements and button presses initiates the reality of its rules and challenges and their capacity to meet them. The complexity of such combinations must not be understated. *Dota 2* players constantly adapt their grip to establish control over the game, whether through custom keybindings or adjusting the sensitivity of gaming equipment (see also Huang, Yan, Cheung, Nagappan, & Zimmerman, 2017).

### *Apprehension*

It is through contact with the *Dota 2* controls that the player begins to make sense of what Tallis calls the ‘intrinsic nature’ of the object by way of ‘scientific enquiry’ (2003, p. 330). Through touch, the dexterous hand comes to *apprehend* the rules of the game via trial and error - for example, the embodied ways in which a player grasps one of the most important phases within a *Dota 2* match: laning.

Typical matches in *Dota 2* are played across the same map, which has three lanes (‘top’, ‘middle’, and ‘bottom’) and three static defensive towers. Early in the game, AI-units (‘creeps’) are automatically generated to move down the three lanes towards the enemy base. Every thirty seconds a new ‘creep wave’ spawns for each team (or faction) at their base. Laning is a skill that requires precision movements of the mouse if the player is to accrue gold and experience efficiently, and resist opposing creeps and heroes. The player must learn to *time* the right-click attack button to ensure that a ‘last hit’ is registered on the enemy creep - hit too early or late, and the creep may be killed by another player, and the gold and experience may be lost to the opposing team. Without attention to these mechanics, as the player soon learns, they cannot level up their spells and abilities nor purchase items, handicapping their hero and making it difficult to progress into later phases of the game.

Players who choose not to use ‘auto-attack’ features train their hands to register ‘last hits’ by learning the *rhythm* between their hero’s Attack Speed (AS) and the Attack Range (AR) - each hero’s AS and AR will differ depending on their class, or what spells, abilities and items are available to them, meaning that there is a lot of trial and error in developing an efficient last-hit technique. Players experiment with the way that different items and abilities

effect the rhythm of their attack speed and the range at which they can ‘farm’. They also learn how to ‘last hit’ effectively from others in the community, using tutorials and other guides (sf Lazy Grasshopper, 2015). From this perspective, the hand apprehends the meaning of a ‘good’ score within *Dota 2*. It practices a rhythm of well-positioned right-clicks as a means of overcoming the inefficiencies of the auto-attack setting.

### *Language Acquisition*

To apprehend the rules of *Dota 2* players must *point to*, *name*, and *point out* the skills and strategies needed to win. Tallis (2010) describes this process as *language acquisition*. The dexterous and intelligent hand learns about the purpose of an object through indexical awareness or ‘signs’. Signing has a number of effects. First, it makes the object stand out. It signals that the pointer has placed it under investigation and has a relationship with it. Second, it allows the pointer to name the object. Tallis argues that pointing is often followed by utterances that allow humans to (re)call the particular name of an object, thereby grasping at its nature. Third, pointing out is a way of cementing joint attention and enquiry for the purposes of creating shared communities and culture: “The point of pointing something out to another is to amend a perceived deficit in their knowledge, or experience, or awareness” (Tallis, 2010, p. 11). Further:

What is special about pointing is that pointees are not only explicit but also *shared* possibilities, or, rather, what is actual for one person is proposed as a possibility for another. Pointing is a fundamental instrument in the socialization of possibility. It makes the beyond explicit and makes it something shared’ (Tallis, 2010, pp. 132-33).

