Devin Gonier

Workplace Gamification of Social Media: Analysis and Strategies

Abstract: Gamification is a burgeoning field in business today and is likely to grow into a staple strategy for workplace management as the economy develops. This paper explores gamification techniques that incentivize communication in business environments using social media technologies. First, motivations for this new approach are discussed. Then, a literature review of relevant gamification techniques is explored. This is followed by a quick overview of some current products on the market today. In the next section, specific strategies are offered for implementing and developing gamification technologies for communication in business and those strategies are evaluated using the Octalysis method. Finally, the paper concludes with a methodology for testing these strategies in terms of business application and code verification.

Introduction

Much of human development can be attributed not to what we make, but how we make it. These two aspects of production (the process and result) are interdependent when the result can affect and improve the process of production. In fact, the feedback loop of this relationship is perhaps the most important contributing factor to the components of our economy which have experienced exponential development over the last two centuries. At the heart of this subject is the nature of automation and motivation. A machine does not need to be motivated to work, but costs money to make. A person must be motivated to work, and usually this happens via financial compensation. Low compensation often results in low motivation to perform. If a machine is cheap to make and can reliably perform a task that would cost more money to motivate a human to do, then that activity will likely become automated. Despite this encroachment into our compensation, many people are motivated to solve a complex crossword puzzle or exhaust their body trying to score a goal for free. Is this to drive away the demand for automation by providing incredibly cheap labor, or is there something else at work? Smart businesses try to find ways to automate simple tasks and motivate complex ones that humans are still far superior at performing. Basic extrinsic motivation is no more complex than offering a good salary and benefits package, but to motivate someone to do a job with as much passion as they would to score a goal in a competitive game requires much creative thinking on the part of managers.

Recently, the integration of computers in the workplace has led to major transformations in how efficiently people work. With the development of social media and gamification it is now possible for this integration to not just improve the efficiencies of human labor, but also create and inspire new motivations for what was previously seen as dull or mundane work. The field of research in computer science devoted to Human-Computer Interaction (HCI) attempts to connect various disciplines such as behavioral economics, psychology, and cognitive science to technological development to better leverage the power of computing in human life. Over the last two decades, social media has become a powerful force in society largely because of innovations in HCI and has on many occasions created interesting opportunities for businesses to understand their customers. Now, the growing trend of gamifying workplace activities creates yet another opportunity for HCI researchers to explore the role of technology in intrinsically motivating behaviors companies see as profitable. As it becomes relatively more important for humans to perform complex creative or innovative tasks than manual tasks which can be automated, it's essential that managers motivate behaviors that get ideas moving. This suggests that technologies which gamify communications in businesses have the potential to inspire innovation simply by improving idea-sharing in businesses.

The primary argument of this paper is that gamification strategies via social media technologies have significant potential for improving the quality of communications in business. More specifically, strategies which tap into key motivations outlined in the section on Octalysis will incentivize users to think innovatively and communicate actively within their companies. Some new strategies are suggested for further development and testing as examples of the potential for innovative thinking in the gamification of social media technologies in the workplace. Those who develop innovative well-tested approaches for facilitating communications via these methods will reap financial benefits and improve the economy overall. This paper begins by setting the stage with a brief overview of the motivations behind gamifying communications in business. It is followed by a literature review of some current gamification strategies and their potential role in social media as discussed by academics and further explored in instantiated business applications. Finally, a brief list of some novel strategies is proposed and a method for their development and testing is explored. The paper concludes on the importance of further research.

Motivations for Gamifying Communications in Business

Businesses live and die by their ideas. Old businesses become obsolete when innovative ideas fail to develop and become stale. Consultants are often brought in to liven up institutions and motivate new ideas internally. There are many reasons new ideas fail to disseminate in an enterprise. Organization hierarchy can discourage sharing ideas from bottom levels to top levels, new employees with fresh thinking may be hired only rarely, satisfaction with status quo practices may inhibit innovative thinking, or simply attitudes about discourse and participation may create a stifling atmosphere.

One strategy used by many consultants is to create games out of Key Performance Indicators (KPI) already in place. For example, The DGC Group (the company I work for) currently creates games to combine various operational metrics into scores that are highly correlated with satisfaction responses on a survey for Automobile Association of America (AAA). Instead of measuring survey responses afterwards, factors that drive satisfaction and are easy to control and measure in real time are evaluated. These include measurements like the response time to a roadside event or the incidence of keeping members informed via status updates.

