Games in the Workplace: Revolutionary or Run-of-the-mill?

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Abstract

Quality means very different things to different people – and, when it comes to software, all perceptions of quality are valid and all approaches must be tested. So to produce high quality software in today's networked universe, you either need to test all possible combinations (which isn't practical), or you need to test differently. When we run our tests, we essentially train the software to respond to a specific set of user actions. Traditional test strategies focus on feature or component level testing through either manual or automated means, but may not account for end-user scenario-based[1] testing or usability related aspects of the product as a whole.

On the Lync team, we use productivity games[2] specifically designed for our features and signature scenarios as a way to complement traditional workplace testing methodologies, and to expand how we test software. This paper discusses how we used productivity games to enhance the quality of our products by improving team collaboration, employee engagement, and cost savings. We illustrate the use of productivity games in the workplace as a way to involve many faces of quality into the software development lifecycle by including all major stakeholders into the gaming experience and targeting multiple platforms. We also show examples of how structured productivity games improve software quality, ensure a highly productive workforce and transform an often mundane task of software testing into a fun activity.

Biography

Chermaine Li (chermali@microsoft.com) is an engineer on the Lync team at Microsoft working on products for Mobile and Slate platforms. She is passionate about finding innovative ways in which customer focused engineering can be adapted into engineering processes.

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1 Introduction

What's driving the use of productivity games in Lync?

The world of technology and the demographics of a global workforce are dramatically changing the way we work. The lines between work and "life" are being blurred. New communication and collaboration tools allow employees to connect in different ways. Enterprise social tools, such as Lync, Skype, Yammer, and Salesforce.com allow collaboration across organizational boundaries.

Microsoft Lync is communications software that runs on many platforms, such as Windows PC, Windows Phone, iOS, and Android, and enables people to collaborate across the globe. As with any mode of collaboration and communication, consumers want access to their apps on all their devices, platforms and services. Users can choose not only to participate in meetings using different Lync clients, but they can also switch platforms while in a conversation. Lync clients on each platform must seamlessly interoperate with each other throughout the entire conversation. For example, Lync enables users to join a meeting on the go with their mobile device and then seamlessly transition the meeting to their work computer. As such, end-user scenarios, interoperability and integration testing[3] of all Lync features and usability testing across all Lync clients is a challenge.

Feature or component level testing, done through manual and automated means, may not identify all defects in the product. When working toward a typical milestone, a variety of people like designers, program managers and customers also influence the software. These diverse perspectives help uncover interaction and usability issues. As we move towards the end of the product cycle, the cost of addressing these issues is greater, and hence it makes sense to involve these people throughout the creation process to get continuous feedback.

Additionally, testing is traditionally done in a monotonous and isolated environment. The same tests and techniques become less effective over time, and it is progressively harder to improve the quality of the product while keeping the team engaged. As such we needed to invest in a strategy to help uncover these defects early on during the product cycle – productivity games (Smith, 2012).

Productivity games can be a cost effective way to improve the quality of a product by providing the necessary engagement and incentive to all stakeholders to participate in the testing process. Productivity games also motivate these stakeholders to uncover issues and provide feedback, while offering additional benefits like improving employee morale, facilitating collaboration and team-work. (Smith, 2012) When we have a diverse set of users looking at the product across different deployments and environments, we get continuous feedback that help catch issues immediately.

2 Productivity games in the Workplace

To validate our initial hypothesis that productivity games are an effective and novel way to improve software quality we structured our efforts in two directions – across Microsoft, and within the Lync organization.

2.1 Games exclusive to the Lync organization

Significant thought was put into how we could incorporate productivity games into our day to day test lifecycle. Analysis of our test processes indicates that a majority of the product's features are tested in silos by individuals with the occasional bug bash[4] organized to bring the team together to test a fully

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integrated feature set. It is also clear that the defect density tends to increase towards the end of a product cycle as members from different teams begin integration, make design tweaks and respond to customer feedback. By organizing productivity games for the Lync organization our goal was to create an experience that would motivate all our team members to participate, and to specifically involve individuals who do not usually participate in software testing. Described below (in no specific order) are the productivity games that were conducted within the Lync organization.