Consider the signage that accompanies the act of ‘ganking’ in *Dota 2*. A gank involves the player(s) entering enemy territory and tracking down a weaker enemy hero to initiate a surprise attack. This usually involves deploying items and/or abilities of high-damage quickly, shocking or stunning the intended target for the duration, reducing the possibility of escape. The player initiating the gank manipulates the mouse to point to the enemy’s position in order to move closer to that location, pointing again to the enemy on-screen to perform their attack moves. As Tallis suggests, both of these actions make the target ‘stand out’. Pointing with the mouse signals to the player initiating the gank that they have placed their intended target under investigation. This signage is important because it allows ‘ganking’ to be named as an objective: as something to be pursued during play. Its utterance conveys meaning. Players recognise the term and recall its purpose. It also conveys self-awareness. Players who understand the term indicate that they apprehend the logic of the objective: to initiate a surprise attack. This awareness is best evidenced in the way that players *point out* a target for ganking to other team-mates. By pressing ALT and left-clicking on the map, players send out a team-wide exclamation mark (!) that indicates a point of interest. Players use this sign in conjunction with in-game chat commands to request that a gank be coordinated on a selected target, or to pledge support to another player. Thus, ganking conveys the beginnings of player strategy and points to the reflective processes that underwrite embodied gameplay practices.

### *Reflection*

The language that players use to describe their practices anticipates a conscious process of *reflection*. Players scrutinise the objectives that they come into contact with to better understand how they may adapt and improve their actions to make progress. Tallis (2003) argues that reflection is a critical part of understanding how the hand learns from its mistakes: it is a process of continuous feedback and fact-checking. The player must balance knowledge with repetitive practise to facilitate effective decision-making. The player must reconcile the realities of their skill-set with the countervailing information presented by the competitive game world. To paraphrase the woodworker and sociologist Peter Korn (Korn, 2013, pp. 55-56), reflection begins with the humility wrought by failure.

In *Dota 2*, one way that players reflect on their progress is via the ‘post-game summary’ screen. The post-game summary offers a detailed breakdown of each player’s gameplay practices. For example, it records the ‘MMR’ or ‘match-making rating’ of each player: a number from 0-10,000 that indicates skill level. MMR is based on the ‘Elo rating system’ used in Chess, Scrabble and other multiplayer sports, like Major League Baseball, to group opponents based on a calculation of wins and losses. In *Dota 2*, MMR is calculated as players compete within ranked leaderboards (solo and team). This ranking is used to *discern* the skill brackets that players fall within and label their skill level, and may be used by players to reflect on their skill position within the wider *Dota 2* community (ELO Entertainment, 2017).

Importantly, MMR doesn’t convey much meaning without the other statistics available on the post-game summary screen, such as ‘Gold Per Minute’ (GPM) or ‘Kills/Deaths/Assists’ (DKA) that inform the player of *which* practices need improvement. A low GPM or a poor KDA (more deaths than kills/assists, for example) is evidence of a novice player: someone who needs to practice last-hit timings, or better coordinate and communicate their ganks. Players can also fact-check their ‘LH/DN’ or ‘last-hit’ deny metric in the post-game summary screen to discern whether their last-hit timings are improving over consecutive matches. From this perspective, it is the process of reflection that facilitates improvement in gameplay performance. Players use the post-game feedback to *learn from their mistakes* by *adapting their hands*. This is how skill is developed: they reflect on their contact with the controls to better apprehend the rules of the game.

In next the section , we consider how the development of skilled hands also facilitates creative expression. In particular, we examine *Dota 2* gameplay practices to consider how the handwork of players generates cultures and marketplaces of creativity, within which their craft, that is, skilled play, is recognised and celebrated.

## Creative Practices

Creativity has been defined in a number of ways. Franken (1998, p. 354) defines creativity as the tendency to generate or recognise ideas, alternatives, or possibilities that may be useful in solving problems, communicating, and entertaining ourselves and others. To be creative, you need to be able to view objects from a different perspective, to tolerate ambiguity, and to find enjoyment in the unpredictable. Similarly, Csikszentmihalyi defines creativity as “any act, idea, or product that changes an existing domain into a new one. What counts is

whether the novelty that he or she produces is accepted for inclusion in the domain” (1996, p. 28).