Gamification is defined by [11] as "the use of game design elements in non-game contexts." By transforming many operational metrics into a synthesized score and making that score highly visible within a game context, people find new motivations and better clarity of purpose in performing their job. Gamification plays with the idea of intrinsic and extrinsic motivation by shifting a general sense of job performance into specific behaviors that have value in and of themselves as part of a larger social endeavor.

Gamification is currently estimated to grow from "USD 1.65 Billion in 2015 to USD 11.10 Billion by 2020." That's an "impressive Annual Growth rate of 46.3%. [9]' It is a growing trend in business for good reason. Much of this growth is motivated not by abstract interests but hard data which supports the view that well designed games in a workplace environment have a great return on investment. Whether cutting training time in half and simultaneously improving tenure of engagement at Deloitte, reducing call times by 15% at CISCO, or growing generated ideas by 58% at SAP Streamwork the numbers consistently support the value of gamification in the workplace [4].

Perhaps the most important side effect of the gamification campaigns DGC Group has implemented thus far is the increased communication between participants. Getting people talking to one another allows for

best-practice sharing and brainstorming. This has revolutionized problems that had previously been reduced to poorly thought out bureaucratic procedures. For the DGC Group, getting people to share has mostly been the result of team dynamics, where teams with participants who don't normally work together suddenly have a shared interest in solving problems in innovative ways. As a result, many great solutions naturally manifest from the process of *playing the game*. Therefore, if one of gamifications greatest benefits is communication, why not make communication itself a part of the game? To do so however, requires fair measurement of certain kinds of communication, which is difficult to do when communication sporadically occurs between diverse groups at various times on different days. This paper proposes that gamifying communications with social media technologies, if done with the right strategies, could significantly impact people's intrinsic motivations to share ideas and innovate with one another. In the next section, current strategies for incentivizing social media participation and general thoughts about gamification are explored. Certain new online technologies that gamify business environments are also briefly surveyed.

Literature and Applications Review of Current Gamification Approaches in Social Media and Business

Julia Vassileva in "Motivating Participation in Social Computing Applications: A User Modeling Perspective" discusses the history and trajectory of game strategies in driving participation in social media platforms. An important initial observation by Vassileva is that any successful structure must by strategically dynamic throughout time, noting that "in the beginning any contributions help the community 'take off', but later, high quality contributions are important mechanisms to emphasize" [12]. If one's primary goal is to get participation and many users, one may have a great start, but end up with an overly crowded platform filled with spam and trite remarks that users no longer enjoy participating in. Therefore, the dynamics of the social media environment must change according to what Silva et al calls "sustainable indicators." [11] Perhaps the most important factor in the maintenance of a social media ecosystem are controlling the various pulleys and levers which influence a user's motivation for being on the site in the first place [12].

Vassileva begins with a discussion of early approaches to monetizing participation via virtual currencies with real-world tangible direct benefits. Different economic theories are compared such as outside "injection" of currencies, negotiation of rates for responses to questions and the reviews of an answerer, and

micro-rewards based on certain behaviors. Vassileva notes that the actual real-world benefits of acquiring currency for social media participation depends on a view of human behavior that heavily emphasizes rational economic participation, and does not place enough emphasis on the views offered by behavioral economics that view "people as irrational" actors influenced by "social, cognitive, and emotional factors" [12]. Instead, Vassileva notes that people are more powerfully influenced by *status*, defined as credit a user can earn while in isolation "by performing certain actions," and *reputation*, defined as "the opinion of other users about the user contribution." For example, status is rewarded by factors like tenure or frequency of posting and can carry "different status levels" such as "appearance" or the number of "ratings to give out" [12] Reputation on the other hand is a "function of the ratings received by the user's contribution by other users", which is a difficult factor to control because one must also encourage users to rate other quality submissions [12]. This balance is described by Vassileva as requiring a "dynamic incentive that 'orchestrates' the individual user behaviors to produce a harmonic overall behavior of the system" [12]

