Dynamic Range: measuring player freedom and its narrative possibilities
in resource-driven games
by Dominic Arsenault

Introduction

The opposition between game and narrative has been a major thorn in the back of game

studies for quite some time already. While we may not be able to solve the problem for

now, we can definitely work something out. I, for my part, believe it is perfectly possible

to combine both worlds inasmuch as we extend our conception of a "story" to include

new, non-Aristotelian forms. Building upon Henry Jenkins' theory of spatial narratives

exposed in his article "Game Design as Narrative Architecture", Janet Murray's

procedural authorship expressed in *Hamlet on the Holodeck*, and Hunicke, LeBlanc and

Zubek's MDA model, I will argue that game systems in themselves can stimulate or

hinder the emergence of narratives based on how much freedom they give to the player.

To that end, I will introduce a tool I have developed to measure player freedom in a video

game, which I call the Dynamic Range.

Game Design and Narratives

Henry Jenkins, in "Game Design as Narrative Architecture", writes: "Game designers

don't simply tell stories; they design worlds and sculpt spaces."[1]. While this is certainly

true, most game designers spend even more time working out and detailing the many

rules and algorithms that constitute the game-play and define how the world will behave.

Throughout his article, he suggests that narratives need to be understood in a broader

sense than the classical Aristotelian or modern narratological models: "the discussion

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[1] Henry Jenkins, *Game Design as Narrative Architecture*

operates with too narrow a model of narrative, one preoccupied with the rules and conventions of classical linear storytelling at the expense of consideration of other kinds of narratives.". Jenkins advocates that a narrative may be an episodic event unrelated to a general, over-arching plot, or that it may be born out of pure cognitive player understanding of events, and not seeded purposely by the game designer. I believe this definition offers a way of understanding how we play games, and thus I will use the term "narrative" in the sense of an *organization of a given playing experience*, as opposed to a game's "story", which I mean to be the set of events orchestrated by the game designer or scriptwriter, and which we find dominant in the traditional media.

The major point of interest to me in Henry Jenkins' article lies in his concept of emergent narratives, which he defines as being "not pre-structured or pre-programmed, *taking shape through the game play*, yet […] not as unstructured, chaotic, and frustrating as life itself" (italics are mine). In short, he believes game spaces can be designed to offer the player the ability to create narratives. Jenkins places at the heart of the creation of narratives the concept of spatiality, one of the four great characteristics that define digital environments according to Janet Murray.

In *Hamlet on the Holodeck*, Murray states: "Digital environments are procedural, participatory, spatial, and encyclopedic."[2]. I would like to take Jenkins' vision of spatial narratives and apply it to another of these four great characteristics, the participatory. In doing so we may touch onto something Murray calls the procedural authorship; given that video games, among other digital media, are participatory in nature, she proposes

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[2] Janet Murray, *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*

that authors define procedures (instructions for the machine, or algorithms) capable of responding to user input and thus generate narratives, instead of trying to map every possible player response and programming a consequence for every possible action.

It is clear that all games are regulated by procedures, and even that consequently, all games can produce narratives – but not necessarily stories. But all games can definitely not do so equally; how different from one another can one hundred Tetris narratives possibly be? It may be a good idea for a developer to design a game in which there is little or no story because the player is free to create his or her own, but how can he know if his design will contribute to stimulate emergent narratives? By giving the player more freedom, the designer relinquishes narrative construction and leaves the task to the player. If, therefore, we are to evaluate a game's emergent narrative potential, what we need to do is measure the player's freedom; the more freedom he is given, the more he can make original, unexpected combinations out of his resources to build narratives. This is where the dynamic range comes in. First, however, I must introduce Hunicke & co.'s MDA model, for it lays theoretical grounds on which I will build.