These definitions relate back to obliquity and flow, and share two particular commonalities. First, creativity is said to be *autotelic*: an intrinsically motivated behaviour that rewards people with an internal state of satisfaction and positive affect. Thus, Sennett, in defining craftsmanship as “learning to do something well for its own sake” (2008, p. 9), suggests that craft labour is also autotelic. Similarly, Korn notes that craft labour creates the conditions for “loving what you do” as the maker becomes immersed in the materiality of the object and the feedback that follows from working towards and reaching set goals. Indeed, he argues that *flow states* characterise the creativity of craft practices, unifying hand, mind and imagination through “exercising one’s innate human capabilities productively and powerfully” (2013 p. 57).

Discovery also characterises the creative process. Korn (2013, p. 50) suggests that the process of discovering or being discovered anchors creative experiences, specifically through “thinking with things”: the way in which humans witness the immediate effect(s) of their ideas on the world and how they implement them incrementally. Sennett concurs, adding that discovery also reveals the essence of complexity that underwrites craft practices: “The good craftsman, [...] can ask, “why?” as well as, “how”? about any project” (2008, p. 11). From this perspective, creativity in a craft is a necessary component of repetitive practice, and the same is true of ludic innovation. As Roger Caillois notes: “It is common knowledge that what to begin with seems to be a situation susceptible to indefinite repetition turns out to be capable of producing ever new combinations” (2001, p. 38). For Caillois, even in competitive games (‘agon’) with strict ludic boundaries, there is almost an ‘indefinite’ depth of playful variation. Korn (2013) argues that studies of craft often dwell on the act of problem-solving, where, in truth, it is the human capacity to *search out* problems, and alter one’s habits accordingly, which characterises creative practices. The question of skill reaches beyond that of process (‘how’) to include the creative choices that have been deliberated on for reasons of personal and social value (‘why’). What makes craft ‘creative’ then, is our human capacity to think through the materials and tools that we have, and make a choice about what aspects of the object we would like to reveal. For Caillois, it is in the emergent space between the rules of games and the competitive skill of players that new strategies are created.

### *Juking*

There are many activities within *Dota 2* which can be considered ‘creative’, but one in particular stands out - ‘juking’ - a term used to describe a deceptive movement within gameplay. In *Dota 2*, a juke happens when a player evades an enemy’s attack, using knowledge of the game to deceive, trick, dodge, or escape. Generally, there are four situations within a competitive match when a player may consider performing a juke: 1) When their hero’s life is low and a likely target of a coordinated gank; 2) when their spells/abilities are on cooldown and they may need to escape a gank; 3) when they want to escape/evade a battle to use items that cannot be used otherwise; 4) when they are initiating a gank and need to get closer to the

enemy hero to use items and/or abilities with range restrictions. Within these situations, players may use their knowledge of the map, items, spells/abilities, and range to initiate one or more dexterous manoeuvres. For example, a player may move towards higher terrain to gain a vision advantage over an opponent. Similarly, a player may right-click around static objects, like trees, to avoid the line-of-sight of an opponent. More sophisticated jukes elaborate on these basics by introducing randomness: players will make sudden direction changes, or alter their movement speed (via abilities, spells or items) to catch opponents off-guard. Unpredictability is considered a key characteristic of a ‘good’ juke. Skilled jukers will act in unforeseen and creative ways: moving, as if erratically, whilst tactically destroying trees to try and *open up* new lines-of-sight, or avenues of escape from their opponent.