The various techniques for regulating status and recognition are framed within a discussion of psychological theories about motivation. Vassileva organizes various theories along a spectrum of intrinsic and extrinsic motivation where Needs-Based theories are intrinsic (such as Maslow's Hierarchy), Social Theories are a combination of both intrinsic and extrinsic (such as the Equity Theory), and Reinforcement and Expectancy theories are extrinsic. These theories are used to diagnose the effectiveness of certain game mechanics in social media. For example, the Social Comparison Theory "can explain the motivational effect of the leaderboard pattern in game mechanics and has been the inspiration for design of incentive mechanics in several research projects" [12] In this theory, people measure themselves relative to what they perceive as their peers. The common identity theory on the other hand "makes predictions about the causes and consequences of people's attachment to the group as a whole" [12] In this theory, people's associations are more important than their perceived comparative value. Anonymity is acceptable as long as one feels a part of a larger group. It is clear that certain game mechanics have varying effects on motivations for users [12].

Aseriskis does a survey of such game mechanics, discussing the role of infinite vs. finite points or the use of badges and scoreboards. [1] All games, according to Aseriskis, carry a common center around a modelled "flow of resources", which can be framed using abstract concepts like "player skill level," "strategic

position", and "state positions." Some features of a game may drain resources, some supply it, and others transform it. Games can have infinite or finite potential access to resources and that access can be modelled according to various states of game play such as time or levels achieved [1].

What is clear from both Aseriskis and Vassileva's articles is the need for designing game mechanics that influence the right motivations in users, and then to ensure such mechanics are dynamically related to the users over time. In his book, Actionable Gamification, Yu Kai Chou discusses the relationship between gamification and motivation for various purposes in society [4]. Chou argues that successful motivation depends upon eight factors: Meaning, Accomplishment, Ownership, Scarcity, Avoidance, Unpredictability, Social Influence, and Empowerment. He challenges readers to avoid what he calls the Points-Badges-Leaderboard Fallacy, noting that "many gamification professionals seem to believe that if you put points on something boring, add some badges, and provide a competitive leaderboard, that once boring activity becomes exciting" [4]. Since gamification is a relatively new tactic for motivating performance in business environments, many professionals feel successful by implementing even the most basic derivative forms of it. Chou encourages gamification designers to analyze their game mechanics to determine how well they align with the eight factors he specifies as key motivators, in a process called *Octalysis*. Each factor in Chou's model is subdivided into positive vs. negative emotions as motivators (top & bottom respectively) and extrinsic vs. intrinsic (left and right respectively). These eight factors are briefly introduced below to serve as a reference for the analysis that follows [4]:

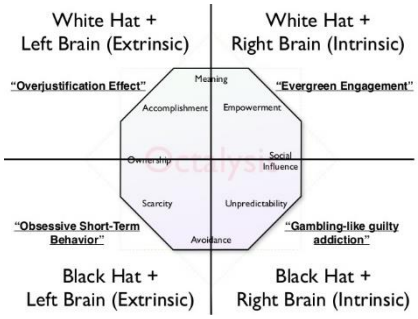


Image credit [4]

1. **Epic Meaning & Calling** – When a user feels like he is "doing something greater than himself or he was chosen to do something." [4]
2. **Development & Accomplishment:** When a user "overcomes challenges", "develops skills" or "makes progress" in something difficult [4].
3. **Empowerment of Creativity & Feedback:** Having opportunities to express creativity and receive feedback from that expression as a part of a problem-solving process.

4. **Ownership & Possession:** When a person feels they own the results of their actions, such as a user profile or accumulating points or wealth in a game.
5. **Social Influence & Relatedness:** The spectrum of motivations that stem from feeling accepted, appreciated, or included by others (companionship) to the desire to outperform others or at least have the same goods or skills that they do (envy).
6. **Scarcity & Impatience:** When a person desires something more because they can't instantly get it or because there is not a large supply of it.
7. **Unpredictability & Curiosity:** The motivation to know what will happen next when an outcome is uncertain. This can be negative in the case of gambling, where one is addicted to getting an outcome which remains uncertain.
8. **Loss & Avoidance:** This is a similar motivation to ownership, except that a person desires to protect what they have or avoid quitting when they have invested significant time in an activity, since to do so would be an admission that the time was a loss**.**

Chou acknowledges a 9th quality (sensation), but argues it is a much more difficult aspect of motivation to control via game mechanics. Physical pleasure is different from other psychological aspects of motivation, which can be more easily manipulated by game mechanics. Chou's model may not be a perfect representation of motivation in human beings, but it does serve as a useful strategy for evaluating gamification and its effect on users. Where possible in what follows, certain practices will be related back to these features [4].

