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Hot Iron Productions

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[SENTIOLOGY: THE STUDY OF EXPERIENCE]

The whole of human experience is composed of individual definable components functioning in concert to produce a dynamic working system of experience. The results of this study are aimed at a comprehensive understanding of this system that can lead Design toward better heuristics for game design, experience design, service design and the like.

A brief note about this paper:

Originally, this study was conducted in an organic manner that defied convention. Likewise, its original presentation defied convention. This paper was originally presented as a series of online posts from a personal blog on the game development community website Gamasutra.com. The purpose of this style of presentation was to encourage open discussion and debate of the study's assertions, as a means to conduct a live peer review. These posts were presented beginning December of 2009, and ending late January 2010. This transcript has been formatted to better align with standard conventions, although the blog post personal comments and recapitulations are shown in italics, and the citations are grouped with each post. The discussion and feedback from the Gamasutra community comments are deserving of mention and recognition in this study.

I assert the following:

If it is the game designer's responsibility to craft the experience in the mind of the audience, then we should have a practical working knowledge of experience at our disposal. Yet, the Game Design community has struggled to define even basic aspects of experience as related to our craft. Frustration and boredom are common experiences, yet we have no clear picture of what those experiences are, what they are comprised of, or how they work. We seem to lack a formal understanding of experience that can guide design. For game designers and others, this is a serious problem, not just in terms of evaluating design aspects and problem solving, but in terms of communicating effectively to each other. Without a practical understanding of experience and how it responds to our designs, we cannot evolve.

To designers in particular, do you agree with this? Do you feel this is a problem worth pursuing? Do you feel this is a practical pursuit? Do you feel that your day-to-day design decisions could be informed by such an effort? I invite you to please comment on or debate my assertion. Thank you.

No, 'sentiology' is not a word

Game Design is primarily concerned with designing an experience¹, which should lead one to consider that, to understand player or audience experience specifically, first we should have a firm understanding of Experience in general. That's "Experience", with a capital "E"; as in, the whole of individual human experience, encompassing anything that could be called a part of an experience. However, research in this direction may lead one to believe that perhaps there is no such thing as The Study of Experience.

It appears that Cognitive Psychology is concerned with most elements of Experience as do other disciplines such as Cognitive Neuroscience, Psychiatry and Neuropsychology. But these disciplines do not appear to encompass Experience in its entirety; at least, not in a way that seems to be practical for Game Design. The goal for this study is to arrive at a practical understanding of Experience that can be used as a design aid; a guide that could be used to analyze, evaluate and design elements that effect audience experience.

Along with obvious sources from Game Design, some relevant research I like has come from theatrical performance, industrial and graphic design, writing and music theory and the fields related to Cognitive Psychology. I believe at least one center of study in the domain of Philosophy² appears to follow similar lines of thinking to my personal understanding of Experience.

I'll list some sources that I found valuable in relating to different aspects of audience Experience. I invite game designers in particular to suggest other valuable reference sources. Please note that the previous post's comments yielded many links and suggestions already. I also invite everyone to comment on or debate the assertions and opinions expressed above. Thank you.

• Anderson, S. P. (2009). www.poetpainter.com (and related materials) [Website]

- Csikszentmihalyi, M. (1997). *Finding Flow: The Psychology of Engagement in Everyday Life*
- Johnstone, K. (1979). *Impro: Improvisation and the Theatre*
- Lotto, B. (2009). TED Talk: “Optical Illusions Show How We See” [Online Video]
- Norman, D. (1988). *The Design of Everyday Things*
- Schell, J. (2008). *The Art of Game Design: A Book of Lenses*

¹ Schell, J. (2008). *The Art of Game Design: A Book of Lenses* p.10.

² Center Leo Apostel for Interdisciplinary Studies (CLEA) in Brussels, Belgium is an interdisciplinary institute which appears to focus on an individual capacity to hold a worldview, or *Weltanschauung*, as opposed to the common idea that worldview is a collective model of understanding among a large group or society. [<http://www.vub.ac.be/CLEA/>]

In previous posts, the idea of studying Experience as a part of the study Game Design was discussed; what that would mean and what sources of reference can serve such study. The study of Experience may need to start with some definition of the fundamental components that make up Experience. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

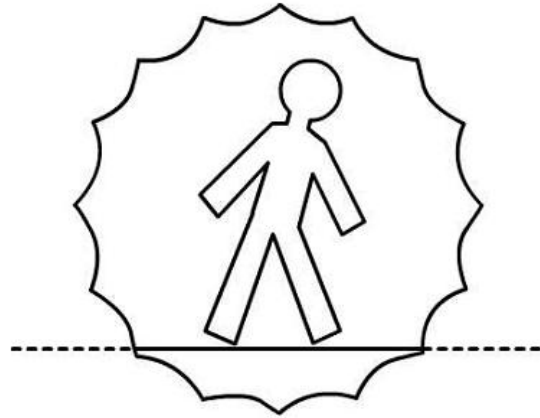


Fig.1. The Self is surrounded by a bubble of Perception

Perception feeds Experience

Perception is understandably a primary focus of many reference sources on the subject of Experience. The primary inputs for Experience are our physical senses. But while the five senses may be ubiquitous components of Experience study, there is a strong potential for disparity between what is sensed and what is perceived. That is, it is widely recognized that while our senses have the ability to take in details of the world, our interpretation of those sensations is not as well defined, and in many cases beguiles the actual state of those details.¹ Rather than include the literal details sensed of the world as a component of Experience, it stands to reason that it is our interpretation of those sensations; our Perception, that resides in Experience. The primary factor in determining how sensations are shaped into Perception is our contextual frame of reference.