2.1.1 Using Lync's instant messaging capability to build crazy stories

The goal of our testing was to uncover reliability issues in the Instant Messaging (IM) feature in Lync where messages were being exchanged across multiple user accounts. To address this we created a game that required all participants to send instant messages in a round-robin manner. The organizer begins the game by sending any random sentence to the person on his/her right. That person would include the person to his/her right into the conversation and then add a new sentence. Each person added to the conversation only sees the previous sentence (not the whole conversation) and has to add a meaningful sentence of their own. Only the organizer sees the entire discussion. At the end of the game the organizer reads out a completely garbled and nonsensical story. This game exposed a few issues around sequencing of the messages when sent within a very short span of time, and allowed us to debug issues around missing messages. In particular we were able to isolate a hard to reproduce problem and identify mitigations for it.

> *This story is about a boy who, in search of a treasure, meets a man who calls himself king.*
>
> *But the king is actually not a king.*
>
> *But the royals are flushed.*
>
> *Flush with cash.*
>
> *Woohooo I am going shopping!*
>
> *Hopefully the Bellevue store still has one of those spiffy Samsung slates left!*
>
> *Otherwise, it was a sure sign of the end times, and time to buy an iPad instead.*
>
> *Instead they decided to hold out for a shiny new Windows 8 tablet because it was way way better!*
>
> *And they hoped that with win8 would get the stock price up.*

2.1.2 Using Lync's sharing capability to identify landmarks

With the launch of Windows 8 the test team had to face the epic challenge of testing the performance of the Lync app for Windows 8 store on a variety of form factors. Tablets in particular had stricter performance criteria and could pose a risk to the perceived performance of Lync features. We designed a game where users were required to navigate between the various screens to complete certain tasks in order to identify the responsiveness of Lync, and to discover how accessible it is for a user to navigate by swiping or using other in-app shortcuts.

For this game, the moderator used Lync to share images of famous landmarks. The fastest person to send the name and location of the landmark using the IM feature won that round. This game proved to be a smart way to identify the device configurations that were optimal for Lync features. It also exposed some configurations for which we needed to optimize performance or provide messaging to the users on long-running tasks. It also served to test new features that were slated to be released as part of the Lync app for Windows 8 store.

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2.1.3 Ink on Lync and safe driving

With the first version of the Lync app publicly available, a new feature called Ink (support for drawing instead of typing messages) was introduced for the next release. Our challenge was to validate the design of this feature as well as get usability feedback from different users about whether they were able to use Ink to complete their tasks, and verify if users were able to exchange accurate ink content using touch, mouse or pen, between the various older versions of Lync clients. We needed to ensure that the messages were displayed correctly and could be viewed by all users. To motivate our colleagues to contribute towards using the app we proposed a game that would reinforce Washington State's traffic signs in the user's minds and simultaneously test the Ink feature. During the game the organizer calls out the name of a particular traffic sign and all users are expected to draw that particular sign using the Ink feature and send it to the Lync meeting. Points were awarded for the best "Ink artists" and the winners took home goodies and a grand prize making it a fun testing experience.

During the meeting we realized that some devices were more optimized for a touch experience. It was evident that the drawing experience was much better using a pen rather than a finger which favored Microsoft's Surface Pro over other non-pen input devices. It also highlighted subtle user experience issues of the Ink feature that we could improve upon. For instance, a common complaint during the game was that the thickness of the ink stroke needed to be increased to enable more fluid drawing. This game also brought about widespread awareness of the new feature on the Lync for Windows 8 store app.

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2.2 Involving Microsoft's employees

Dogfooding[5] is a common practice where a software company uses its own product to demonstrate the quality and capabilities of the product. Microsoft uses dogfooding as one of the ways to gather feedback on a product in real-life scenarios. Since the process is voluntary, it is often difficult to keep users motivated and actively engaged in using the product. Collecting dogfood data on a mobile platform presents an additional challenge due to the restrictions that the mobile platform may bring. For example, a mobile device will have a smaller keyboard than a desktop computer, making it harder to type a message. When a user receives a new IM, they are more likely to respond from a computer than a mobile phone. This is a common feedback from Lync dogfood users when asked what barriers prevent them from using Lync on a mobile phone. The Lync Mobile team delivers the app on Windows Phone, iOS, and Android platforms and needed feedback with respect to usability and reliability of these features of Lync on all supported platforms. To encourage dogfooding, the team decided to use productivity games.

2.2.1 Lynctober MobileFest

The Lync Mobile team held a month-long challenge during October 2011 to gather dogfood data. Each week, a representative from the Lync team would send a list of tasks and survey forms to dogfood users. Users could complete as many tasks as they chose and respond to the survey form. We handed out points for any issues, frowns, smiles, or ideas reported, and gave out weekly prizes. In addition, the grand prize of a mobile device was given to the person with the highest score at the end of the challenge. For the conclusion of the MobileFest, we held a Mobile Beta Bash and invited all dogfooding users to spend an afternoon participating in productivity games with the Lync team. This also gave the users a quick way to accumulate points and get on the leader board. Some of the productivity games at the Mobile Beta Bash included:

- IM Taboo - The first person to guess the word using hints sent over IM wins.

- Story Station - Build a story using IM conference by only seeing the sentence from the previous person. The result was a fun, nonsensical story that drew a lot of laughter.

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- Solve Me A Riddle - Solve a riddle posted on a wall in the room and call in your answer.

- Rock, Paper, Scissors with Presence - This is a remake of the popular children's game played by changing a user's presence status.

Each game was hosted at its own station and participants could travel to as many stations as they liked. The Mobile Beta Bash also gave participants the opportunity to interact directly with Lync engineers. We found that participants really enjoyed the events. They shared feedback, and felt encouraged by the fact that the engineering team was really responding to their comments and concerns. Participants who attended the event tended to be more engaged in dogfooding even after the event ended. Conducting productivity games across the company opened up a whole new avenue for increasing brand loyalty and product awareness whilst allowing employees across Microsoft to have fun and derive a certain satisfaction that they had contributed to the release of another Microsoft product. The Lynctober MobileFest was a huge success with dogfood users, but it came with a price tag. The team dedicated a lot of resources to planning and coordinating the event, creating a system to handle surveys and feedback, and handing out prizes during the event.

2.2.2 Lync Mobile Dogfood Bash

Following the success of the Lynctober MobileFest, the Lync Mobile team decided to use productivity games again in a subsequent release to gather dogfood data. This particular release had an additional challenge. We had limited test resource available and needed program managers to step in and help coordinate the event. Instead of a month-long challenge, this event was a single-day online meeting version of the games. Users collected "badges" during the day for completing tasks, and the person with the most badges won. Knowing that participants would drop in and out of the event at various times during the day, we tailored the tasks to require a minimal amount of people and allowed interactions to be asynchronous. Badges were collected for activities such as:

- Making a video call to a Bot[6] and identifying a random object shown by the Bot.

- Leaving a voicemail to a Bot.

- Receiving a surprise call.

- Joining a conference at a certain time.

Again we heard feedback from users that they enjoyed the productivity games and felt more encouraged to provide feedback in the future. Talking to a real person rather than emailing a large distribution group gave users the confidence that someone was listening to their feedback.

However, there was less effort put into organizing this event and it reflected in the results we received. The initial MobileFest had weekly challenges that helped advertise the event and created enthusiasm amongst the players. Without such benefit for the Dogfood Bash, we saw that the number of people who attended the event was significantly less and users tended to stay for a shorter period of time. Since this was a one-day event, people who could not attend missed out completely. In addition, we found it harder to keep people motivated and interested through online interaction. Though the data collected was useful, we did learn that the quality of the data we received was directly proportional to the effort we put in to organizing the productivity games.

3 Lessons learned

Productivity games are a fun and cost effective way to uncover issues that traditional test methodologies may have overlooked early in the product cycle. Some of the lessons we learned by using this test strategy are detailed below.