Current Business Products in Gamification

Several gamification platforms have manifested over the past few years, and that number is likely to increase. In this section, some key products will be highlighted and special attention will be given to features which relate to business communications.

Badgeville

Founded in September 2010, Badgeville (https://badgeville.com) is based in Sillicon Valley and was recently acquired by Callidus Software for approximately $40 Million in June 2016 [5]. The company specializes in business gamification platforms and claims several impressive features, many of which relate to communications. The 'Rules Engine' is the primary component of the platform used to define business rules that track specific behaviors related to industry specific performance, which can be specified from a behavior library (including behaviors like '30 days accident free') or customized to the specific interest of the client. The Engagement Engine and Impact Engine both relate to quantifying participation in their social media platform using metrics like frequency of posts, number of shares or replies by other users, or frequency of site visits. The Reputation Engine and Guided Experience engine both provide unique user experiences based on specific goals and measurement of milestones related to those goals. For example, "a user becoming an 'Expert in Data Science' will have a different path from someone who will be an 'Expert in Facilitating Discussions" [2]. These various measurements are then put together to form a leaderboard for users to see how they compare with others. The Badgeville website claims many impressive case studies in which participation according to various indicators (such as number of documents shared) improved [2].

Gameffective

Founded in October 2012, Gameffective (www.gameffective.com) is based in Tel Aviv and received $7 million in investment funding last year. Gameffective also focuses on online gamification platforms, but seems to have very little social media integration [5]. Besides the standard tools associated with a well-designed dashboard that measures various targets according to KPI's set by a client, the platform offers "micro-learning" opportunities to users which fall behind others in a domain, and then publicizes a user's progress in those domains. Users can see how they compare to others and to their own milestone using a racing metaphor graphic [6].

LevelEleven

Also founded in October 2012, LevelEleven (https://leveleleven.com) advertises three categories of unique features for its gamification platform. The first is a 'Scorecard' which is specially designed to allow users (via their desktop or through an app) to focus on the metrics that matter most as determined by supervisors or managers and makes progress with goals clearly defined with status updates like "Ahead of Pace" or "Behind Pace" [8]. The product claims to help new employees learn from veterans via peer to peer communications. Another interesting feature of 'scorecard' is its ability to store baseline data for a user to indicate when consistency is becoming a problem. The second major feature offered on the LevelEleven platform is the 'contest engine,' which makes it possible to create sales contests quickly and easily to motivate behavior when it is more sluggish than normal. Finally, their 'Channel 11' feature is essentially a real-time leaderboard that makes it easy to publicly recognize certain behaviors or make announcements [8].

Gigya

Gigya, founded in June 2006, is a much larger company currently funded at approximately $106 million [5]. They specialize in "Customer Identity Management Platforms," but have recently begun integrating gamification tools. Gigya views gamification technology as a feature instead of a product, offering gamification tools as "plugins." No plugin seems particularly unique, but they manage to capture the essence of what many competitors offer. What distinguishes them is that these tools are features of a larger platform used for a variety of purposes. The results and activity are more readily accessible. Achievements, badges, profiles, and notifications of progress are all more visible than other platforms which might require users to travel to a particular webpage and login to see results [7].

Microsoft

Finally, Microsoft is offering a gamification plugin for its CRM software Dynamics 365, which is free with the Dynamics 365 software. The software is heavily motivated by sports analogies, allowing users to visualize activities on fields, draft players to specific teams, view stats and user profiles, and chat. Although the technology is fairly basic compared to some other products previously discussed, Microsoft's software also

has the advantage of being highly integrated in a system already being used for other purposes, making it easier to have real-time access to certain KPIs [10].

Current Product Observations

Workplace gamification is a growing trend in business. The products outlined here are not exhaustive of the current gamification technologies marketplace, but do suggest some of the major trends and growing interests. Currently, the priority is on gamification of KPIs that are industry specific, but some companies like Badgeville are innovating ways to emphasize the communication advantages associated with gamification in the workplace.

