Seriosity: Addressing the Challenges of Limited Attention Spans

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1. Introduction

Dr. Byron Reeves believes work should be more like play. A professor in the Department of Communications at Stanford University, Reeves also is co-founder of a startup known as Seriosity. Reeves' bio describes Seriosity's objectives providing the "technology and services that bring sensibilities of multi-player games to the conduct of serious work".

But why the focus on multi-player games and why should work be more like play? The answer starts with the premise of massively multiplayer online role-playing games (MMORPG's). Examples of MMORPG's include World of Warcraft and EverQuest. Such games are played online, in which individual players interact with each other through networked, computer interfaces to carry out complex, interdependent "quests" or missions. While doing so, players often form relationships, to include friendships or allegiances of loyalty (dubbed "guilds" in MMORPG's). Friends or allegiances frequently cooperate on missions together, often requiring the coordination of as many as 70 individuals simultaneously performing a set of multi-faceted activities to successfully complete the effort. All of this is done through a computer interface with no face-to-face interaction (Bartle 2003; Castronova 2005).

In addition to friends and allegiances, most MMORPG's and virtual worlds (which are similar to MMORPG's, only that they are open-ended without specific plots) feature virtual currencies. Second Life, an example of one virtual world, includes an endogenously maintained currency exchange (known as the LindeX) that traded an average of $150,000 (U.S.) a day between the Linden dollar (L$) and foreign currencies in early June 2007. For most of 2006 and early 2007, the Linden dollar traded at about L$270 per U.S. dollar. In June 2007, Second Life's virtual characters exchange an average of $1,700,000 U.S. daily (Hof 2006).

In other virtual worlds, virtual currencies do not float, but are instead traded at fixed rates among virtual characters. The virtual currency of another virtual world known as Entropia Universe, the Project Entropia Dollar or PED does not float, but instead is fixed, currently exchanging at 10 PED to the U.S. dollar. Entropia Universe is wildly popular in Europe, with more than 500,000 virtual inhabitants. In 2005, more than $160,000,000 (U.S.) was exchanged among the participants in Entropia Universe and, in 2004, the Entropia Universe entered the Guinness World Book of Records for the most expensive virtual item ever sold ($26,500 U.S.) at that time (Castronova 2005).

In almost all instances, virtual currencies in MMORPG's and virtual worlds allow participants to purchase virtual items from each other, including virtual clothes, virtual homes, virtual pets, etc. Within MMORPG's, virtual currencies are earned by participants both for completing goals or missions within the plot-driven world, as well as for manufacturing virtual

items for other participants. Several MMORPG's include in-world markets, where players can buy and sell items either at fixed prices or in an auction format (Bartle 2003).

These elements of virtual worlds represent the foundational permises behind Seriosity: (1) the ability for individuals to collaborate and coordinate efforts as part of a larger group towards a goal, and (2) the exchange of virtual currencies for tasks or items of large groups to accomplish a goal. If 70 people can collaborate and coordinate their activities through a computer interface as part of a game, could similar rewards (to include virtual currencies) and objectives be incorporated towards "real" workplace challenges and goals?

Our case study seeks to investigate how Seriosity operates as a distributed problem-solving network with the goals of addressing the organizational challenges of limited attention spans – embodied both by information pollution and knowledge overload. Next, we first consider the background behind the human problem of limited attention spans, which produces the challenges of information pollution and knowledge overload that will increasingly diminish organizational performance if not successfully mitigated by organizations of the future. Then, we consider potential measures of the performance outcomes associated with Seriosity's technologies – specifically, how would Seriosity know it is successful at translating elements of MMORPG's to help individuals better collaborate and coordinate their activities? We close our inquiry considering an abstract instantiation of the Seriosity platform and, from this thought-exercise enumerate emergent themes for future researchers to explore.