The well-known professional *Dota 2* player Danil ‘Dendi’ Ishutin is particularly renowned for his creative high-level juking tactics. Ranked in the world’s top 100 players, Dendi possesses exceptional dexterity with the game controls, which he uses to juke his opponents into early-game ganks, and farm effectively. Dendi uses the hero ‘Pudge’, whose ‘Meat Hook’ ability ‘hooks’ an opponent towards him (into danger) or, alternatively, ‘hooks’ a teammate out of the way of an attack. Pudge’s hook moves over an extended distance quickly in a straight trajectory: it must be aimed and does not lock on. If the player’s positioning is off, and the hook misses the target, then the attack is wasted and placed on cooldown. Dendi, referred to in the community as ‘The King of Pudge’ or ‘Pudge Master’, perfected ‘The Fountain Hook’ (Jarrett, 2014), a move he developed in which Pudge is teleported back to the friendly team’s base (fountain) at the same time that an enemy hero is hooked. The result is that the opponent is dragged across the map to (almost) certain death at the enemy base. This manoeuvre, deployed by Dendi during a professional match in 2013 (*‘The International’*), not only requires an adept grasp of the hooking mechanic, but also experimentation with the game’s rules. Dendi discovered that Pudge’s ‘Meat Hook’ could be used in conjunction with Chen’s ‘Test of Faith’ teleport ability to juke a player into an early game gank. Indeed, another name for this skill is the ‘Dendi Express’: a phrase that celebrates the author’s creative expression (in a Reddit discussion from 2014, Dendi himself notes that *Dota 2* facilitates creative opportunities (Dendi, 2014)).

### *Cultural Value*

It is this creativity that makes for cultural recognition. Korn (2013, p. 147) argues that the process of discovery feeds what is understood to be the culture of craft: the recording of novel ideas and successful ways of making and/or doing things. Importantly, Korn suggests that the process of discovery is not isolated to the creative. To understand what creativity is, Korn argues that one must make sense of the experience of the person who encounters its craft: the object’s respondent. From this perspective, skilled hands can lead to the dispersion of innovative ideas, for which the craftsperson may be recognised or even celebrated. As Sennett writes, “the cultural value accorded to the craftsman” (or craftsperson), “is not blind worship, but appreciation for the social and economic value of their creativity, expertise, and skill” (Sennett 2008 p. 291-93). Historically, whether in mythology, medieval guilds, or modern workshops, the craftsperson’s capacity to practice, acquire skill, and produce an output, is

recognisable in the embodied skill of the esports player, valued by the spectators on the “digital field” (Witkowski 2012). Further, play and games (even in the digital realm, as we discuss here), guide the physical action that underpins the coming together of mind and body that defines the craftsperson (Sennett 2008 p. 294).

In esports, this mastery of craft is evident through the value placed on the practice and reconfigurative achievements of a player like Dendi, who is appreciated by the wider Dota 2 community, a global base of players and fans centred around sites like DOTABUFF, as well as Steam, Reddit, and Twitter. Sennett’s understanding of the powers of the craftsperson, and the notion of the medieval guild, or the workshop, is useful here in terms of cultural value, but also the wider marketplace wherein “the hands-on transmission of knowledge from generation to generation” (Sennett 2008 p. 27) produces knowledge capital amongst a community of masters (pro and high-ranked players) and apprentices (those at various levels still learning to fully master all elements of the game). In the context of *Dota 2*, Dendi is a master whose experience and bodily control are seen as symbols of knowledge capital and high skill, and as such, his authority is sought by players in order to improve their own skills. Guides, discussion forums, tutorials, workshops, and other online media provide players and fans with a shared space to work on their skills and knowledge, discuss hardware and software configurations (the tools of their craft), and follow rankings and masters closely.

To return to the earlier discussion on tacit knowledge and craft – DOTABUFF offers a space for a kind of apprenticeship – the passing on of experience through knowledge, in order to attain a mastery of the craft. As Peter Dormer notes, “tacit knowledge is learned and absorbed by individuals through practices from other people; it cannot usually be learned from books” (1997, p. 147). In the case of *Dota 2*, practical know-how is passed from person to person via online play and guild-like online communities whose shared practices often reflect the experiences and tacit knowledges of the community.

Within these guild-like spaces of mutual support and craft, Dendi’s skilled hands are not only valued, but studied by other *Dota 2* players as evidence of ‘good work’ - not simply a winning strategy (nochet2211, 2015). Pro player Arteezy, for example, cites Dendi’s skill in the mid-lane position as ‘personal inspiration’, suggesting that his pursuit of the game follows from watching videos of Dendi (Liquidota.com, 2014). Dendi’s team Natus Vincere (or *Na’Vi*) also provides detailed instructions for entry-level players seeking to study Dendi’s hotkey and other setups (Ishtun & Besehanych, 2014). The attraction for players wanting to understand Dendi’s setup is particularly related to Dendi’s exceptional ability on the keyboard - executing his signature moves, like the fountain hook, with high speed and precision: constantly keeping his fingers poised to respond, and practising until he can react reflexively, yet creatively, in the moment (Dendi, 2014).

Fellow players also provide examples of Dendi’s mappings, tips for other approaches, and discussions of Dendi’s skill and abilities, recommending, for example, that emulating Dendi’s key setup will not bring ‘automatic’ mastery of the game. Indeed, each player must learn *their own game*, and “simple imitation”, as Sennett writes, “is not a sustaining satisfaction” (2008, p. 194). On the contrary, players are advised to learn a key lesson that is applicable to both craft labour and *Dota 2* gameplay: that skill comes from “adapting the *form* of a tool, or improvising with it as it is, using it in ways it was not meant for” (Sennett, 2008, p. 194). Dendi’s use of Pudge’s hook (above) is an example of such ‘improvisation’ and players

recognise it for the manner in which it reveals the deep and enduring learning curve that comes with the complexity of *Dota 2* gameplay. From this perspective, new players are advised to acknowledge Dendi's expertise, but to use his key mappings as a guide in the development of their own setup, rather than follow his play style.

Dendi's mastery of the game is his craft, and his tacit knowledge is dispersed through online guild-like apprenticeships (and, in the case of coaching competitive *Dota 2* teams, is also passed on face-to-face). David Gauntlett (2011) writes that the 'essential dimensions of craft' can be summarised as follows; 'the inherent satisfaction of making; the sense of being alive within the process; and the engagement with ideas, learning, and knowledge which come not before or after but *within* the practice of making' (p.24-25). Dendi is engaged in all of these elements of craft.

### **Is Gaming 'Good Work?'**

By way of conclusion, let us draw together the main themes of this article to consider an avenue of research in the future. Sennett's work (and others) provide important insight into the use of the hand in generating an experience of craft labour. By dissecting the gameplay activity of *Dota 2*, we have shown that computer gaming can provide a similar experience of skill. How the hand makes contact with the controls, apprehends rules, communicates with others and initiates reflection, is evidence of the craft that follows gaming on a computer.

What we have not been able to discuss, however, is the 'quality' of this labour nor the marketplace in which these skills are valued and rewarded. Sennett's discussion of craft is double-edged. He recognises that 'good work' can soon turn corrosive when situated within professional contexts that value profit over the desire to do a job well for its own sake. Indeed, the problem posed by expertise is exemplified in the social changes that wrought the end of guilds, where "the modern expert has few strong rituals to bind him or her to the larger community or indeed to colleagues" (Sennett 2008 p. 246). Quality-driven labour, valued as part of a close-knit network, was increasingly replaced by a specialised 'expertise'. Sennett was critical of the way that market-driven value turns the focus of craft 'inwards' towards obsession, comparison and competition.

Future research may consider whether esports, and the professionalisation of computer gaming, subordinates the craft of play to the demands of competitive markets. In recent years, competitions in *Dota 2*, such as *The International*, offer prize monies in excess of \$20,000,000. However, to qualify for these events, players are locked into systems of competitive individualism. Consider, for example, the way in which *Dota 2*'s solo-queue ranking system turns the craft of play into an rational exercise of chasing MMR. In solo-queue, players will select heroes and positions that prioritise their individual playstyles. They will act instrumentally and communicate through divisive language, such as "u play ur game". Collaboration is replaced with aggressive competition as players compete to be amongst the TOP500 in the world: a symbol of 'expertise' that can be marketed to secure a position within a professional esports team. From this perspective, future research may consider how best to 'qualify' labour in games, and whether the design of ranking systems, by way of 'invidious comparison' (Sennett, 2008, p.249), reinforces the toxic communications that currently corrode online interactions within the *Dota 2* community (Thursten, 2016, Thursten, 2015). We conclude by suggesting that more research is needed to understand this paradox of gaming labour as a craft.

**Acknowledgements:** The authors would like to express their thanks to the anonymous reviewers and guest editors who helped clarify the ideas presented in this article.

## References

- Alexander, L. (2012). *GDC 2012: Sid Meier On How To See Games As Sets Of Interesting Decisions*. Retrieved from [http://www.gamasutra.com/view/news/164869/GDC\\_2012\\_Sid\\_Meier\\_on\\_how\\_to\\_see\\_games\\_as\\_sets\\_of\\_interesting\\_decisions.php](http://www.gamasutra.com/view/news/164869/GDC_2012_Sid_Meier_on_how_to_see_games_as_sets_of_interesting_decisions.php).
- Aloupis G., Demaine. E. D., Guo A., Viglietta G. (2014). Classic Nintendo Games Are (Computationally) Hard. In A. Ferro, F Luccio. P. Widmayer, (Eds). *Proceedings of International Conference on Fun with Algorithms* (Vol. 8496, 40-51). Sicily, Italy: Springer.
- Cailliois, R. (2001). *Man, Play and Games* (M. Barash, Trans.). Urbana and Chicago: University of Illinois Press.
- Calleja, G. (2011). *In-game: From Immersion To Incorporation*. Cambridge Massachusetts and London England: MIT Press.
- Clark, A. (2008). *Supersizing the Mind Embodiment, Action, and Cognitive Extension*. Oxford: Oxford University Press.
- Crawford, M. B. (2015). *The World Beyond Your Head: On Becoming an Individual in an Age of Distraction*. New York: Farrar Straus and Giroux.
- Csikszentmihalyi, M. (1996). *Creativity: Flow and the Psychology Of Discovery and Invention*. New York: Harper Collins.
- Danesi, M. (2002). *The Puzzle Instinct: The Meaning of Puzzles in Human Life*. Bloomington: Indiana University Press.
- Dormer, P. (1997). Craft and the Turing Test for Practical Thinking. In P. Dormer (Ed.), *The Culture of Craft: Status and Future*. Manchester: Manchester University Press.
- Dendi. (2014). *Dendi Ask Me Anything Dota 2 Reddit*. Retrieved from [https://http://www.reddit.com/r/DotA2/comments/21flzc/dendi\\_ama\\_8pm\\_cet/](https://http://www.reddit.com/r/DotA2/comments/21flzc/dendi_ama_8pm_cet/).
- Eichner, S. (2014). *Agency and Media Reception: Experiencing Video Games, Film, and Television*. Berlin: Springer VS.
- ELO Entertainment. (2017). *DOTABUFF*. Retrieved from <https://http://www.dotabuff.com/>.
- Franken, R. (1998). *Human Motivation*. Pacific Grove CA: Brooks/Cole.
- Farro, R., & Iacovides, I. (2012). *'In the game'? Embodied Subjectivity in Gaming Environments*. Paper presented at the Philosophy of Computer Games 6th International Conference: The Nature of Player Experience, Madrid Spain. Retrieved from [http://oro.open.ac.uk/33357/1/82-Farrow-Iacovides\\_FINAL.pdf](http://oro.open.ac.uk/33357/1/82-Farrow-Iacovides_FINAL.pdf).



Gauntlett, D. (2011). *Making is Connecting: The Social Meaning of Creativity from DIY and Knitting to YouTube and Web 2.0*. Cambridge UK and Malden USA: Polity.

Gunter, B. (1998). *The Effects of Video Games on Children: The Myth Unmasked*. Sheffield UK; Sheffield Academic Press.