Products which have milestones and progress updates like Badgeville and LevelEleven successfully influence *development & accomplishment* and *ownership & possession motivators*. Furthermore, platforms like Badgeville which quantify participation in communication outlets also effect *social influence and relatedness*. However, there are still many motivating opportunities that are being neglected by most of these products: including *scarcity and impatience* (Is enough emphasis being placed on finite rewards or time-frames?), *loss & avoidance* (Can a person lose points or fail?), *unpredictability & curiosity* (Does the game change in unpredictable ways?), *empowerment of creativity and feedback* (Are there small challenges that require innovative solutions with quick feedback?), and *epic meaning and calling* (What is the grander purpose or narrative behind the game?). It's unfair to say none of these motivators are influenced by the products discussed so far, but there are serious deficiencies in many of these domains. The primary purpose of the previous survey is not to critique these products, but to give the reader an overview of the current technologies being used in the gamification of workplaces. In the next section, some new strategies are discussed for gamifying business communications.

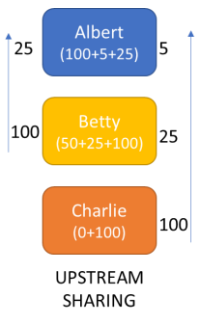
Some Novel Strategies for Gamifying Social Media in the Workplace

1. *Rethinking the Follower and Followee Dynamic*

As has already been briefly discussed, recognition is a powerful motivator for people. Fame has many faces. It can be heavily correlated with cultural activities, various art forms, humor, innovation, or other social factors. Many social media platforms leverage fame and recognition as a tool for driving participation. One common approach involves some form of demonstrated popularity (karma or upvotes), which can lead to *followers* that listen to ideas or thoughts shared by the *folowee* (the person being followed). In many cases upvotes can also lead to higher priority ranking in certain forum views of topics. Recognition is quantified by the number of followers or upvotes a user has acquired. This dynamic however, could be more sophisticated.

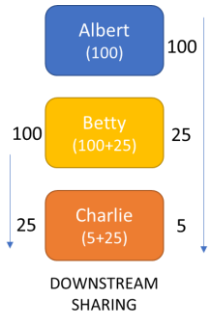
Consider first how pyramid schemes work. An early participant A (call him Albert) theoretically sells an item X, and then overtime recruits another participant B (call her Betty) to sell item X. Albert receives 100% of the profits from his sales, and a small percentage of the profits from Betty's sales for being recruited by Albert (either in the form of direct commission or bulk sale of items to Betty). If Albert is crafty, he will recruit enough people to sell X, so that he no longer needs to actually sell X to customers. Instead, he only needs to find new sellers from which to collect a percentage of their sales. If Betty thinks like Albert, she will do the same and try to recruit Charlie, which will benefit both Albert and Betty. The chain goes on like this so that it is very profitable to be the first recruiter and very unprofitable to be the last.

Social media platforms often struggle with the "take-off" phase of their development. Assuming recognition in the form of points is valuable, then like monetary pay-offs a pyramid scheme approach would incentivize participants to invite others. In such a scheme, Albert receives a percentage of the upvotes of Betty instead of a percentage of her profits. For example, assume that Albert invites Betty to join the platform and then Betty invites Charlie to join. Albert currently has 100 upvotes, Betty has 50 upvotes, and Charlie has zero. If Charlie receives 100 upvotes for a post he has just made, his new total is 100. Betty will automatically receive 25 votes (for a new total of 75) just for having invited Charlie, and Albert will receive 5 votes (for a new total of 105) for having invited Betty who invited Charlie. If Betty were to then post something that received 100

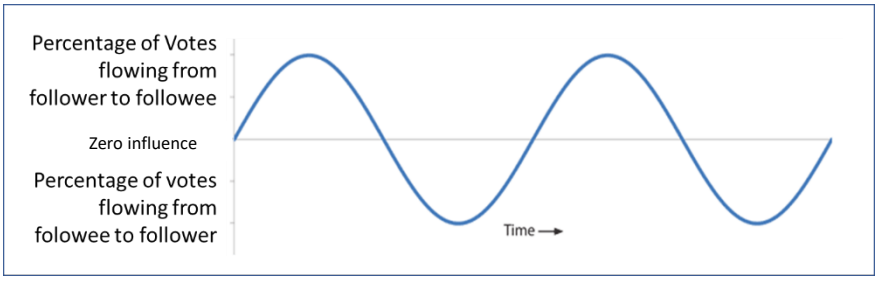


upvotes, Charlie receives zero upvotes (since Charlie is down-stream of Betty), but Albert receives an extra 25 (for being directly up-stream of Betty). In this way, people who have invited many people that also invite many people will have access to significantly more votes just for having invited those people.

The problem with this approach is that it clearly benefits the early participants, and while it may help start a platform, eventually it degrades the platform because late-comers would have very little voice relative to early starters. In other words, the flow of upvotes is one way: upstream (newcomers to early-starters). Now consider the opposite. What if the stream moved down instead of up? A newcomer would automatically get a percentage of the votes of everyone above them in the chain (i.e. Charlie gets 25% of Betty's upvotes and 5% of Albert's upvotes). In this scenario, it would be to one's relative advantage to be new and not invite others and to one's disadvantage to be old and invite. The optimum scenario is clearly neither upstream nor downstream. Rather, one could oscillate between both over time and in response to certain states of the community. The rate of oscillation could depend for example on the size and amount of participation between users at any given point. Theoretically there will always be an optimum level of upstream weight to downstream weight to keep people inviting, participating, and sustainably staying in the platform, but that level will necessarily change as the community changes.



The chain of users (i.e. Albert to Betty to Charlie etc.) can be determined in several ways. It could be based on invitation, or perhaps more appropriately it could also be connected to whether a person is following or being followed. This relationship is related to the Prisoners Dilemma, in that despite technically being in competition with one another, the optimum scenario is for me to follow you, for you to follow me, for me to upvote you, and for you to upvote me, since each user gets the upstream and downstream benefits. Generally speaking, in order to win one ought to have many followers, follow many people, post frequently, upvote



others, and be appreciated by others through upvotes. All of this is assuming users are in competition with one another for attention or some other prize, and is designed to dissuade inactivity or exclusivity as a way to gain advantage in a competition. I call this model *shared sine-stream voting,* since upvotes are not restricted to the users who receive them, but are shared throughout one's connections, and exactly how that distribution occurs depends on a sine-wave oscillation between different weighting systems.

2. *Types of Voting*

This approach is made more sophisticated by considering the variable of voting itself. There are four types to consider: voting finiteness, voting categories, group identification, and investment voting. A finite vote refers to treating voting as a scarce resource, which can be spent and lost. Usually players in a finite system would start with an initial finite supply for giving out and then would attempt to spend votes and post strategically so as to get other's finite supplies. Infinite voting on the other hand implies an unlimited supply of votes for which players never run out of as a distributable, but can only receive a limited supply from others. A mixed approach assumes that players have some types of votes which are finite (such as themed badges), and other votes (generic upvotes) which are infinite. Assuming categorical differences in voting have different roles in a game (either as being worth more or as affecting a different component of a score), a mixed voting approach probably maximizes participation as no one is ever completely out of the game, but everyone feels a sense of scarcity for certain kinds of voting. The categorical vs. general differentiation follows from this latter distinction. Categorical voting has a specific badge-like meaning (such as an idea being uniquely innovative, highly relevant to the user's circumstance, or the right answer to a specific question), whereas generic voting is a general statement of appreciation without specific meaningful content (i.e. just a general upvote). In a mixed system, users can have some infinite category of voting and some finite category of voting. Group identification refers to voting as a group (this will be discussed more in a later section).

Finally, investment voting assumes a finite supply of the investment communication currency. This finite supply is *invested* in good ideas and the followers who create those ideas with the hope of more return votes through investment sine-stream sharing chains. However, investment voting should also assume the possibility for negative votes, and must account for people who dislike a post or unfollow a user. Investment

voting forces users to really evaluate the worth of an idea, or frankly a person's tendency to produce good ideas, since poor investment in another's ideas (just like in real life) could result in negative consequences. This especially has value in a workplace, where it's important for users to post knowing their ideas have real-world consequences.