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3.1 Reduce risks by encouraging a diverse user base to participate

Most products have a huge test matrix that needs to be validated across various deployments, platforms and configurations. The typical solution employed by most test teams is to simulate these environments and run all possible tests against them. However, in many cases it is extremely difficult to simulate such complex real world environments in a test lab. Also, this is clearly an expensive task. For example a simple test to validate the quality of Ink messages requires that the test be performed on different platform architectures, against multiple Lync server topologies, on all applicable form factors like tablets and desktops, and using multiple ink input modes such as pen, mouse and finger. Multiply these permutations by the number of Ink scenarios and the insurmountable nature of the task becomes obvious.

Crowdsourcing is a very cost effective technique in such situations. Users bring different perspectives towards using our product and exercise functionality on various platforms, devices and environments. People also tend to exercise the same scenarios in different ways to uncover distinct issues. The goal is to make sure we are able to incentivize and engage the diverse user base to help validate our scenarios. As such we need to create experiences that appeal to a broad set of users. Productivity games that rely on unique player skills limit the number of capable participants which then limits the various user configurations. For example, the "Ink on Lync and learn safe driving" game was about a user's knowledge of traffic signs. This made the game generic enough for everyone to participate and did not rely on the technical knowledge of the intricacies of the Ink feature.

In the end, not all users have the same incentives. Some are motivated by leader board scores, others by prizes and yet others by contributing towards charitable causes. (Smith, 2012) By designing productivity games that cater to diverse cultural and personal motivations, we can provide incentives to engage a wider audience.

3.2 Engage people in different roles to improve quality – not just testers

Improving the quality of a product is not just a tester's job. Other individuals like designers, program managers, and security and localization experts can contribute significantly towards improving the product quality by uncovering various issues based on their subject matter expertise. In a typical product lifecycle these individuals are not part of the testing process and tend to review and provide feedback on the non-functional aspects of the product very late in the cycle. This introduces the risk of destabilizing the product due to the changes from their feedback. Encouraging these individuals to validate and provide immediate feedback on the product will improve product quality.

3.3 Increasing brand awareness and product knowledge

Organization-wide productivity games clearly lead to an increase in brand awareness of Lync and customer perception of symbiosis with the product team. With multiple types of Lync clients (e.g. mobile clients, desktop clients, web browser clients) available to consumers, the use of productivity games served to educate people on scenarios where one client was more relevant. It also helped promote new Lync clients (e.g. Lync app for Windows 8 store) in cases where consumers were entrenched in the habit of using another client. The use of niche features was encouraged during these productivity games.

One piece of feedback from participants in our mobile events was that the productivity games helped them learn features that they never knew existed in the Lync client for a particular platform. After discovering the richness of the feature set of Lync on mobile devices, these users claimed that they are more likely to use Lync on their phones in the future. In addition, using games to teach makes training more effective since the learning process is attractive and rewarding (Smith, 2012). While teaching Lync features was not an intended goal of these events, it is an interesting avenue that the Lync team can explore when considering future events.

3.4 Gathering consumer feedback

Without a doubt, it is clear to us that productivity games yield benefits that routine test approaches struggle to provide. During and after each of the games we conducted, we received very valuable feedback from our dogfood users (gamers) that illustrated how Lync customers interact with our product on a daily basis. Once our product ships, we have very limited ways to contact customers to get their feedback. Productivity games provided an incredibly important avenue to receive such feedback early on. Throughout these games, engineers also get insights into the usage patterns of customers. As Lync engineers working on specific features, we get used to the way our features behave. We learn tricks and shortcuts that we unfairly expect our dogfood users and customers to grasp the first time they use our product. Watching and talking directly to gamers creates empathy and helps us bring the end user's point of view into the testing process.

3.5 Identifying feature requests for the next version of the product

In addition to improving brand awareness, we found that the Lync productivity games that we designed helped us identify feature requests for upcoming releases of the product. We notice that around 10% of the feedback received is usually in the form of wish lists from users. This gives us a broad perspective of the types of features desired by customers. It also allows us to predict market trends and helps us prioritize work for our future releases.