Dynamics and Range

Robin Hunicke, Marc LeBlanc and Robert Zubek established a model for understanding games called the MDA, which stands for Mechanics, Dynamics, Aesthetics. They suggest that the rules of a game (the way it behaves, or its Mechanics) supplied by the game's designer, and the attitude and expectations (Aesthetics) of the player meet to create the Dynamics, "the run-time behaviour of the mechanics acting on player inputs and each

others' outputs over time"[3]. They offer the case of a strategic military simulation game as an example:

> Dynamics might include the ability to earn or purchase powerful weapons
> and spy equipment, and to develop tactics and techniques for stealthy movement,
> deceptive behaviour, evasion and escape. Mechanics include expansive tech and
> skill trees, a variety of enemy unit types, and levels or areas with variable ranges
> of mobility, visibility and field of view and so on.

Dynamics, then, are the different variables over which the player has an influence.

From now on I will focus on single-player, resource-driven games (that is, games in which managing resources is a central part of the game-play system, as opposed to skill-based or puzzle games) for the sake of clarity and ease of demonstration. In resource-driven games, the player's control over his resources (money, army units, hit points, etc.) – the game Dynamics – is synonym of his freedom to play. The dynamic range aims to measure this.

- Surface Definition

I define the dynamic range as a measure of the extent to which a player can manipulate the game Dynamics in order to face a particular challenge requiring a specific set of Dynamics.

- Step-by-step Definition

a measure of the extent: The extent is determined by comparing the player's usual statistics with the maximal fluctuation he can reach by optimizing his Dynamics (such as

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[3] Robin Hunicke, Marc LeBlanc & Robert Zubek, *MDA: A Formal Approach to Game Design and Game Research*

changing equipment, trading resources, etc.) to increase one or a select few particular variable(s). The measure takes the form of a graphical chart representing the player's Dynamics, before and after the manipulation.

manipulate: this term, opposed to *spend* or *gain*, emphasizes that the player does not make an irreversible choice. The process of customization has to be possible without a cost that would impair a player's future odds of winning or chances of survival. For instance, it is not an appropriate decision for a king to empty the chests of his kingdom to win a battle, if the resulting absence of gold will later prevent him from winning the war.

game Dynamics: as noted above, and derived from the MDA model's definition, the different variables over which the player has an influence.

a particular challenge requiring a specific set of Dynamics: all challenges which a player faces in a video game can be observed from a "what do I need to win?" perspective. Defeating a fire-breathing dragon may require a certain degree of protection against fire, and defending the keep against an army of a thousand men may necessitate five hundred archers, ten catapults, and solid castle walls. Are these conditions part of the player's range of influence?

Applying the Dynamic Range

The number of game Dynamics that can be manipulated by the player, and the amount of control he enjoys over them, varies between games (and sometimes between different

moments in a given game). Some offer a vast amount of resources and give the player little control over them; others allow only a select few resources to be managed, but the player can do so at a great extent. Therefore, the first step in drawing a game's dynamic range is to identify which Dynamics can be influenced by player input. This makes up the game's Scope; the Depth is the actual difference between the standard and exceptional values of a given Dynamic – in other words, how much of an influence the player has over it. The chart below gives an example based on a non-existing game:

Fighter's Dynamic Range
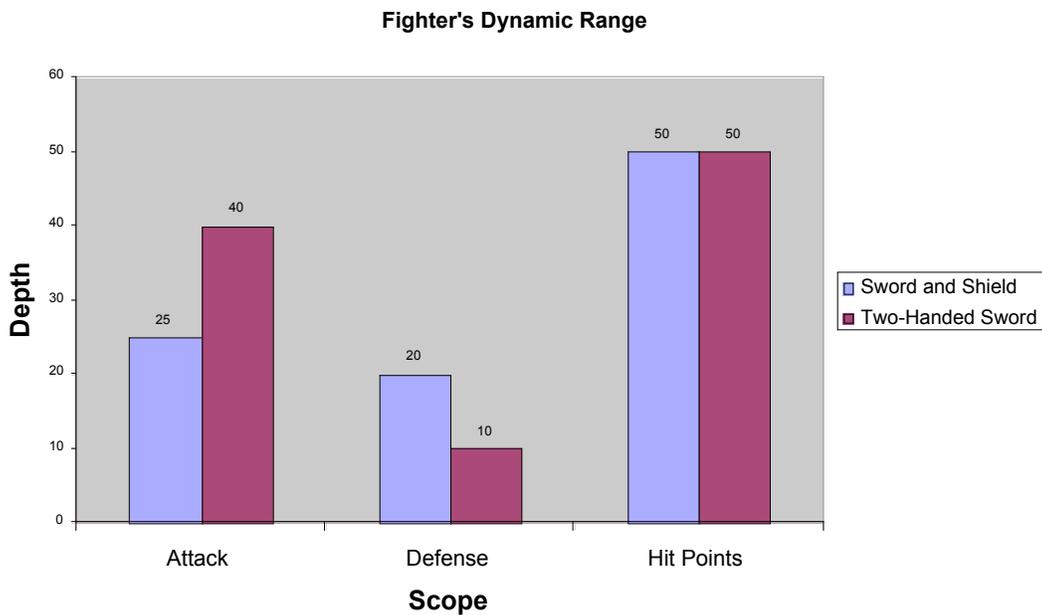
In this simplistic, untitled game, we have but few rules, or Mechanics: when a character strikes another character, he inflicts damage according to his Attack rating. The victim's Defense rating reduces damage accordingly, and the final remaining difference is subtracted from the victim's Hit Points. Not a very exciting game system by today's standards, but these simple rules will serve our purpose.

Fighter's standard statistical set (when he uses his trusty sword and shield) is represented above in blue. However, sometimes he'll meet an enemy with 25 or more Defense, effectively rendering his attacks useless. At such times Fighter lets go of his shield and grabs his sword with both hands, thus reducing his Defense but giving him that much-needed Attack bonus. This is Fighter's exceptional statistical set. Note that while his Hit Points are not affected by this change, other items or situations in the game can indeed affect this Dynamic. If Fighter could never have an influence on his Hit Points total, it would not be a Dynamic, but a Mechanic, and as such would not appear on the chart, in much the same way that the speed at which Fighter strikes or the distance he can jump does not. Adding player control over these elements of game-play – that is, morphing them from Mechanics to Dynamics – would increase the Scope of our game. Adding a magical sword that makes Fighter even stronger than when using his sword with both hands (giving him an Attack rating of 60 or so) would increase the Depth of our game, for it would expand the player's range of influence over the Dynamics.

If we increase the scope and/or depth of our beloved Fighter's dynamic range sufficiently, adding variables such as magic spells, mana, speed and different weapons, and separating his pure, raw strength from his ability to wield weapons, and so on, we will soon find that Fighter's dynamic range is so wide it makes the prediction of possibilities impossible. In such a case, we could not place monsters in a certain linear progression aiming to provide increasingly challenging battles, for the player controlling Fighter could certainly overkill many of them with a good manipulation of the right game Dynamics. A narrative where the game character is a demigod growing bored of

destroying enemies with one hand behind his back might emerge, and clash against the game's story of a warrior cheating death in a most jarring way. In this example, as the game designer gives more freedom to the player through the game system, the player gains freedom to create narratives.

The Future of Narratives

By increasing the scope and depth of a game's dynamic range, a game designer gives more control to the player over the game Dynamics, which in turn ensures that different players will have a different experience playing the same game. While this may not – yet – generate stories with elaborate plot and character development, we must nevertheless consider these different play-experiences as narratives.

Sources used:

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About the author:

Name: Dominic Arsenault
Occupation: Master Student
Institution: University of Montreal (Universite de Montreal)
Address: 3749 Jean-Talon Est, app. #5
Montreal, QC, Canada
H2A1Y1
Phone: (514)729-6237
E-mail: dominic.arsenault@umontreal.ca
or doum182000@yahoo.ca

Brief Bio: Dominic Arsenault is a master's degree student at the University of Montreal. He is studying game design and its impact on the emergence of post-Aristotelian narratives. He previously worked for two years as a creative designer at the now-defunct Montreal-based indie developer studio Evillusion.