3. *Dynamic Profiling – Trends, Skills and Interests*

Finally, all of this only makes sense if voting means something in a business environment. While some may feel recognition is itself worthwhile, others may be indifferent to how many votes or points they acquire. If points have no relevance to a specific game campaign (with actual monetary rewards), users like this would be less likely to participate. However, almost every successful business person has an ambition to climb higher in the management structure of their institution. That climb ultimately depends on performance evaluations, tenure, opinions of colleagues, and the particular requirements of the opening. A platform that successfully measures and records demonstrated skills and relevant ideas for the business would be a great asset for someone who wishes to grow in a company. In other words, social comparison of relative skills and ideation according to very specific domains of business acumen could give a huge boost to applicants when positive or inhibit them when negative.

The measurement of skill-specific business acumen would begin with an initialized setting by the user of certain skills in a zero-sum assignment of finite points. In other words, if there are fifty key business skills (coaching, research, data analysis, administration, etc.) and a person only have 30 points, they choose the skills that are most appropriate to them and weight those skills appropriately. Someone who is very good at data analytics for example, may place 10 of their 30 points on data analytics and only one point on 20 other skills. After initialization, a person's various skills grow without limits in two ways. First, other users can visit that person's profile (much like Linked-in) and give a limited amount of points to that user in various skills. Second, if a user posts something, each upvote they get for that post carries a specific weight of values from the user who did the upvoting, which is then assigned to the poster's profile. For example, if user B has 100 points in data analytics, when they upvote user A's post, a percentage of their 100 data analytics points is added to user A's profile (but not subtracted from user B). Thus, each upvote received grows user A's skill-set

depending on the type of person (i.e. skilled in data-analytics or marketing, etc.) that upvoted them. Very highly skilled individuals then have very powerful votes and their votes are an expression of their unique skill set. This ensures that an upvote is more than just general, but is specific to the voter, because it represents the unique skill-set or expertise that voter has acquired. Over time, a user develops a skill-set which is reflective of other's opinions and the genres and quality of their posting history.

4. Group Dynamics and Identities

Shared Sine-stream voting gives greater power to one's associations, which is why it can emphasize the importance of group dynamics in social media. This is particularly important for competitions within and outside of an organization. Inside an organization, at any given moment there may be team-based competitions which measure success according to Key Performance Indicators (KPI) such as the percentage of satisfied customers in a particular branch according to a survey. The scoring of such competitions should be bound together with communications throughout the campaign. These types of competitions reward best-practice sharing, both inside and outside of certain team structures. Shared Sine-stream voting allows for the manipulation of different kind of group associations. In other words, instead of a binary relationship between two users (follower and followee) there can also be group associations of users, and associations between different groups of users, all with their own unique dynamic weighting structure for distributing votes in a shared sine-stream approach. This allows for team associations that are based on geography, skill-set, interests, project, job department, or via other arbitrary means to influence scoring of communication. Essentially, group identities are users which don't post, but receive partial credit from posts of each participant and distribute credit to other users that are a part of that group. In other words, groups identities can essentially function as distributors of credit. The shared sine-stream oscillation algorithm can influence the dynamics of distribution for a group by regulating the flow of voting credit from a participant to the group and from the group to a participant.

Furthermore, this more sophisticated way of measuring participation as a component of association, allows for a strong indicator of overall health of discourse in an organization. Therefore, two companies in similar industries could theoretically compare themselves to each other according to this discourse dynamic. For example, the Automobile Association of America is made up of 50 clubs that all perform similar functions

in different geographical areas. These clubs have completely different management practices and employees, but regularly compete on certain KPIs. Currently they (like most businesses) have no way of measuring the health of inter-organization communication dynamics. Group associations via shared sine-stream voting would allow clubs to measure themselves relative to one another on their abilities to innovate by sharing ideas and communicating with one another.

5. *Leaderboards, Levels, and Challenges*

At this point it is probably clear that social comparison as a motivator is a significant driving force behind the thinking of these various strategies. For this to be successful, it needs to be clear who is winning, and where any user stands in relation to others. Rankings ought to be measured in a variety of ways. On a user-individual level, factors like tenure and skill-set should be taken into account so that peers are compared to one another in addition to being compared to the entire group. In the case of very large environments, different classes should be used for defining leader boards much like pro-sports is compared to amateur sports. Finally, group identities should also be ranked according to other similar groups by size of group, type of group, or competition.

Another component to consider along these lines are rule changes or feature changes that are level dependent. In other words, if a user is falling behind, should the rules be changed in minor ways to give them advantages and vice versa for leaders? