Using Gamification to Build a Passionate and Quality-Driven Software Development Team

Applying game design techniques can increase software quality and motivate employees to improve the complex software development process across the lifecycle.

Executive Summary

More than 70% of Global 2000 organizations will have at least one gamified application and 50% of companies that manage innovation and research will use gamification to drive innovation by 2015, according to Gartner research. If so, this means gamification has transcended buzzword status and has moved into the mainstream of corporate computing.

But what is gamification? In simple terms, it is a fun, outcome-based process of employing “game” elements and techniques to engage employees, reward and recognize individuals and keep people motivated to achieve end results. Gamification is evolving, however, and in many pundits’ minds will play a key role in managing innovation – both internal and external – for many organizations. The reason? Organizations are challenged to effectively engage employees and customers to achieve basic business goals. Using points, levels, rewards, badges, etc. to incent performance and honor accomplishments, is seen as a powerful 21st century way of stoking the competitive nature of human beings – particularly millennials who have grown up in a digital world where gaming is often the rule not the exception.

To properly leverage gamification, organizations must first understand basic game mechanics that successfully engage employees. For starters, many of these concepts can be applied in non-gaming situations throughout the company’s business model. For companies starting to gamify activities, the first design point is to identify ways to motivate participants to achieve key goals – and those goals should align with the company’s business objectives. For starters, we suggest gamifying project management, innovation, the software-development training process and delivery.

Gamification can start with internal as well as external initiatives. Internal gamification processes are aimed at keeping employees greatly satisfied and excelling in creating quality work products. External gamification is aimed at maintaining a happy customer base and in turn achieving business goals.

This white paper discusses the process and framework of gamification and proposes an approach for applying game mechanics and dynamics in software development and delivery models. It looks at why gamification is necessary, examines realistic processes to be followed on
the ground and identifies the key benefits to be reaped, supported by case studies from projects we have implemented. We will also explain how game design techniques can be used in non-gaming environments that not only engage and motivate employees, but also improve customer satisfaction and engagement, gleaned from our client interactions.

Why Gamification?

Most organizations are challenged to understand business initiatives or employee behavior changes that can affect the achievement of long- and/or short-term goals. Moreover, gaming techniques, although in vogue as a result of the digital revolution, are not really new. In fact, many organizations already have reward systems to recognize their employees’ work (i.e., “Employee of the Month/Year”) and thereby increase employee engagement and motivation levels.

Once the basic definitions are understood, organization need to ask the following questions:

• What are the problem areas?
• Why should we invest in gamification?
• How can business use gamification to engage, foster collaboration among and motivate employees?

In the traditional feedback cycle, employees often wait a year for their performance to be recognized by management. By changing existing protocols and processes, organizations can enable fast and meaningful feedback, accelerating employee growth and learning. This is important for organizations seeking to build or extend momentum. Sadly, in many businesses short-term goals are unclear, particularly as the business environment evolves, making change inevitable. Moreover, rules often lack transparency; rewards and recognition are rarely given to participants who excel across functional areas throughout the year.

Long-term goals are often more focused, but companies need to work to establish small wins, intermediate milestones and a drive to master new skills to keep employees motivated and contributing to business value. To extend competitive advantage, they need systems to enable employees to earn rewards and respect within their peer groups, as well as to validate their skills and the abilities of others. The key is to create competition in a scalable, automated way that can be used to drive repeatable results. Driving competition, collaboration, networking and knowledge-sharing among employees is critical to achieving long-term organizational goals.

Gamification: What Is It?

gamification = gam(e) + -ification

• applying game-design thinking to non-game applications to make them more fun and engaging

Figure 1
Successful software development and maintenance projects are typically advanced by collaboration, effective teamwork, active participation, enthusiasm and quality deliverables. Challenges normally arise on software quality, meeting performance benchmarks, on-time delivery with improved quality, innovation, value-adds to customers, etc. Managing employees' behavior and motivation levels is yet another challenge for IT organizations. Utilizing gamification techniques as part of the software development process can assist in dealing with some of these challenges, particularly motivationally oriented ones. Gamification brings the process of applying game mechanics and dynamics into software development and the delivery model. Game mechanics, including elements such as points, scoreboards, levels and challenges, can drive developers to outperform the competition, hit personal and professional achievements, gain rewards and recognition, track progress and feedback, find ways to express themselves and improve their motivation levels.

Gamification can be implemented in many software development and maintenance activities such as on-time delivery, performance improvement, code quality, requirement management, defects fixed during maintenance and knowledge management. To achieve delivery excellence, most companies have a business strategy in place. But most realize they have to go the extra mile and engage customers and employees through the power of gamification.

Gamification Tools and Framework

As noted above, gamification uses game mechanics such as points, collaboration, fun, challenges, levels, Leaderboards (or scoreboards) and rewards to engage employees and drive their behavior. Game dynamics include those things that make people love games – including competition, rewards, recognition, status, self-expression and altruism. By enabling reward systems and increasing game levels, organizations can continuously engage employees to achieve short- or long-term organization objectives.

Organization or project teams should use a framework to facilitate the process of gamification. This means employing game designers who use various strategies and frameworks to create new games, provide more attention to defining game rules, bring out various levels to challenge employees, offer attractive reward mechanisms, etc. Gamifying business activities requires a clear and transparent process to track the progress, provide real-time feedback and also recognize employees whose talents distinguish their performance.

The project manager should clearly identify the business problem, define rules and goals to incorporate the game features used in work activities, reward and recognize the desired behavior, track progress and establish feedback loops to achieve the organization or project-specific business objectives. Well-designed games challenge players, encouraging them to move to various levels and unleash passion and commitment until they complete all levels.

The gamification process has a framework of points, feedback, leaderboards, badges, rewards and levels for players to see their progress and compare their performance with others to achieve the organization's long-term goals (see Figure 2).

Lessons Learned

In 2012 Gartner predicted that by 2014 over 80% of current gamified processes will fail, primarily due to poor design, improper rules and poorly defined goals and reward mechanisms. The simplest way to overcome failure is to understand the problem better, know your audience, define rules and establish goals representing business objectives. These steps enable gamification to be implemented in ways that educate employees about the process of playing the game and thereby achieving the organization or project-specific business objectives.
# The Essential Elements of a Gamification Framework

<table>
<thead>
<tr>
<th>Gamification Tools and Framework</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Set Goals</strong></td>
<td>The goals layer is where the organization or project team plans and communicates goal objectives to employees. Define clear goals and well-defined rules of play to ensure employees feel empowered to carry out their defined objectives. Enable the process to set milestones that can be achieved in a short timespan to make regular progress. Simplify the gamification process for employees and specify the goals and rules about what they can and cannot do in the game, define the points table to know the scores and list the game levels. Gamification focuses on business goals, rules and feedback mechanisms used by both the employees and the organization.</td>
</tr>
<tr>
<td><strong>Set Rules</strong></td>
<td>Define a simple set of principles that can be interpreted easily. Communicating the rules is a critical task in defining and deploying a game. Rules define limits on players to accomplish the goals.</td>
</tr>
<tr>
<td><strong>Rewards</strong></td>
<td>The rewards system is a very critical part and big motivation for a project team that needs to be addressed by the manager. Employees feel very good on completion of the assigned tasks but at the same time they become motivated to achieve new rewards or awards in bigger forums.</td>
</tr>
<tr>
<td><strong>Leaderboards/Scoreboards</strong></td>
<td>In typical game design, players know where they stand in the game and also other players’ status. A sense of progress is very important even if it’s small, as it is critical to keep employees motivated and highly engaged. Employees in an organization want to know how they are doing and expect a system in place to share feedback frequently in the areas they need to focus on. It is the organization’s or project manager’s responsibility to track progress and communicate feedback and areas of improvement to employees in an easily digestible format. Set up a series of small wins to engage employees and keep them motivated to achieve long-term goals.</td>
</tr>
<tr>
<td><strong>Real-Time Feedback</strong></td>
<td>We get instant feedback while we play games. Positive feedback energizes players; negative feedback enables players to focus on their improvement areas and perform better. Currently, many employees receive feedback annually; organizations should change the system to share real-time feedback frequently with employees to improve their delivery excellence. Timely feedback is essential for employees to focus on the improvement areas. During the gamification effort, the project team should determine the metrics to be tracked and update the leaderboard on a regular basis with an analysis of the metrics against benchmarks. This process helps employees to understand their progress and the work needed to achieve the defined goals. The feedback to the employees should be in real time and suggest to them if they need to change their behavior to perform the assigned tasks.</td>
</tr>
<tr>
<td><strong>Measurement</strong></td>
<td>The project team should define the metrics that can be utilized during the gamification effort to see the team progress toward its goals. During the gamification process, there may be situations or events requiring a change in the defined metrics and elements. The process should be flexible enough to accommodate such changes and communicate the same to employees.</td>
</tr>
<tr>
<td><strong>Badges</strong></td>
<td>The organization faces a challenge in identifying employees’ strengths and expertise. This is crucial for the organization in order to achieve the long-term goals by assembling great teams. Employees need identity in the workplace – i.e., reputation, certification, achievements, etc. This shows individual ability and demonstrates mastery of skills and accomplishments. Badges solve this problem and help employees to earn rewards, skills and validation.</td>
</tr>
</tbody>
</table>

Figure 3
For starters, point systems and rules should be transparent to employees. During one gamification effort for a client in the legal software product development space, we encountered confusion about the game rules and point system. Rules defined in the gamification effort were not explained properly to employees, which led to confusion. Due to this confusion, only a few employees were happy when the results were announced and rewards and badges were bestowed. Transparency in communication about the rules and points system and educating the entire team on the process before kick-starting gamification is critical. Draft a clear communication plan and make it transparent with employees during the effort; this can ensure communication with meaning for all.

Things may go wrong if the actual business problem and customer demands are not addressed as part of the gamification process. Therefore, organizations need to elevate their understanding by conducting employee surveys and make the required improvements in their next gamification endeavor. Finally, gamification should be created to enhance organizational fun, collaboration and competition where employees will be motivated and recognized with rewards for interacting with one another to achieve the business goals.

Ready, Set, Go

The use of gaming elements such as badges, levels, points, rewards, etc. can help to identify and recognize employee talents and achieve-
ments. The organization should focus on the areas to engage and encourage employee collaboration as a community.

Sustaining developer interest in a long and monotonous process can be challenging, raising obstacles to rewarding and recognizing performers. To overcome this, organizations must:
- Accelerate the feedback cycle.
- Establish tangible goals and level the playing field.
- Identify challenges and create meaningful rewards.

Gamification brings a mindset shift to employees and motivates them to continuously perform better throughout the year. Peer pressure kicks in and facilitates a faster feedback cycle that shares achievements and improvement areas with employees.

Gamification helps us to deliver quality software that exceeds client expectations and fulfills their business requirements. It also can be leveraged in employee learning and training programs and innovation initiatives. Gamification techniques and frameworks can be applied in both application development (AD) and application value management (AVM) projects, as highlighted below.

**Gamification in Delivery Model: Case Studies**

**Bugs Premier League: Improving Defect Closure Rate**

- **Background:** One of the leading global providers of legal information and services solutions to professionals had encountered a major challenge in controlling production backlog defects. The count was growing, with an average of 40 to 50 new defects every week. The assigned maintenance team did not have enough bandwidth to address the backlog as a result of constant inflows. Given resource bandwidth constraints and business stakeholder dependencies, the weekly defect outflow has been drastically reduced. Due to high defects inflow every week and clarification dependencies with customer SMEs and project stakeholders, the backlog defects count surpassed 500. Customer budget constraints made it difficult to add more positions to control the incoming defects and reduce the backlog count. Our management was concerned about the rising backlog numbers every week. Developers appeared to lack the motivation to go that extra mile to fix the backlog defects.

- **Goals:** Reduce backlog maintenance defects count from 500+ to fewer than 50 defects in a three month time frame.

- **Leaderboard:** We published a dashboard to the bug fix team on a weekly basis to show the progress of defect fixing, featuring a trend chart and announcement of top developers of the week (along with their photos and scores).

- **Solution:** We rolled out a Bugs Premier League (BPL) gamification contest, similar to an Indian Premier League (IPL) cricket series (with names and captains), to reduce the backlog maintenance defect count. The objective of this contest was to engage both development and maintenance teams to reduce the backlog defect count within three months. The game elements involved distributing orange caps to bug busters (employees who fixed the most defects), purple caps to bug crushers (teams that fixed the most defects) and green caps to backlog controllers (employees from the maintenance team who fixed the most defects) along with the weekly publication of winners and the top five contenders. This encouraged the team to break out of the silo and fix more production defects in a shorter period. The defects have now been reduced to double digits. The maintenance team’s responsibility is to control the backlogs by fixing all the incoming defects the same week they are identified to ensure no spillovers are added to the backlog list. Weekly rewards and recognition are given to developers and module leads based on the bug fix league scores.

- **Benefits:**
  - Resolved 800+ defects in a 10-week time frame; defect backlog count was reduced to double digits from 500 (baselined at the start of the contest).
  - Developers controlled the backlogs by fixing all incoming defects in the same week.
  - Increased defect fixing rate by more than 75%.
  - Increased employee motivation and engagement, with many of them now going the extra mile to clear out backlog defects.
  - Improved customer satisfaction and their confidence in our team as a result of our gamification effort.

**3Curve Contest: Improving Code Quality and Performance**

- **Background:** Cost of quality was high, as nearly 20% of our effort was spent on reviewing code
The Bugs Premier League

**BUGS PREMIER LEAGUE: Gamification**

Rolling Out **Bugs Premier League (BPL)** Contest to reduce maintenance backlog count from 500+ to less than 50

**BPL Rules**  
League Duration: April – Jun 2013

- Fixing SEV 2 defects takes priority – Do not fix other severity defects until the SEV 2’s are cleared.
- Fix/analyze other module defects only after clearing their module backlogs.
- Start fixing SEV 3 defects only after bringing down SEV 2 backlog count to 0.
- Bonus points will be awarded to whoever fixes/analyze the other module defects.
- Status update must be shared with Maintenance Lead on a daily basis.

**BPL Weekly Awards**

| BugBuster | Associate who fixes the most number of defects. |
| Bug Crushers | Team fixes the most number of defects. |
| Backlog Controller | Maintenance team associate who fixes the most number of defects. |

**BPL Tournament Awards**

- Bug Crushers of the Tournament – Recognize team who fixed most no. of defects during tournament duration.
- BugBuster of the Tournament – The associate who fixed most no. of defects during tournament duration.
- Best Backlog Controller – This award goes to maintenance team associate who fixed most no. of defects during tournament duration.

**Scores for Severity**

<table>
<thead>
<tr>
<th>Severity</th>
<th>Score/Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sev 1</td>
<td>100</td>
</tr>
<tr>
<td>Sev 2</td>
<td>50</td>
</tr>
<tr>
<td>Sev 3</td>
<td>25</td>
</tr>
<tr>
<td>Sev 4,5,6</td>
<td>10</td>
</tr>
</tbody>
</table>

**Rewards and Gifts**

- Trophy
- WAH Points
- Surprise Gifts
- Certificates

**Bugs Premier League Leaderboard**

**BUGS PREMIER LEAGUE: Content Services**

**BPL Weekly Awards (Week 15-July 5th to July 11th)**

- BugBuster: Leon — 50 points
- Buglog Controller: Pattabi — 275 points
- Bug Crushers: TOC Risers

**Current League Toppers**

<table>
<thead>
<tr>
<th>Orange Cap</th>
<th>Points</th>
<th>Green Cap</th>
<th>Points</th>
<th>Purple Cap</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Praveen</td>
<td>2025</td>
<td>Pattabi</td>
<td>5100</td>
<td>TOC Risers</td>
<td>9420</td>
</tr>
<tr>
<td>Sreelakshmi</td>
<td>1748</td>
<td>Praveen</td>
<td>4450</td>
<td>Search Super Kings</td>
<td>2955</td>
</tr>
<tr>
<td>Chenna</td>
<td>1225</td>
<td>Leon</td>
<td>3475</td>
<td>Retrieve Riders</td>
<td>2112</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Royal Shepards</td>
<td>860</td>
</tr>
</tbody>
</table>

**Backlog Trend Chart**

**SMASH BUGS ACROSS THE BOUNDARY AND WIN EXCITING PRIZES**
and test cases. Performance bottlenecks were identified later in the systems development lifecycle (SDLC), and the cost to fix emerging performance issues was high and impacted our release schedule. Code quality was not easily measured. More defects arose from the system testing cycle as test cases were insufficient.

- **Goals:** Showcase delivery excellence with respect to code quality, performance improvements and on-time tasks completion.

- **Leaderboard:** Published weekly to the team to show the progress of release deliverables and announce top developers of the week along with their photos.

- **Solution:** Implementation of SONAR – an open-source code-analysis tool for improving code quality – and customization to include customer-specific coding standards. Integration of niche technology rules and code coverage under the one roof of SONAR. Automated evaluation of code using SONAR and a report sent to developers via e-mail to take appropriate actions and fix all violations. Use of performance driven development (PDD) to identify and fix performance bottlenecks in the coding phase of the project. Recognize and reward developers and module leads each week based on the progress shown along these parameters.

- **Benefits:**
  - Cost of quality was reduced 75% by automating the code quality checks and code and test coverage.
  - Development and integration of niche technology’s rules with SONAR brings more control over defect leakage.
  - Easy monitoring of the progress through automated scripts to run based on the current version of the source control system.
  - Reduction of performance-related issues at the later stage of the development cycle.

### 3Curve Gamification Contest

**3Curve Contest: Gamification**

Launching gamification contest for release deliverables – encourage team members to showcase their excellence in code quality, features completion & performance improvements.

#### Code Quality – Points Table

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Sev1 Defect</th>
<th>Sev2 Defect</th>
<th>Sev3 Defect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce new SONAR violations</td>
<td>-50 Points</td>
<td>-30 Points</td>
<td>-10 Points</td>
</tr>
<tr>
<td>Fixing existing SONAR violations</td>
<td>30 Points</td>
<td>20 Points</td>
<td>10 Points</td>
</tr>
<tr>
<td>Fixing defect raised by SME or onsite team – INT/CERT cycle</td>
<td>30 Points</td>
<td>20 Points</td>
<td>10 Points</td>
</tr>
<tr>
<td>Defect fixed by development team – INT/CERT cycle</td>
<td>25 Points</td>
<td>15 Points</td>
<td>5 Points</td>
</tr>
<tr>
<td>Defect raised by testing team – INT/CERT cycle</td>
<td>-50 Points</td>
<td>-30 Points</td>
<td>-10 Points</td>
</tr>
</tbody>
</table>

#### Performance Measurements – Points Table

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meet performance KPIs</td>
<td>50 Points</td>
</tr>
<tr>
<td>Deviation or performance degradation</td>
<td>-20 Points</td>
</tr>
</tbody>
</table>

#### Features/Tasks Completion – Points Table

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>On time task/feature completion</td>
<td>20 Points</td>
</tr>
<tr>
<td>Delay/incomplete feature completion</td>
<td>-10 Points</td>
</tr>
</tbody>
</table>

The winners are announced every Friday afternoon:

- Best module for the week
- Best developer for the week

The contest is measured under three parameters:

- Code quality using SONAR
- Features/tasks completion on time
- Performance improvements using PDD

At the end of the release, best developers and best modules and most valuable player awards will be announced.

**Rewards and Gifts**

- Trophy
- WAH Points
- Certificates

Figure 6
Gamification Tools and Measurements

Cost of Quality
- Development and integration of niche technology rules with SONAR brings more control over defect leakage.
- Cost of quality was brought down by 75% by automating code quality checks and code test coverage.

Performance
- Performance driven development (PDD) process was incorporated to address performance hotspots during development cycle.
- Reduction of performance-related issues in the later stage of development.

On-Time Delivery
- Effective usage of TFS Urban Turtle to track the development task status and timely feature completion.

Innovation & Thought Leadership
- Innovation Café portal encourages creativity among associates and recognizes out-of-the-box thinking.
- This portal helps associates to log their ideas, conduct depth rating and select the best innovation and top ideators.
- Providing interface to upload the generated ideas into iSpace portal.

Backlog Reduction
- Defect Tracker pulls down the open defects from the system and circulates the dashboard via e-mail to the development team.
- Associate takes an action based on the published dashboard and starts to fix the defects accordingly.

Figure 7

Delivery Excellence Achievements Post-Gamification

Cost of Quality
- Reduced cost of quality – 75% reduction in CoQ.
- Fully automated – integrated SONAR dashboard.
- 9.75 – Highest Codenizant Score – among the Java projects at Cognizant level.

Performance
- 90% improvement on performance fixes effort.
- APDD – performance driven development used.
- Proactive measures to identify & fix performance bottleneck in dev. cycle.

Employee Motivation & Satisfaction
- >130 rewards & recognitions – regular floor meet, leaderboard, badges, Wah! points.
- Improved employee motivation as they receive appreciation, respect and R&R throughout the gamification contest.

Innovation Value
- 400+ ideas from 90 associates.
- Implementing ideas worth $1.6 million.
- 100% innovation index – in less than 6 months.
- 30+ tools implemented.

Backlog Tickets
- Declining backlog tickets – <50 tickets pending.
- Increased customer satisfaction.

Figure 8
Footnotes


About the Author

Senthil Rajamartandan is a Senior Manager within Cognizant’s Advanced Solutions Practice. He has more than 16 years of service delivery experience with a key focus on global project and service delivery management, with an emphasis on P&L and delivery management in North America. He is currently responsible for program and solution delivery of an online legal research application developed by a leading U.S.-based legal information services provider. He has delivered large critical programs successfully for Fortune 500 organizations across multiple segments. He holds a B.E. (electrical and electronics) and a master’s degree in business administration from ICFAI university and is a certified Project Management Professional (PMP). He can be reached at Senthil.Kumar.Rajamartandan@cognizant.com.

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