3.6 It's Fun!

We found that productivity games evoke a feeling of fun and served to boost team morale. The team enjoyed participating, and, at the same time felt a sense of accomplishment for completing productivity tasks. As a result, we were able to increase employee engagement, collaboration, trust, and employee retention. In the past, our participation rate for bug bashes was low because of the repetitive nature of the tests. With productivity games, people enthusiastically participated in these new forms of bug bashes. The benefits when a group of employees leave a conference in laughter and high spirits, knowing that they have each played a crucial part in improving the quality of our product, are immeasurable.

The competitive nature of some productivity games and the additional incentive of having rewards ensured that gamers were more focused and motivated. Competition in particular led to higher volumes of feedback and an increase in the fun quotient of the events we conducted.

4 Cost and Disadvantages

Despite all the benefits of using productivity games there are a few costs and disadvantages to keep in mind. Productivity games take a lot of resources. Time and effort is required to design productivity games with quality results. In addition, we needed additional infrastructure to support the increase in feedback that we got. A huge event like the Lynctober MobileFest also requires monetary support.

Not all scenarios are suitable for productivity games. It is important to understand the target audience before designing a game. For instance, productivity games targeting the internal product teams need to be more challenging since the teams are often aware of the subtleties of the application. Yet, the value of designing productivity games for internal product teams is very high since feedback is highly targeted and well-structured. For productivity games targeting a wider audience, we try to focus on mainline scenarios and showcasing new features.

We use productivity games to transform the mundane task of software testing into a fun activity. As such, we also need to change the games from time to time to ensure our participants remain engaged and challenged. Each of our productivity games is designed with a particular feature in mind, to help build awareness and get more eyes on the feature early on. Once a particular feature is tested via crowd

sourcing, we can fall back on traditional testing strategies such as automation to ensure the quality of the feature in the future. By focusing on a different feature area each time, this also ensures that our games vary.

Finally, it is hard to quantitatively measure the success of productivity games. It is difficult to prove that the same benefits cannot be achieved through more traditional test techniques. However, productivity games provide a means of deriving value through a fun and inclusive way of testing.

5 Future plans

Until now we've restricted the scope of our productivity games to Microsoft employees. We plan to expand this to a wider audience. The Microsoft Lync team has an extensive Technology Adoption Program, where external companies try out a Beta version of Lync. We've heard internally how productivity games help dogfood users learn new features and build brand awareness. Perhaps the same can be used with Beta users outside of our organization to showcase new Lync features, encourage usage, and gather feedback. Games can make learning a product more attractive and rewarding for our Beta testers in other organizations.

Productivity games are successful in increasing organizational citizenship behavior and expanding in-role behavior (Smith 2010). Thus far, we've focused on using games that encourage good corporate behavior by incentivizing dogfooding and cross-feature testing. The next step for the Lync team may be to use productivity games to dissolve the boundaries between different roles. With the Lync team moving to a more agile development[7] model, it is beneficial for everyone to be capable of interchanging between our traditionally defined roles. We can design productivity games to teach, and users can learn within the context of play. Through productivity games, we can continue to increase the quality of our products by improving team collaboration, the skillset of the team, and employee engagement while reducing cost.

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[1] **Scenario-Based Testing:**

A test methodology where test cases are derived from real user scenarios.

[2] **Productivity games:**

A sub-category of games designed to improve productivity and morale of people in the workplace.

[3] **Integration testing:**

A stage in software testing where all components of a product come together and the system is verified as a whole.

[4] **Bug bash:**

A coordinated event where multiple people come together to explore and find bugs in a product within fixed amount of time.

[5] **Dogfooding:**

Common term in software where a company releases a pre-Beta build of software to be used by its own employees. The software builds are usually unrefined and may contain bugs. The goal of dogfooding is to demonstrate confidence in the software that a company develops by encouraging employees to use the software first.

[6] **Bot:**

An automated program that simulates the behavior of a Lync user.

[7] **Agile Development:**

A software development methodology that focuses on short and incremental iterations to produce working output, and to incorporate customer feedback on an ongoing basis.

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