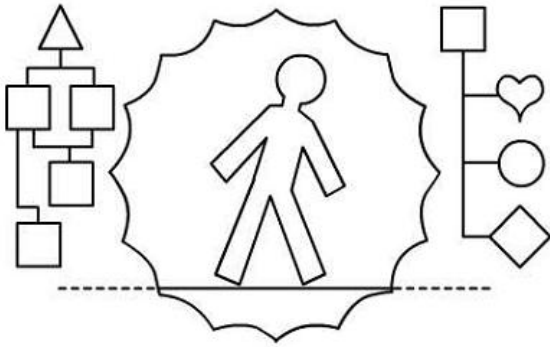


Fig.2. Cognitive Models, the structure of understanding and another form of input

Experience forms Cognitive Models²

Perception does not occur in a vacuum. Perception is the result of interpreting sensations according to one's understanding of the world. In essence, sensations are compared to a Cognitive Model of the world and the aggregate results of any correlation or disparity to that model is what we call Perception. Our Cognitive Models of the world shape and are shaped by our Perception, but they are not the same as Perception. One can imagine something novel; something that does not exist either in the world or in one's prior Cognitive Model of the world. This act alone suggests that Perception is not the whole of Experience; that our Cognitive Models of the world play a major role in Experience. Our use and manipulation of Cognitive Models (A.k.a., critical thinking) may not be a true sixth sense, but the results of thinking provide another form of cognitive input along with Perception.

¹ Lotto, B. (2009). TED Talk: "Optical Illusions Show How We See" Online Video. [http://www.ted.com/talks/beau_lotto_optical_illusions_show_how_we_see.html]

² Another word for a Cognitive Model is a schema, but here it is framed as an organization of schemata that encompasses everything we attend to within Experience. (i.e., an individual worldview)

In the previous post, Perception and Cognitive Models were introduced and discussed as concepts that provide some foundation for describing Experience, however they do not inherently address the important relationship to time. This post asserts that Memory and Prediction are two more fundamental components of Experience, which add a dimension to our evolving diagram in relation to Perception. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

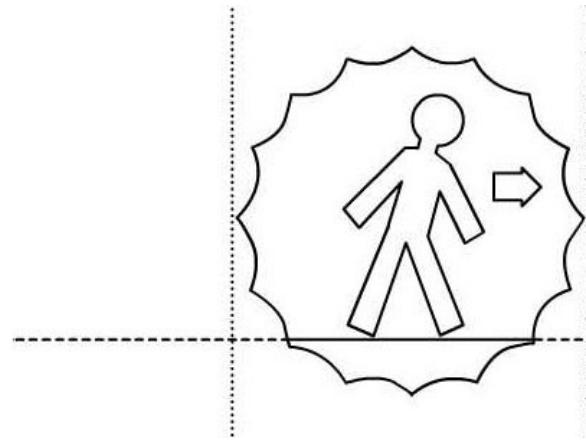


Fig.3. Memory shown as an area to the left, introducing a dimension in time this diagram of Experience

Memory stores Experience

The process of interpreting sensations and arriving at Perception uses a Cognitive Model of the world that already exists; one that was manipulated in the past and is retained for future use as Memory. The ability to store Experience represents a foundation for relative evaluations of comparison and contrast. Memory holds relevant preconceptions, which in turn support a variety of operations within the system of Experience; one learns over time, one changes one's mind, one can have an expectation validated or discredited, one recalls. A common example would be the act of telling a story, which heavily relies on Memory, both for the audience to follow the story

and the storyteller to tell it. When new concepts are presented, we rely on Memory to retain them for reference so we can then build upon them.

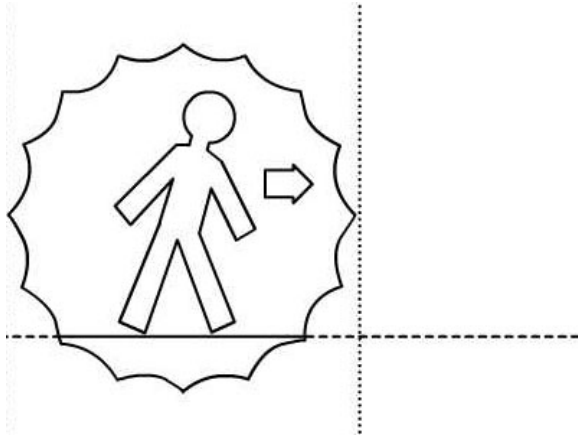


Fig.4. Prediction is shown as an area to the right of Perception in this diagram of Experience

Experience informs Prediction

The critical function that our Cognitive Models serve is to use previous Perceptions stored in Memory to make Predictions of future events, states and conditions of the world. Without this ability, our minds would be simply reactive and unable to plan, innovate or to arrive at comprehensive expectations based on similar Cognitive Model constructs and limited Perceptions. Our Cognitive Model of the world and its interconnectivity between similar concepts allows us to solve problems, to see relationships and correlations, to identify new potential threats or problems and to expect distinct outcomes from a standpoint of uncertainty.

Prediction is what allows us to shortcut interactions and make routine tasks graceful. Narrative designers know audience Prediction is a primary focus. It is the main element that must be carefully guided through presentation to bring the audience to specific expectations, which will then typically be broken to serve as a twist, or it will be satisfied somewhat as predicted, usually to serve as the indicator that a milestone or resolution has been reached.

In the previous posts, four fundamental components of Experience were defined and discussed: Perception, Cognitive Models, Memory and Prediction. In this post, those components are fit together to form a model of Experience as a whole. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

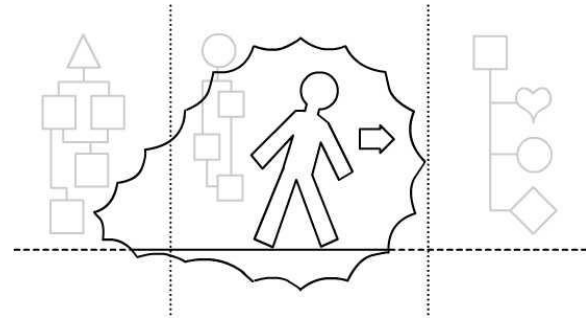


Fig.5. A diagram of the model of Experience, integrating the previous concepts of Perception, Cognitive Models, Memory and Prediction

A Unified Model of Experience

This diagram is a simplistic representation of an individual's complete Cognitive Model of the world. This individual's worldview is asserted to be a network of many Cognitive Models, performing a variety of operations and providing the basis for all structure within Experience. In the center of Experience is the Self in the here and now. The Self is surrounded by a bubble of Perception. Note that the Self shown here is not the actual body, but the interpreted sensations of the body; as everything in this model resides in the mind. Everything perceived by the Self fits inside this bubble of Perception.¹ To the left of the dotted line is the past; and in terms of the Cognitive Model, it is Memory. The time boundary of the Cognitive Model goes back as far in time as the most previous distinct memory this Self is currently concerned with. To the right of the dotted line is the future, and it is represented in the Cognitive Model by Prediction; those things which the Self assumes will be. Here, the time boundary of

Experience is defined by the furthest prediction this Self is concerned with.

In essence, the Cognitive Model of the world itself is the whole of individual human Experience; with the other three primary aspects defining distinct subsets of the model: the Memory of the past, the Prediction of the future and the Perception of the present time. The indistinct portion of this model is the section of the Cognitive Model of the world in the present time that falls outside sensory Perception. This is the domain of current thought, imagination and critical thinking on concerns not perceived.

This static model would only describe a part of the story; a snapshot of Experience. To understand the dynamics of the system of Experience, one would need to consider how these components appear to interact and what forces influence those interactions.

¹ In this evolution of the diagram, the bubble of Perception trails into the past (Memory), indicating that, as interpretations of sensation, it takes a measure of time to acquire some perceptions. For example, if you've ever caught a glimpse of something while hurrying along and a moment later you stop short and revisit that glance, having grasped its relevance and meaning a moment afterward; you've experienced this dynamic.

In the previous posts, a model that describes a static structure of Experience was defined and discussed. In this post, dynamic conditions will begin to be presented; starting with an assertion that Reliability is a critical condition that impacts all fundamental components of Experience. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

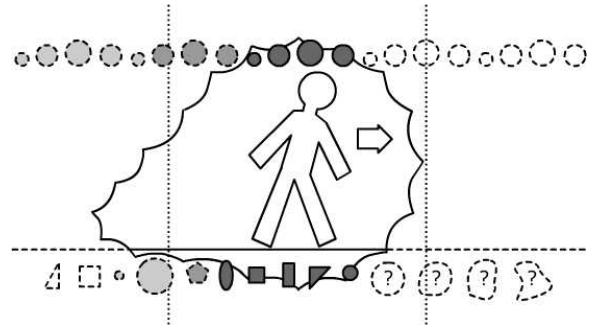


Fig.6. Reliability is a critical condition of Experience, influencing all fundamental components.

Experience requires Reliability

Experiential elements are not absolute. As mentioned previously, Perception can differ from what our senses actually detect of the real world. Likewise, our Memory can falter, our Predictions can be off, our Cognitive Models as a whole are imperfect representations of the real world, as evidenced by simple differences in opinion and points of view. Yet in terms of how we use Experience, Reliability of these experiential elements is a crucial factor that impacts our ability to understand clearly, think creatively and operate effectively. Our Cognitive Models follow a progression of evaluation, revision and manipulation to align closer to what we perceive and understand to be, as a matter of Reliability. However, the factors that determine Reliability differ some for each of the components of Experience.

Perception relies on our ability to sense clearly those things within our Experience that we are currently concerned with. Reliability of Perception also depends on the objectivity of interpretation of those sensations when compared to our Cognitive Model of the world, so as to minimize the transformative effects of contextual reference. The Cognitive Models' Reliability is determined primarily by our ability to make meaningful connections between discrete model subsets; those relationships between what we are currently attending to and other distinct elements of the Cognitive Model that are foundational, recent or pervasive to our current understanding. That is, the more interconnected the

concern is to other Cognitive Model subsets and the more connected the concern is to things that are already considered reliable, the more reliable that concern is. Being that the other components of Experience are subsets of the Cognitive Model of the world, all are subject to this Reliability by association to other discrete model subsets. So, the Reliability of Memory is determined by this interconnectivity factor, which could also be described as its relative significance to us in the present, but it is also dramatically affected by the amount of attention paid to that experiential element. We are able to forcibly retain an experiential element of Memory that would otherwise be too disconnected to the rest of our Cognitive Model by spending effort to strengthen it through attention. Another way to look at that dynamic is that the longer time has passed since we last attended to an experiential element of Memory, the less reliable it becomes. Prediction is derived from, and strengthened by, the interconnectivity to reliable elements, but it too has its Reliability affected by another unique factor, which is the rhythmic or regular qualities of the subject of Prediction. We can more reliably predict those things that happen regularly, with rhythm or in sequence. Here we can see why Prediction heavily depends on all the other components of Experience just to remain reliable and relevant, let alone to be created in the first place.

In the version of the Experience diagram presented above, the vertical axis shows a measure of regularity for the concepts held in Experience. This is to indicate the relationship between the regularity (sequence, rhythm, etc.) and the resulting Reliability of the concepts for Prediction in particular. Along the top is a sequence of shapes presented over time that is relatively reliable to predict, due to its regularity, and to retain in Memory, due to its relevance and similarity to current concerns, such as the current Perception of the sequence. Along the bottom is an irregular sequence of shapes presented over time that is difficult to predict and difficult to maintain in Memory as relevance to the present wanes with the passage of time.

In the previous post, Reliability was defined as a crucial dynamic aspect for each component within the system of Experience. In this post, Understanding is described as an ideal condition of overall Reliability, and Attention is defined as a means by which Reliability is achieved. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Experience seeks Understanding

With the relative Reliability among all components of Experience, the Cognitive Model of the world approaches a state we call Understanding. Understanding is the relative quality of Experience in which our Cognitive Model concerns are comprehensively consistent and Reliable among Memory, Perception and Prediction. By contrast, with a relative inconsistency among the components Experience, we are not be able to associate Reliability among Cognitive Model subsets and we are not able to interpret sensory input via contextual reference to arrive at Perception that has significant meaning. That condition is a state of confusion, where one can still perceive, remember and try to predict, but in a confused state, one does so with a detrimental deficit in Reliability; making each of those tasks more difficult to do effectively, particularly Prediction. Understanding is the primary goal of Experience. The system of Experience as asserted constantly improves, working toward an efficient state of Understanding.

Experience uses Attention

It is by no accident that we refer to the act of focusing efforts to define and connect discrete subsets of the Cognitive Model of the world as “paying attention”. Attention requires effort; effort that is equitable to a limited resource that must be managed, similar to the water resources of a well. One can only bring up one bucket of water at a time and, in the extreme, one can drain the reserves, leaving no available resources until

those stores are replenished over time. What we receive in exchange for our Attention is increased definition of our Perception, greater interconnectivity between our Cognitive Model subsets, more reliable Memory and, as a result of all those, a measure of improved capability of Prediction. Attention is a wholesale investment in the Reliability of Experience; squarely aimed at bringing our Cognitive Model of the world toward the state of Understanding. Attention is the means by which the system of Experience is improved upon, but as asserted, this comes at some cost.

In the previous post, concepts of Understanding and Attention were defined with regard to the system of Experience. In this post, Efficiency is introduced as a ubiquitous force that shapes the components of Experience and drives the operations of the system. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Experience needs Efficiency

For the whole of the system of Experience, Efficiency is a law. As an example, rather than receive the actual sensory inputs as they are, we interpret them and arrive at Perception; a streamlined version of that sensory input, because it is more efficient. Our whole Cognitive Model of the world is a simplified version of real world concepts and their relationships; coded for efficient manipulation, association and search operations. Memory and Prediction are typically only concerned with pertinent details. Memory is largely forgotten as a natural form of garbage collection. But Efficiency not only defines how the fundamental components of Experience are structured, it is also a consistent and pervasive guideline for the direction of operations within the system of Experience.

The ideal of Understanding represents a goal towards an efficiently consistent state of Experience overall.

And when one pays Attention to something that is novel, there is an Efficiency goal that is being progressed toward, which is further Understanding. When one continues to pay Attention to it, after it is no longer novel, it becomes progressively more difficult to do so. At some point, Efficiency goals are no longer being served and there is nothing more being wrought from this aspect of Experience that yields a greater Understanding. This difficult state to maintain, paying Attention to the Experience that is no longer informative in a way that allows progression toward an efficient state of Understanding, is boredom. As well, without a considerable amount of deliberate reserves used to continue to pay Attention, a natural process will take over Attention and direct it elsewhere; to simultaneously cease attending to the concerns that no longer offer an Efficiency tradeoff, and to instead begin the search for aspects of the Cognitive Model that, if attended to, can yield a measure of Efficiency. A common automatic expression of this transition is daydreaming. These are just some of many dynamic effects Efficiency has on the system of Experience.¹

¹ The dynamic effects of Efficiency are evident throughout these assertions, but one interesting exploration omitted from this presentation is the notion of Intuition as an efficient method of evaluating and problem solving. Intuition operates without the formal structure of normal Cognitive Model interconnectivity, which equates to operating with a relative lack of Reliability. However, the intuitive process overall can be relatively efficient, especially in cases where there is a lack of contextual reference. This seems to reasonably suggest why Intuition can serve well in times of uncertainty, but can also represent a source of anxiety in times when the current efforts are of high priority; as in, when Efficiency tradeoffs are significant.

In the previous post, Efficiency was defined as a pervasive force within the system of Experience. In this post, Stress is introduced as a condition that disrupts Efficiency. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Stress affects Experience

In an imperfect world, and particularly in using an imperfect representation of the world to navigate and operate within that imperfect world, there are often inconsistencies encountered in the system of Experience. As a matter of Efficiency, the system of Experience will naturally make attempts to reconcile any contradictions or missing details in the Cognitive Model of the world. This reconciliation effort consumes energy in the form of Attention; where the larger the discrepancy that is found, the larger the amount of Attention that is required to reconcile it to a sufficiently efficient state. Missing details of a discrete Cognitive Model subset that is heavily relied upon, for example, requires a larger reconciliation effort than a minor inconsistency to a concern that we are only casually attending to. Extreme cases requiring such effort would be those situations where reliable aspects of the current Cognitive Model of the world are directly contradicted by reliably attended to elements of Perception. Other extreme cases would be those situations where there are new significant distortions or missing details of a Cognitive Model subset that previously represented a Reliability foundation to many other subsets; particularly those of current concern or those which are more commonly used in our navigation and operation in the world. These conditions of extreme discrepancies between the various Cognitive Model subsets; posing a threat to Reliability, blocking our goal of Understanding and requiring significant reconciliation in the form of Attention as a matter of Efficiency, are what we understand as Stress. Conditions of Stress take a double toll on the system of Experience, in that both a considerable Attention energy cost is paid over

time to reconcile those discrepancies, and those other systematic operations that could be performed during that time are neglected. A stressful situation can easily stop short our graceful operations in the world and cause us considerable discomfort, even elicit clear signs of pain, due to this necessary reconciliation effort and the toll it takes on the system of Experience.

In the previous posts, conditions of Efficiency and Stress were described and discussed as persuasive forces within the system of Experience. In this post, concepts of Motivation and Satisfaction are introduced as dynamic aspects that are derived from those forces. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Motivation directs Experience

As mentioned previously, a state of relative Understanding represents the primary goal for the system of Experience; which stands to reason in light of its Efficiency. By the same token, a relative lack of Efficiency; a state brought about by Stress, for example, represents an operational threat to the system of Experience. For both of these conditions, Attention is called up to address Efficiency goals. Here, two primary forces are being described that are constantly at work in directing the operations of the system of Experience; both pivoting on Efficiency. One force pulls while the other pushes. These forces not only play a part in the lower-level aspects of the four components of Experience described previously, they also serve to direct the higher-level operations of the system of Experience; the choices we make, the concerns we choose to attend to, the relative values we place on concerns, our self-expressions, and the like. The forces represented by the Efficiency goal of Understanding and the toll of Stress direct our Motivation; our propensity to act, choose or attend in a progressive fashion.

Satisfaction rewards Experience

Our Motivation serves to lead the system of Experience away from situations of relative Stress or inefficiency and toward a relative state of Understanding. Motivation is the direction of effort applied to progress toward Efficiency. However, there are competing factors of Motivation; in that the progression is aimed at Efficiency, yet the means with which to reach that goal costs Attention effort. There is a regulatory aspect of Motivation that assesses the relative progress toward Efficiency and that either calls up further Attention effort to be applied, as when situations of Stress arise, or allows the directed effort on the concern in question to wane as specific measures toward Efficiency are reached. If Understanding is the overall goal of the system of Experience, it is these specific measures toward Efficiency; where Attention is allowed to wane, that are the intermediate goals. Upon reflection to a course of Attention effort applied, an intermediate goal that is achieved, represented by a specific measure of progressive Efficiency, is seen as a point of Satisfaction; where its amplitude can be roughly correlated to the amount of Attention paid in relation to the Efficiency gained.

The Lens of the System of Experience¹

If there were any consensus on the previous assertions regarding the components and dynamics of the system of Experience, the concepts could be applied to practical aspects of Game Design for the purposes of informing both design decisions and the refinement of the system itself. In this post, the concepts outlined previously will begin to be applied as we look through The Lens of the System of Experience; a way of observing common Game Design aspects in the language of the system of Experience. It might be reasonable to start such a survey with the primary experiential concept coined by Johan Huizinga: The Magic Circle. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

The Magic Circle

The Magic Circle is the game world, as defined by the rules of the game and inhabited vicariously by players. It is that virtual space in which players freely enter and abide by the rules of the game in order to receive the experience the game provides. In terms of the system of Experience as asserted, the Magic Circle represents a specific subset of the Cognitive Model of the world, including its own discrete input channels and available actions valid to the game world. The Magic Circle represents an altered Experience, and as such, the player is expected to alter their perceptions, thinking and actions accordingly.² Yet, in terms of the processes undertaken by the system of Experience, there is no difference in how the player operates between the real world and within the Magic Circle. Players will interpret sensory input in the frame of contextual reference of the Magic Circle to arrive at Perception relevant to that world. Players will make associations of Reliability between Cognitive Model subsets within the Magic Circle. Players will store significant experiential elements of Memory for future use and they will use the Cognitive Model of the Magic Circle, along with any detections of regularity, to arrive at Prediction. Likewise, all other systematic factors as described thus far can be applied to the system of Experience that is operating within the Magic Circle.

¹ Much of this presentation is owed to Jesse Schell's fantastic book, "The Art Game Design: A Book of Lenses". Not the least of which is the idea of the Lens as a practical alternative to the concepts of theory, heuristic or guideline. This presentation takes minor liberties with the idea; expanding on the catalog of Lenses of Game Design that Jesse began, but used here in particular to reveal the system of Experience and its operations within the context of some common considerations for game designers.

² Commonly, the Magic Circle will not be entirely abstract but will include some analogous elements as

compared to the whole of Experience, allowing new players to make some interconnectivity relationships with existing reliable Cognitive Model subsets. For example, one of the first questions is typically, "What's the object of the game?"; whereby a reasonably coherent theme of the game will readily provide not just the answer to that question, but an implied set of actions, obstacles and strategies in line with that theme. By taking advantage of the common processes of the system of Experience, those implications are easily associated between the real world and the Magic Circle.

In the previous post, the idea of the Lens was described as a design tool concept used by Jesse Schell in his book, "The Art of Game Design: A Book of Lenses", and a new Lens was introduced as way of observing aspects of Game Design in terms of the system of Experience. This Lens was then applied to the concept of The Magic Circle for the purposes of evaluation and analysis. In this post, the Lens is applied to the concept of Communication. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Communication

Communication is the heart of Game Design. Effective Communication is the only way to convey the altered reality of the Magic Circle, the theme and rules of the game and the player's goal, obstacles, affordances and feedback. A game cannot be played without effective Communication, let alone be designed or developed; as a fundamental role of the game designer is that of a communicator. In terms of the system of Experience, Communication is the process by which we attempt to transfer Understanding between individuals; that is, to attempt to transfer discrete Cognitive Model subsets in a way that maintains cohesion and retains or instills Reliability.

Communication is a supremely difficult task to perform ideally. One's translation of thoughts to words alone poses a significant threat to its cohesion, as one shifts Attention to linguistic development. To communicate between individuals, we employ a considerably complex procedure to arrive at verbal, non-verbal, written, visual or auditory signals that represent the primary means of actual Understanding transfer. From there, and assuming no signal interference is present, our process to arrive at Perception takes those signals and interprets them in accordance with contextual reference; which as mentioned is also an imprecise process. Even at that point, Communication can reveal differences in opinion or point of view between individuals that can, in turn, cause contradictions and inconsistencies in the Cognitive Model that must be then reconciled via Attention; which also threatens its cohesion as compared to the thought of origin. While clear Communication is crucial to a game Experience, it should be respected as an extremely complex process.

In the previous post, the concept of Communication was defined as a complex transfer of Understanding. In this post, Presentation is defined as a particular form of Communication that relies on the communicator's Understanding of the audience. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Presentation

Presentation is the form of Communication that relies on choices of the sequence, timing, composition, mode and style of signals transferred as a strategy to affect resulting Cognitive Model Reliability. In using Presentation, the communicator is acknowledging the relatively complex process of Communication and uses their Understanding of the audience to assume those preconceptions; those previously established relevant Cognitive Model subsets; which are intended

to serve as ready subjects of interconnectivity within the audience's system of Experience. If the communicator's Understanding of the audience Experience is sufficient, these assumed preconceptions should affect Reliability for the transferred Cognitive Models subsets, for the subsequent Perceptions interpreted, for the Memory elements to be stored, and for novel Prediction to be formed from that structure. Note that because Presentation is concerned with the way in which concepts are communicated, it can be used in accordance with or in violation of the law of Efficiency; which effects Reliability, and can in turn direct Attention, establish or subvert Understanding, alleviate or induce Stress, guide Motivation and deliver or deny Satisfaction.

In the previous posts, the concepts of Communication and Presentation were described and discussed with regard to Experience. In this post, the Lens of the System of Experience is used to examine a common narrative device, The Hook. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

The Hook

As an example of a typical experience design element, the Hook can be defined within the system of Experience as a Presentation of a concept that is easily associated with audience preconceptions so as to establish Reliability; one that simultaneously implies, without direct association, a broader application of the new concept to many other preconceptions. In other words, the Hook is a Presentation of a concept that is easily assimilated by the audience, resulting in a measure of Understanding; while the scope of the concept's potential impact on Experience as a whole is deliberately obscured. In terms of the system of Experience, the audience preconceptions allow the Presentation of the Hook to establish Reliability and support the novel Understanding of the concept;

while at the same time the implied associations to related concepts pose an Efficiency burden, requiring Attention and directing Motivation to define and reconcile those potential associations. In this way, the Hook is used as a method of directing Attention and shaping Motivation. A particularly effective Hook will conjure a Prediction of Efficiency in the mind of the audience, where the implied scope of the concept's interconnectivity will lead the audience to believe that the scope will yield a significant Efficiency trade off if Attention is paid.

In the previous posts, the Lens of the System of Experience; something that has been built up over the course of this series of posts, has been applied to the Game Design concepts of The Magic Circle, Communication, Presentation and The Hook. In this post, this Lens is applied to two different design concepts for the purpose of comparative analysis, in terms of how they relate to Experience and what design decisions might be considered when evaluating them. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Accessibility and Usability

Accessibility, as an experiential element, could be defined as the general relevance of novel concepts as presented; a measure of potential Understanding of the designed Experience. Usability could be defined as the potential interconnectivity of a set of novel concepts has to established audience Experience, which would yield Prediction of affordance and provide context for Perception of feedback. They are definitely not the same thing, yet both terms deal with the same relative interconnectivity the Presentation concept has with existing audience Experience. In the same way that an Experience surrounding a narrative theme about aging might not be accessible to a teenager with the stereotypical view of invincibility, a typical real time strategy game will not be as easily usable to a player who is only familiar with another

genre, such as first person shooters, fighting games or platformers. For both these situations, the effect and remedy are the same: they will inhibit Reliability and likely give rise to Stress; which can lead to boredom, for example, if no valuable Efficiency tradeoff is predicted by the audience, or they can be presented as the means by which greater Understanding is achieved, if presented as intriguing Hooks.

In the previous post, two different Game Design considerations were comparatively analyzed using the concepts being built up over the course of this presentation. In this post, the common design consideration of difficulty is viewed through the Lens of the System of Experience to show how it can provide both a basis for anxiety and a direction for Motivation. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Difficulty as Crisis and Opportunity

When discrepancies and inconsistencies arise in the system of Experience, such as when the Prediction that is expected differs from the interpreted Perception of results, there is a deficit in Reliability that Efficiency dictates must be met with Attention; at a cost of some Stress, but with the goal of gaining Understanding in the form of greater Efficiency. To Experience, there is no intrinsic quality placed on this dynamic, given this is both a signal of inefficiency and a call for progress toward greater Efficiency. The factors that determine the quality associated with this dynamic by the audience has much more to do with the context by which it is interpreted, than with the nature of the Experience itself. In essence, one's point of view, one's current state of Experience, determines whether we see difficult situations as being more an inhibitor to our Understanding or a potential path to achieve greater Understanding. This is another experience design element that can be shaped via Presentation; as by a compelling Hook.

In the previous post, the Lens of the System of Experience was used to describe a duality inherent within the common Game Design balance consideration of difficulty. In this post, the Lens is used to see how that duality aligns with the formal psychological concept of flow, as introduced by Mihaly Csikszentmihalyi. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Anxiety, Boredom and Flow¹

When we begin a new task and the relative difficulty is low, the system of Experience is operating on novel concepts, and thus Motivation is likely to direct Attention to continue the task because Efficiency is being achieved and Understanding is being progressed toward. If this task continues without increasing in difficulty or offering any novel concepts, the system of Experience may continue to make efforts to achieve Efficiency with the current Cognitive Models via continued Attention for more detailed Perception and more accurate Prediction. But if the Attention paid to this task no longer yields an acceptable progress to Understanding as compared to other Attention efforts, the result is boredom. On the other hand, if the task difficulty increases beyond our abilities; which could come about by insufficient interpretation of Perception, major inconsistencies between Cognitive Model subsets, a deficit in Memory relevant to the situation or an inability to make accurate Prediction, the assessments made on the situation may lead to the conclusion that the Efficiency tradeoff for Attention is insufficient; that no reasonable progress to Understanding can be achieved as compared to the Attention cost that effort poses. If the priority for the task is high; that is, the outcome of the effort towards the task is predicted to have a significant impact on overall Efficiency, the system of Experience is in a severe state of conflict that cannot be readily reconciled.² This is a significant Stress condition

which we call anxiety. Game designers understand the management of difficulty; so as to avoid the extreme states of boredom and anxiety, as game balance. It is achieved by matching the challenges posed by the game to the skills possessed by the player. As the game progresses, this balance continues so that as the skills and agency of the player increase, the challenges that the player faces become more difficult. Flow is the term used to describe the delicately balanced state between task difficulty and skills necessary to the complete the task. In terms of the system of Experience and its current efforts toward Understanding, flow is achieved with a balance between the perceived Reliability deficit the current situation poses as Stress and the predicted Attention effort required to achieve a progression of Efficiency gains; as long as both these factors are interrelated as a cohesive progression.

Experience in flow simultaneously acknowledges a succession of Stress conditions as they are met with a relative progression of Attention efforts, and a succession of Satisfaction points as the Efficiency gains acquired are able to be applied to the subsequent challenges. A linked progression of challenges, or Stress conditions, yields a progression of skill, or Efficiency gains, that make the subsequent challenges easier, or requiring relatively less Attention effort; while at the same time the system achieves a significant measure of overall Reliability and Understanding in the aggregate because the challenge/skill progression is interrelated in this way and offers a measure of Reliability. While the system is constantly encountering Stress, it is also constantly encountering Satisfaction, plus it is gaining significantly more Efficiency overall by comparison, due in large part to the relationships between the gains acquired and the subsequent Attention demands and the Reliability those relationships represent. This aggregate increase in Reliability explains why Motivation could be inclined to continue a course of Attention effort in flow, as long as Efficiency gains are perceived to be connected reliably to the Attention efforts demanded by the subsequent Stress conditions

and the overall progress made toward Understanding is perceived. As well, the constant encounters with Satisfaction points would indicate why an audience experiencing flow would reflectively report an overall feeling of happiness, as Csikszentmihalyi found in his studies.

¹ Csikszentmihalyi, M. (1997). *Finding Flow: The Psychology of Engagement in Everyday Life*

² When the perceived difficulty of the task represents a random variable that cannot be predicted, the gap between a valuable potential Efficiency gain and the loss paid through the predicted Attention effort represents a risk to the system of Experience that itself becomes a focus that taxes Attention. This concept will be explored further in a future post.

In the previous post, Csikszentmihalyi's concept of flow was described as consistent with the dynamics asserted of the system of Experience. In this post, the Lens of the System of Experience is pointed squarely at arguably the most damaging results of unsuccessful Game Design: Frustration. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Frustration

When a Prediction is made about an Efficiency tradeoff, any discrepancies between the predicted outcome and the perceived results of that tradeoff weigh heavily on Motivation. As mentioned previously, if the predicted Efficiency gain is high, the priority of the task weighs on Motivation to complete the task; which in the face of severe difficulty, leads to anxiety. When predictions are instead made about the Attention cost, any discrepancies with the perceived resulting cost to that Prediction also weigh heavily. In a situation where a predicted Efficiency gain is high

but the predicted Attention cost is relatively low, Motivation will likely lead one to engage in the task to pursue the goal of Understanding. If then the Attention does not yield that result, and a reevaluated Prediction of the total Attention cost rises, Motivation is likewise reevaluated to determine whether the ultimate Efficiency tradeoff for this task is still valuable. In the extreme case, when a predicted total Attention cost rises from a relatively low level to beyond the level of the predicted Efficiency gain, the tradeoff will no longer be seen as valuable and Motivation will likely direct the system of Experience to abandon the effort, despite the fact that a significant Attention cost has already been paid with no discernable Efficiency gain.¹ Upon reflection, this condition will be described as Frustration; when a payment of significant Attention effort has yielded no significant gain in Efficiency, no significant progress toward Understanding.

¹ There are actually two kinds of revaluation that Motivation engages in at that point; to determine how the total Attention cost compares to the predicted Efficiency gain, and to determine the extra Attention cost from this point in time as compared to the predicted Efficiency gain. Frustration poses acute Stress.

In the previous post, the concept of Frustration was defined and discussed with regard to the system of Experience. In this post, the Lens of the System of Experience is used to reveal distinct categories of perceived Variation and the different ways the system responds to them. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Variation, Chance and Randomness

Discrepancies between Prediction and Perception can either be evaluated positively or negatively, in terms of the current efforts' Efficiency tradeoff. When these variations between Prediction and Perception are significant, the Variation itself becomes a subject of Attention effort for the Cognitive Model of the world. The Variation will be modeled according to Perception, Memory and any relevant associations to other Cognitive Model subsets to arrive at a more reliable Prediction of that variance. Motivation will focus one's Attention on significant Variation to try and arrive at a state of Understanding regarding its nature.

There are three broad categories of Variation that will be considered by the system of Experience: Variation, Chance and Randomness. True Variation is a discrepancy that follows a set of consistent rules one is able to discern. Chance is discrepancy that is not predictable in nature, but is predictable in degree, range or scope. Randomness is truly unpredictable; with no patterns or discernable structure and no bounds to the scope of the discrepancy.

If successive Perception is acquired, and significant Memory is built up regarding the nature of the Variation, a more accurate evaluation of the Variation is possible, based on the discrepancies between Prediction and Perception. In light of the current tasks leading toward Understanding and their predicted Efficiency gains, discrepancies between the Prediction and Perception of Variation that impact the tasks are seen as either potential risks to the predicted value of the exchange of Attention and Efficiency or as potential opportunities to minimize the Attention cost or to increase Efficiency gain. If the Variation is predictable in some way, there is a potential to exploit the Variation and achieve a more valuable Efficiency tradeoff than previously predicted. In this situation, the Variation can be seen as relatively interesting and it will likely continue to be attended to. However, if the Variation is evaluated as wholly unpredictable, as in Randomness, the Motivation

evaluation highlights an increased risk to the predicted Efficiency tradeoff of the current associated effort toward Understanding. Perceived Randomness is a significant threat to the goal of Understanding in general.

In the previous post, the Lens of the System of Experience was used to examine perceived variation and ways that the system responds to it. In this post, a well-established theory of intrinsic motivation from the field of Cognitive Psychology is comparatively analyzed with the dynamics of system of Experience. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Competency, Autonomy and Relatedness

In Cognitive Psychology, Self-Determination Theory concerns itself with the study of Motivation. Within this theory, Motivation is thought to be driven to satisfy basic needs. Some Need Satisfaction elements recognized within this theory are Competency, Autonomy and Relatedness.¹ The game development industry has recently begun to pay closer attention to these Need Satisfaction elements and how they may inform design to offer sustained engagement of the game product and a higher overall value to the consumer.² From the vantage point of Experience, one can dissect these Need Satisfaction elements to explain how they provide Satisfaction or not.

Competency is the relative Understanding one has of the current situation, where Perception, Memory and Prediction are consistent and Efficiency to operate within this situation is high; so as to be able to achieve further Understanding with relative ease. Autonomy is the available choice of action one has to operate within the current situation, which is essentially a form of Variation regarding the choice of courses of Attention effort toward greater Efficiency and Understanding; and with more available paths of action comes a greater likelihood of Efficiency gain, a

greater chance of success in pursuit of Understanding in the future. Relatedness is the quality of personal interconnectivity and Communication one has to other individuals. As social beings, this may simply seem to be an evolutionary human condition that serves to ensure our survival, but it is interesting to explore how this can affect an individual's system of Experience. Relatedness to other individuals gives the system of Experience more opportunity for effective Communication, more opportunity for cohesive Cognitive Model transfer between individuals. When Communication is successful, a Cognitive Model subset along with its related connections to other Cognitive Model subsets is delivered, ready to use within the receiver's system of Experience. When done effectively, Communication is a powerfully efficient way to acquire new Understanding, where very little Attention is required as compared to the complexity of the Cognitive Model construct delivered. Relatedness is a form of Variation on the potential input of knowledge and Understanding, with a significantly efficient upside.

Each of these factors is linked directly to Efficiency in a way that Motivation will pursue as long as the Perception of their availability is clear and the Prediction of their affordance can be made. Additionally, as long as these factors continue to exist within the system of Experience, a continued succession of Efficiency gains, like the succession described with flow, will provide a series of Satisfaction conditions; translating to what Self-Determination Theory describes as a state of sustained engagement.

¹ Ryan, R. M., and Deci, E. L. (2000). "Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being" University of Rochester. [http://www.psych.rochester.edu/SDT/documents/2000_RyanDeci_SDT.pdf]

² Rigby, S. Immersyve, Inc. (2009). San Francisco Game Developers Conference Session: “From First Date to Committed Relationship: Designing for Engagement and Sustained Satisfaction”

In the previous post, the Cognitive Psychology concepts of basic needs from Self-Determination Theory were asserted to be consistent with the dynamics of the system of Experience. In this post, the Lens of the System of Experience is turned toward two related experiential conditions that are common goals of Game Design. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Immersion and Persistence

As asserted previously, there is no difference between the way the system of Experience operates in the real world and the way it operates within The Magic Circle. Our ability to focus Attention on discrete subsets of the Cognitive Model of the world is a strategy of Efficiency; where we can direct Attention to what is of current concern, while simultaneously abandoning Attention from other areas of Experience.

In the extreme, when Motivation has forsaken the concerns of the real world, including its Perception, Memory and Prediction, in favor of concerns of The Magic Circle, we call this state Immersion. However, Immersion is not exclusive to The Magic Circle. One can be fully engaged in any real life activity, “lose track of time” and find oneself later with no significant Memory of anything during that time outside the activity. Immersion is a state that can be brought about accidentally by daydreaming; where the current task promises no Efficiency gain and Motivation automatically seeks a task that does, or it can be deliberately induced, as in during meditation or when we decide to step inside The Magic Circle to play a game.

When Immersion offers a significant Variation to paths toward Understanding the concerns of The Magic Circle, and if the potential Efficiency tradeoffs are perceived as valuable, Motivation may continue to direct Attention to those concerns even when we do not consider ourselves within The Magic Circle; after we’ve stopped playing the game. When we continue to pay Attention to concerns of The Magic Circle from outside it, due to some ongoing Cognitive Model task that will yield a measure of Understanding, it is called Persistence. And due to the nature of Attention, Motivation will also decrease available Attention effort to concerns of the real world during a state of Persistence of The Magic Circle. Where the real world is concerned, this dynamic is represented as distraction.

In the previous post, two common Game Design experiential goals, Immersion and Persistence, were defined and discussed with regard to the system of Experience. In this post, the Lens of the System of Experience is used to explore other experiential relationships between the real world and The Magic Circle. Everyone should feel encouraged to join the discussion and comment on or debate the assertions presented. All relevant comments are welcome and appreciated.

Beyond the Magic Circle

The operations of the system of Experience can have an effect on, and can be effected by, concerns both within and outside The Magic Circle. In some cases, correlations can be made between Cognitive Model subsets that represent concerns of those two worlds. This is a natural extension of the normal operations of the Cognitive Model; indeed, this is how we extrapolate ideas from one area of concern and apply them to another in order to solve problems. In terms of Game Design, the significance of this dynamic takes the form of real world Understanding wrought from Magic Circle Understanding and vice versa; a form of self-Communication between two worlds that suggests that it is the responsibility of the designer to

wield that power with great consideration. Just as real world Understanding can be used to instantly inform the player of Magic Circle structure and dynamics, the concerns from within The Magic Circle can inform the player of real world possibilities.¹

¹ Burkinshaw, R. (2009). "Alice and Kev: The story of being homeless in The Sims 3"
[<http://aliceandkev.wordpress.com/>]

This has been a long and deliberate presentation; building step-by-step from rather abstract concepts toward a comprehensive experience model that can be used practically in the evaluation and analysis of aspects that relate to the craft of Game Design in particular. The last sections have been dealing with that practical application to reveal a relative consistency between the system of Experience as asserted and the common knowledge and best practices from this craft as it stands today. Further application of this experience model to aspects of this craft that are not yet commonly understood may result in discovery and development of new design methodologies and stimulate the evolution of Game Design.

Potential directions of study and exploration using this experience model as a guide include:

- Formal description of other concepts of Game Design in terms of the system of Experience, such the ludological concepts of Intentional Play from Doug Church and Improvisational Play from Clint Hocking.
- Comparative analyses between a wide range of experience design domains; such as how a state of trance, as identified from various sources, relates to a state of Immersion, or what knowledge from improvisational theater can apply to the problems of interactive narrative design.

- Development and evolution of specific heuristics that target prevalent challenges for Game Design in the industry today; transforming the more elusive and subjective tasks into more targeted and graceful ones.
- Formally challenging conventions of Game Design and proposing new standard practices with supportive reasoning, particularly for those aspects which have suffered from a lack of objective analysis previously.
- Identifying unknown aspects of experience design and performing explorative tests to better understand the scope of the field and to take full advantage of that new territory.

Throughout this presentation, the discussions that followed each post included many intriguing questions related to this study. Many interesting relationships to other disciplines have been suggested. Review of those discussions should reveal a number of potential directions of study and exploration.

Conclusion

This was a reasonable attempt at a formal presentation of one designer's personal understanding of a system of Experience. The hope has always been that it can lead to interesting discussions and further reasoning on the nature of experience and the effects that external forces have upon it, particularly as that understanding pertains to the field of Game Design. Everyone should feel encouraged to continue to discuss or debate the assertions made in this presentation as part of an ongoing evolutionary effort.

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