Solving Procrastination
an application of Flow

Version 1.1

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Being a part of an industrial society, we all share the experience of being assigned tasks. These tasks are typically states with either explicit or implied deadlines and difficulty levels. "Have essay completed by 11:30pm on Sunday," "learn how to typeset a document in LaTeX," and "eat a doughnut" are examples of tasks. Procrastinating on a task is the delaying or postponing of action that would contribute to completion of said task. This procrastination may be caused by one of myriad situations; however, one of the most common is that the person attempting a task finds the task too difficult or of insufficient importance to warrant immediate completion.

This deferral process tends to repeat until a task's deadline is imminent. For the procrastinator this may result in stress, as the person is continually reminded that the task is incomplete while the possible time allocable for the task is constantly shrinking. People depending on the procrastinator may also experience stress and loss of productivity for the same reasons. As it stands, procrastination seems profoundly undesirable.

Several methods have been introduced by productivity pundits that aim to eliminate procrastination. One of the most successful is GTD, or Getting Things Done, by David Allen.[1] GTD was built upon various ad-hoc rules that David found to enhance his productivity, which, although they provide decent coverage of the problem space, do not address the underlying causes of procrastination. Kleinberg and Tardos, in Algorithm Design, claim that if one models time management as interval scheduling problem, where one is given a set of jobs to complete, each of which has a deadline and fixed time requirement, that completing the jobs with the closest deadlines first irrespective of job length is actually optimal behavior.[2] However, their method does not address the spontaneous addition of tasks by distraction-based procrastination. Additionally, the model they present does not take into account that the a task performed by someone at one moment in time will not necessarily have the same time requirement as an identical task initialized by the same person at another moment in time.

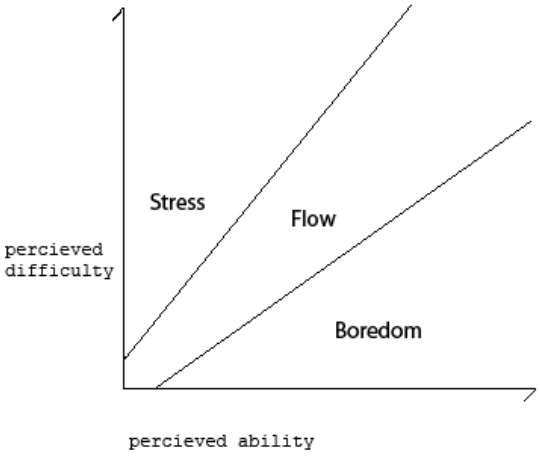

Figure 1. This graph illustrates the relationship between the perceived difficulty of a task and the perceived ability of the person doing the task. As the person completes more tasks at increasing difficulties, their perceived ability increases. Assigning a task that is beyond their perceived ability will result in stress. Assigning a task beneath their perceived ability will result in boredom.

To understand this phenomenon, we need to understand the concept of what Mihaly Csikszentmihalyi introduced to the world of Western psychology as Flow. Flow is a state of mind in which a person experiences heightened engagement and optimal performance. This state is achieved by performing an increasingly challenging series of tasks that are particularly suited to one's perceived ability level at any given moment in time. The concept is nothing new. Athletic trainers, trade teachers, and game designers have known about it for many years.[3]

The strategy most people implement when faced with a multitude of tasks is the optimal interval scheduling strategy presented by Kleinberg and Tardos. In real-

[1] Wikipedia http://en.wikipedia.org/wiki/GTD (12/17/2006)

[2] Kleinberg & Tardos (2006). Algorithm Design. Boston: Addison Wesley

[3] Csikszentmihalyi, Mihaly (1990). Flow: The Psychology of Optimal Experience. New York: Harper and Row.

ity, the strategy is far from optimal, since the order of tasks does not take into account perceived difficulty levels, and thus, the strategy is susceptible to procrastination. According to the principles of Flow, following the optimal interval scheduling strategy will result in gross mismatches between task difficulty and user ability. If a person is assigned a task below their perceived ability level, they will suffer from boredom and procrastinate by being distracted by superfluous tasks that seem more interesting and immediately rewarding than the one assigned. On the other hand, if a person is assigned a task above their perceived ability level, they will feel overwhelmed and will tend to procrastinate by deferring their assigned task to a later date.[4] The key to eliminating procrastination is eliminating times when there are mismatches between a person's perceived ability level and the perceived difficulty of the task assigned.

When beginning work on a batch of tasks, one should begin by ordering the tasks in increasing order of perceived difficulty. Although this is a good first order representation of the progression of task difficulty prescribed by Csikszentmihalyi, this may result in situations in which a certain task does not raise one's perceived ability level enough to approach the next task in a state of Flow. Since we want to stay in the Flow if at all possible, one solution to this is to break larger tasks into subtasks to fill the gap and maintain an appropriate rate of difficulty progression. This is similar to how a painter might approach a blank canvas. A painter typically draws strokes that make up the painting while keeping the desired composition of the painting in mind.

The splitting of tasks should not be taken lightly, as it involves introducing additional context-switching overhead. Imagine that instead of telling you to write "Mary had a little lamb," I asked you to write "capital M-a-r..." etc. Or suppose, that instead of asking you to walk across the room, I asked you to raise your right hip at a twelve degree angle while shifting your weight three centimeters to the left of its previous location, etc. It is evident that you should have as few breaks in a task as possible in order to keep the task fluid, without the time-wasting overhead of micro-management.

If dividing a larger task is not feasible, then the gap should be filled with additional tasks designed to increase one's perceived ability level in preparation for the larger task. This might seem counter-intuitive, since we are consuming a limited resource, time, to do work that is not required by, or immediately applicable to, any task. However, these intermediate tasks serve the same purpose as training serves for performers who must complete a task that is immediately too difficult, but must be performed at some time in the future. In order to avoid repurposing the intermediate tasks for distraction-based procrastination, it is important to keep the overall goal in mind while choosing these intermediate tasks. Google implements a similar approach and has benefitted from it greatly.[5]

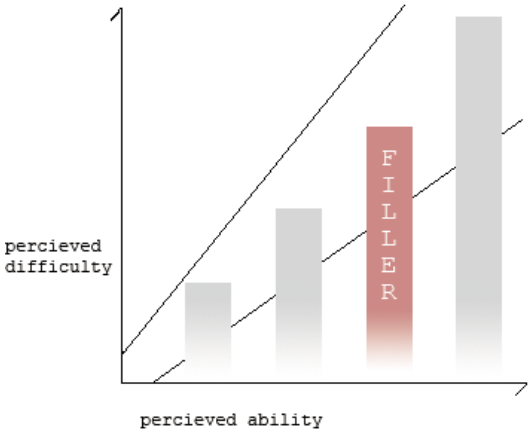

Figure 2. Fillers bridge the Flow gap between relatively easy tasks and more difficult ones.

The real win from using this method comes when people are so absorbed in the Flow that their perceived ability surpasses their actual ability. They begin to tackle problems that they would have never even thought of approaching before. When successful, both their actual and perceived ability are raised, and instead of having to battle with the artificially limiting handicap of procrastination, they are free to explore their full potential.

[4] Wikipedia http://en.wikipedia.org/wiki/Procrastination (12/17/2006)

[5] "Google engineers all have '20 percent time' in which they're free to pursue projects they're passionate about. This freedom has already produced Google News, Google Suggest, AdSense for Content, and Orkut products which might otherwise have taken an entire start-up to launch." - http://www.google.com/support/jobs/bin/static.py?page=about.html (12/17/2006)