Before proceeding, we disclose our methodology for this case study to inform discerning readers. Specifically: we four researchers conducted interviews with the leadership of Seriosity. The Internet was used to search for all journalistic coverage of Seriosity, from press releases by the company to blog posts by critics. We then employed a process of meta-triangulation (Weick and Roberts 1993; Gregor 2006) in which we searched for common themes between: (1) what we saw with the Seriosity platform, (2) what we heard through the interviews, and (3) what we read from press releases to blog posts by critics. With this case study, we report what commonalities we found across all three sources as representing probable truth as to the Seriosity platform. Moreover, where these three sources disagreed, we also elevate these findings as points of conjecture worth considering further in future research contexts.

Throughout our case study, we will attempt to link the findings of our investigation with relevant literature streams – thus situating an empirical investigation with extant literature and theory. We do this both to extend existing literature and to synthesize our findings with relevant research (Gregor 2006). We will conclude our case study by consider a emergent themes from this case that could have universal relevance to subsequent research and practitioner-related investigations.

2. The Problem of Limited Attention Spans

In the November 2003 issue of ACM's *Queue*, Jakob Nielsen raised interesting questions surrounding the concept of "information pollution". In his essay, Nielsen commented, "a one-minute interruption can easily cost a knowledge worker 10 to 15 minutes of lost productivity due to the time needed to reestablish mental context and reenter the flow state."

Events since 2003 have reinforced Nielsen's conclusions. According to a recent report from Basex, the average "knowledge worker" – someone who is part of the growing information economy – loses 2.1 hours a day to interruptions associated with multi-tasking. If those workers make an average of $21 an hour, that adds up to $588 billion a year, more than the gross domestic product of Argentina. Another recent study found knowledge workers experienced interruptions approximately once every 10 minutes and it took an average of 23 minutes for them to return to their original task. With knowledge overload and turbulent environments, individuals confront multiple demands for their attention (ABCNews.com 2005).

Granted, "information pollution" is the negative side of a more positive global movement empowering individuals to access and produce knowledge globally. Never before has humanity created and had access to so much knowledge. *TIME* Magazine's recent recognition of every individual (i.e., "you") as the 2006 Person of the Year represents the accelerating trend where anyone can find, analyze, produce, and remix various media on the internet. For academia, the growth of new knowledge is exponential. In the year 1900, there were 9,000 scientific articles published that year. In 1950, there were 90,000 and by 2000 there were 900,000 scientific articles published in that year (Hawking 2001).

Yet with this positive movement of internet-enabled empowerment, concerns of "information pollution" and knowledge overload loom as well. It would seem that information technology serves as a double-edged sword: it facilitates the flow of electronic information and with unprecedented levels of speed, volume, and accessibility – while at the same time, runs the risk of overwhelming the cognitive capabilities of humans. In short, even with technology, there is only so much we humans can know, learn, mentally absorb, and incorporate into a broader *Weltanschauung* (Kling 1991; Grant 1996).

Enter Seriosity's mission as a company: to translating elements of MMORPG's to help individuals better collaborate and coordinate through a computer interfaces with no face-to-face interaction. Clearly individuals in MMORPG's do absorb information about their environment (albeit a virtual one), learn, and incorporate knowledge into their goal-driven activities. More gamers are entering the workforce. While the average age of online gamers is 27 years old, 19% of online gamers are older than fifty and 43% are between eighteen and forty-nine, leaving 35% of online gamers less than eighteen. 43% of online gamers are female, 56% are male -- and in 2005, gamers spent an average of 22 hours/week playing online (Castronova 2005; Hof 2006).

In addressing its mission, Seriosity's initial solution for organizations is the Attent plug-in for email, which the company believes represents the ultimate challenge of ever-increasing "information pollution". Attent enables a monetary-based message prioritization system for emails, where individuals visibly tagged email currency value that signals the importance of the message to the recipient. Seriosity believes that for the deluge of email to be managed successfully, the behavior of senders must be addressed. By incorporating elements of a virtual currency to email, the company believes that senders can quickly communicate the importance of their interactions to would-be recipients (Tsoukas 1996; Seriosity 2007).

Historical records and estimates for future email use report that in 2003, 17% of the average knowledge worker's work day was spent reading and sending emails. By 2006, 26% of a knowledge worker's work day was spent reading and sending emails. Predictions suggest that by 2009, 41% of a knowledge worker's work day will be spent on similar activity (Radicati Group 2007; Reeves and Malone 2007).

At the same time, Seriosity's Attent client allows managers in an organizaiton to award virtual badges similar to virtual badges given in MMORPG's to guild members for helping others or successfully working to complete a task. The premise behind these badges is they represent an alternative to rewarding collaboration that also helps to create a sense of identity among virtual participants. Equally, virtual badges allow managers belonging to other parts of an organization to address the problem of knowledge overload. Managers can quickly identify competences and top-performers within the organization at specific tasks. Individuals with badges appropriate to a specific task or goal represent clear choices to involve in the effort, if available (News.com 2007).

Though still in beta development, as of early September 2007, the Attent client supported the Microsoft Outlook email client. Of note, Seriosity does not tightly code the rules associated with its Attent product, so companies could try different rules and see if they influence the nature of the "email exchange as a repeated-series game". Is a virtual currency paid automatically upon receive of an email, automatically upon reply, or only if the reply is valued as helpful by the original sender of the query?

3. Potential Indicators of Performance

The current generation of youth (the Millennials) matured during an era of internet-enabled email, instant messaging, iTunes, YouTube, MySpace pages, Friendster, Facebook, and other social networking media websites. Research shows that this generation deals better cognitively with multi-tasking demands for time and attention (HarrisInteractive 2003).

The human brain does include some plasticity, particularly for the first five years following birth. Yet even then, there are cognitive limits to all of us. Humans have finite memories and cognitive processing capabilities. Most information systems literature examines the use of a single system or technology artifact. While this approach allows for greater depth in analyses, this approach also ignores the reality that knowledge workers now use multiple technologies throughout their day at the office, during their commute, and during their personal time (Davenport and Beck 2001; Lamb and Kling 2003; Bock et al. 2005).

For Seriosity's initial Attent solution, several measurements are possible for the company to demonstrate its value in addressing limited attention spans. First, does use of Attent contribute to a qualitative increase in "email experience satisfaction" among participants following use of the product? A quantitative measurement might be more desirable, but also would pose challenges for investigators – what represents better performance with regards to email? Less emails sent? More replies to email or faster replies to emails, either of which might not be as informative?

At the same time, measuring the influence of Attent on the satisfaction of participants is at best a proxy measure for the overarching responsiveness and efficiency of an organization. Are more people in the organization finding themselves able to respond in a timely manner to new opportunities, potential problems, or other organizational challenges needing to be addressed? Equally as important, are people finding themselves able to locate and receive information in a non-redundant manner that does not waste valuable resources or time of others in the organization?

Measuring these outcomes will require a more in-depth study of the Attent product, to include establishing a baseline for one or more organizations prior to implementation of the solution – followed by multidimensional measures of the organization after implementation. Further, focusing on email is insufficient for a comprehensive study, since multiple technologies are available to participants for communicate information and exchange knowledge (including the ability to opt for a knock on an office door and arranging a face-to-face meeting). It could be that email use satisfaction improves, while at the same time use satisfaction of other methods of communication – more telephone calls, video conferences, or personnel meetings – might deteriorate, shifting "information pollution" from other method of communicating to another (Argote and Ingram 2000; Cramton 2001; Majchrzak et al. 2005).

Another interesting opportunity presented by the Attent solution stems from its nascent state of development. The rules in Attent are flexible and as such, comparison studies evaluating whether different rules for rewarding individuals who receive emails represents an intriguing investigational opportunity (again requiring a long-term series of studies, controlled for different settings).

Seriosity is not the only company considering making work more like a game. Google employs an "ESP Game" (www.espgame.org) where participants are rewarded points for correctly guessing what other players labeled an image. Behind this game, the "play-related" efforts of participants help Google to appropriately know what tags to assign to images for indexing (specifically, the consensus of participants).

Additionally, the Hollywood Stock Exchange (HSX, www.hsx.com), which allows players to virtually buy and sell "stock" related to the popularity and success of movies and movie stars. Such transactions employ a virtual currency given to a participant when they open account, and the point of the "game" is to grow the original amount of virtual currency received, through a series of smart investment choices. As such, real Hollywood producers and

investors can employ the HSX to cultivate a sense of the perceived marketability, fame, and other intangibles associated with either an upcoming movie or the career of a movie star.

