Growth, Reproduction, and Environmental Stress: The Evolution of a Botany Game in Response to Rapidly Changing Conditions

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In an age where many students are hard-pressed to identify even the most common garden vegetables, relating complex concepts like photosynthesis and pollination to a middle school audience is no small task. *Reach For the Sun* aims to do just that by exposing students to a simplified model of a highly identifiable annual plant growing from seed to mature fruit-bearer over the course of a single growing season. In our presentation, we will explore the unexpected evolution of our game's design in response to two starkly different play environments: a typical middle school classroom and Valve's juggernaut release platform, Steam. While we have no hard data to present, we do offer engaging anecdotes that raise important questions about how player expectations and environment impact a game's learning potential.

Reach For the Sun was designed to introduce middle school students to basic concepts of plant function and anatomy. Our design team constructed a simplified plant model with resource management-style gameplay to support one of our primary learning objectives: that students understand the importance of key resources in the growth and reproduction of photosynthesizing plants. Players engage with the system by making strategic decisions about where and when to expend energy. Crucially, players must choose when to transition from resource acquisition to reproduction. If they wait too long, they may reach the end of the growing season with huge quantities of resources but no mature seeds. Players are exposed to concepts of pollination, photosynthesis, and seasonal growth along the way.

Early on in the design process, we considered turn-based gameplay, but ultimately decided against it due to assumptions about our target audience. In particular, we were concerned that students playing at school may lose interest in the game if we failed to keep them constantly engaged. Our solution was to require players to click on leaves and roots throughout the growing season to maintain photosynthetic processes.

Our first in-school playtest revealed that the game was too difficult for both students and teachers. Students struggled to collect sufficient resources to produce a fruit before a killing frost terminated their plant. Teachers were befuddled by the (intentionally) sparse user interface, and seemed equally frustrated by the relentless pace. Unfortunately, we failed to take into consideration the expectations of our audience at this critical juncture. Instead, we focused on the symptoms: our players found the game too difficult, so we made it virtually impossible to fail. We hoped that by removing the pressures of success from the game, we would allow players to spend more time thinking about how plants grow and reproduce. What we were really doing was tuning the game to non-gamers.

Six months after our second release, Steam presented us with the opportunity to bypass their "Greenlight" process. As one of the first overtly educational titles on the distribution platform, we were unsure how gamers on their home turf—far removed from a structured classroom environment—would receive the game. Our only reviewers had been game-centric educational media bloggers, and some of our number were concerned that gamers accustomed to triple-A production values and conventional mechanics would balk at our unique take on the resource management genre. We placed the game in Steam's "casual" catalog in an attempt to connect with gamers accustomed to shorter titles and unconventional gameplay mechanics, but we neither obscured nor called attention to the game's educational nature.

Within hours of the game's release on Steam, the community began to respond. Within a matter of days we had received more direct feedback to *Reach For the Sun* than we had gathered in the year and a half since our first release. But it was the nature of the feedback that surprised us most. Instead of dismissing the game as edutainment as we had feared, the vast majority of negative reviews focused on one of two problems: excessively click-happy gameplay and insufficient strategic depth. Our Steam audience, accustomed to games that demanded mastery of mechanics in order to succeed, found *Reach For the Sun's* predetermined win state anticlimactic at best. A handful of players commented on the game's educational bent, but critics and supporters alike judged the game on its entertainment qualities. It shouldn't come as a surprise that players who purchase and play games on their own time with their own money expect to be entertained and will judge their experiences accordingly, but we were nonetheless primed to expect players to scrutinize our learning game as a learning experience.

Most of our reviewers identified themselves only as gamers, but some of our most valuable feedback came from users claiming to be parents and educators. This small subset of our rapidly growing community acknowledged the game's classroom potential, but their expectations were clearly different than those of the parents and educa-

tors who had tested Reach For the Sun as a learning tool. It seems possible that our carefully gathered “in vitro” feedback had been muddled by the attendant expectations.

As we considered a gameplay patch, we finally recognized that by giving players so much to manage, we had inadvertently inhibited their ability to contemplate growth and resource strategies—the very crux of the game’s learning potential. Our solution was to introduce a separate, tightly balanced, turn-based “strategy” game mode that players could switch on or off at any time. (A small but vocal group of users advocated on behalf of the original game mode.) Early in-house playtests suggested that the new constraints required players to think about the system—and therefore the learning content attached to that system—in order to succeed, as opposed to the old setup that rewarded a brute-force approach.

As we prepare to release a second game on Steam, we hope to address some of the provocative questions raised by our *Reach For the Sun* release. In particular: How does the environment in which learning games are acquired and played impact players’ expectations about their educational content? How can we structure playtests to refocus reviewers’ attention on the entertainment potential of learning games? Can Steam serve as a reliable litmus test of objective quality in learning games? What techniques can we employ to mitigate players’ bias against learning games played in classrooms?