Grodal, T. (2000). Video games and the pleasures of control. In D. Zillmann & P. Vorderer (Eds.). *Media Entertainment: The Psychology Of Its Appeal*. Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Huang, J., Yan, E., Cheung, G., Nagappan, N., & Zimmerman, T. (2017). Master Maker: Understanding Gaming Skill Through Practice and Habit From Gameplay Behavior. *Topics In Cognitive Science*, 9(2 April 2017).

Ishtun, D., & Besehanych, O. (2014). *Settings*. Retrieved from [http://twop.navi-gaming.com/en/dota\\_2/gameplay/settings](http://twop.navi-gaming.com/en/dota_2/gameplay/settings).

Jarrett, J. (2014). Fountain Hooks, Emergent Exploits and MOBA games. *Videogame Cultures and the Future of Interactive Entertainment 6th Global Conference*, Oxford UK. Retrieved from [https://www.academia.edu/11791387/Fountain\\_Hooks\\_Emergent\\_Exploits\\_and\\_the\\_Playful\\_Co-Creativity\\_of\\_MOBAs](https://www.academia.edu/11791387/Fountain_Hooks_Emergent_Exploits_and_the_Playful_Co-Creativity_of_MOBAs).

Juul, J. (2011). *Half-Real: Video Games Between Real Rules and Fictional Worlds*. Cambridge Massachusetts and London England: The MIT Press.

Kay, J. (2010). *Obliquity: Why Our Goals Are Best Achieved Indirectly*. London: Profile Books.

Korn, P. (2013). *Why We Make Things and Why It Matters: The Education of a Craftsman*. Jaffrey New Hampshire: Godine.

LazyGrasshopper. (Producer). (2015, 1 May 2017). *How To Improve Last Hitting – DOTA 2 Fundamentals*. Retrieved from <https://http://www.youtube.com/watch?v=3foOsg9GOgI>.

Liquidota.com. (2014). *20-20: EG.Arteezy Answers*. Retrieved from <http://www.liquidota.com/forum/dota-2-general/452425-20-20-egarteezy-answers>.

nochet2211. (2015). *Open Letter to Dendi From A Fanboy* Reddit. Retrieved from [https://http://www.reddit.com/r/DotA2/comments/3nfsh6/open\\_letter\\_to\\_dendi\\_from\\_a\\_fanboy/?st=j3ht0wya&sh=3ae7ebdd](https://http://www.reddit.com/r/DotA2/comments/3nfsh6/open_letter_to_dendi_from_a_fanboy/?st=j3ht0wya&sh=3ae7ebdd).

Rigby, R. and Ryan, S. (2011). *Glued to Games: How Video Games Draw Us In and Hold us Spellbound*. Santa Barbara, California: Praeger.

Sennett, R. (2008). *The Craftsman*. New Haven & London: Yale University Press.

Tallis, R. (2003). *The Hand: A Philosophical Inquiry into Human Being*. Edinburgh: Edinburgh University Press.

Tallis, R. (2010). *Michelangelo's Finger: An Exploration of Everyday Transcendence*. London: Atlantic Books.

Taylor, T. L. (2012). *Raising the Stakes: E-Sports and the Professionalization of Computer Gaming*. Cambridge Massachusetts and London England: MIT Press.

Thursten, C. (2016). *Dota 2 and The Value of Selfishness*. Retrieved from <http://www.pcgamer.com/dota-2-and-the-value-of-selfishness/>.

Thursten, C. (2015). *Merry Christmas, Dota 2*. Retrieved from <http://www.pcgamer.com/merry-christmas-dota-2/>.

Toft-Nielsen, C., Nørgård, R. 2015. Expertise as gender performativity and corporeal craftsmanship. Towards a multilayered understanding of gaming expertise, *Convergence*, 21(3), p.343-359.

Valve Corporation. (2013). *Dota 2. Defense of the Ancients*: Valve Corporation.

Valve Corporation. (2017). *Dota 2*. Retrieved from <http://blog.dota2.com/page/50/>.

Witkowski, E. (2012). On the Digital Playing Field: How We “Do Sport” With Networked Computer Games. *Games and Culture*, 7(5), 349-374.