If we are to consider potential indicators of the success (or failure) of the Seriosity model applicable for future researchers, it would seem we need to take a step back from the immediate context of the Seriosity platform and Attent application, to instead consider the underlying fundamentals present within the network (March and Simon 1993; Gregor 2006).

When we do as such, it becomes apparent that an abstracted Seriosity platform operates as a mechanism for addressing the challenges of limited attention spans associated with a knowledge ecosystem or distributed problem-solving network. Specifically: there are two general sets of actors participating in this network: (1) those with expertise and knowledge, and (2) those who would like to know relevant new and emergent knowledge from the first set of actors. In terms of membership, actors may occupy both groups (i.e., they may both possess expertise in some areas and be seeking new and emergent knowledge). By a knowledge ecosystem, we mean a dynamic network which both fosters knowledge exchange opportunities among employees and encourages allows knowledge exchange activities to occur and evolve as environmental circumstances require (Heckscher and Donnellson 1994; Clippinger 1999; Hansen et al. 2005; Bray 2007). Such an ecosystem frees an organization from the nearly impossible task of identifying what knowledge its employees have, need now, and will later find valuable; rather, ecosystem-framed solutions require pragmatic approaches to maximize the likelihood of relevant inter-individual knowledge exchange opportunities and "seed" positive behavioral antecedents.

Delineating the two principle groups present in an abstracted version of the Seriosity model reveals an interesting nuance: *those who would like to know emergent knowledge do not necessarily always know what knowledge they should know*. Moreover, all actors face a second challenge: *what communications are a priority for their limited attention spans and what are of nominal value*? If asked, we hypothesize that most actors would subjectively judge a majority of the communications they initiate as priorities, however this then creates a problem where everyone perceives a majority of their own communications as urgent (Markus 2002; Orlikowski 2002).

Continuing our abstraction, it becomes apparent that electronic communications demonstrate a network externality effect. As the number of participants sending and receiving electronic communications grows, the number of electronic communications being sent and receives grows not linearly but exponentially (Kling 1991; Clippinger 1999; Singh 2005). This consequentially creates a burden for all participants who now have a higher volume of electronic communications of read and respond to (if necessary) within the same generally fixed amount of time, i.e., a workday. This burden can also cause (1) several electronic communications to either be marked as urgent as they "compete" for the attention of receivers – or (2) several emails to be disregarded by receivers altogether simply because the receives have too many communications competing for their attention. If too many communications are labeled urgent, the value of this tag in signaling for the attention of a receiver is effectively diluted (Winograd and Flores 1987; Nonaka 1994; Simon 1991).

In an abstracted version of the Seriosity platform, those who seek to know relevant new and emergent knowledge from the first set of actors are also: (1) dependent on the actors with expertise and knowledge to elevate knowledge to their attention, and (2) dependent on these same actors to help filter through all the knowledge being exchanged to determine what knowledge is worth knowing. This reveals another interesting nuance to the Seriosity model: *within the network there is too much knowledge for any one individual to know*. Members of the network must help each other by filtering through the exchanged insights of the community to produce stronger signals regarding important knowledge (Levinthal and March 1993; Rivkin and Siggelkow 2001; Siggelkow and Rivkin 2005). In addition, members of the network much help each other to signal the priority of the insights being electronically community by the community.

Research into complex adaptive systems demonstrates that for a system to product on-going, emergent outcomes which adequately adapt to a changing environment, the system much possess elements which amplifying appropriate signals in response to an environment

while also dimensions non-relevant environmental noise (Daft and Wiginton 1979; Daft and Weick 1984; Winograd and Flores 1987). For the Seriosity model, a clear challenge and apparent indicator of success for the network is its ability to employ the actions of all community members to filter through all knowledge exchanges and signal what knowledge is worth knowing. Moreover, the continued growth (another indicator of success) of Seriosity seems dependent on this ability to employ community members to clearly amplify relevant knowledge signals while ignoring non-relevant noise.

In closing, we suggest that the emergent themes from our abstracted Seriosity instantiation represent potentially universally relevant inquiries worthy of subsequent research and practitioner-related investigations. Specifically, the Attent solution does not explicitly tell participants using the tool what communications they should review or knowledge is worth sharing, but serves as a tool helps the participants signal the likelihood that the communications they are sending and receiving possess these qualities (Eiseinhardt 1989; Jansen et al. 2006). Recall: *those who would like to know emergent knowledge do not necessarily always know what knowledge they should know*. As such, is an abstracted Seriosity platform context-dependent, or could it be applied to more urgent, time-sensitive environments such as the U.S. Intelligence Community for national security or public health agencies for the purposes of better disease response and situational awareness?

Moreover, the Attent solution does provide a mechanism by which participants can indicate *what communications are a priority for their limited attention spans and what are of nominal value* – but such a mechanism is dependent upon the subjective perceptions of the participants. For example: if the sender of a communication does not perceive the communication to be a priority (when in fact it objectively should be), then a signal will never be sent by the sender nor received by a receiver that the communication is a priority. Urgent communications may still be lost to the noise of other communications through human judgment errors (Markus et al. 2002). The Seriosity platform can help overcome some of the subjective biases of human participants, but some will still remain unaddressed (probably because human participants so integral to the distributed problem-solving network approach). Unanswered questions include whether or not Seriosity is scalable for large organizations of 5,000 or 50,000 individuals – or potentially larger networks of loosely-affiliated, national or international groups than could include millions of members. Would a Seriosity approach still work?

Lastly: *within the network there is too much knowledge for any one individual to know*. Seriosity only helps human participants filter through the noise of information pollution and knowledge overload to identify priority communications and insights. The Seriosity platform does not augment the cognitive limitations of humans, helping individuals to know more or know insights faster (Galbraith 1982; Drucker 1992). Such challenges remained relatively unanswered, but may one day be address in not-so-distant future where the divisions between human and artificial (augmented) agents participating in a problem-solving network become blurred. What happens when the "individual" generating a list of prioritized list of organizational emails worth reading today is a computer program?
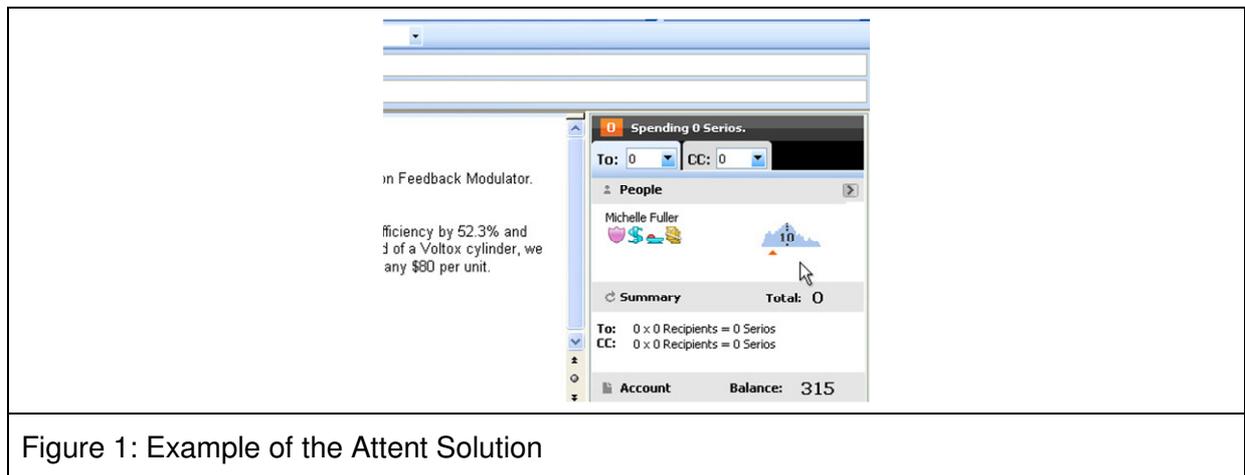
4. Appendix

Figure 1: Example of the Attent Solution

5. References

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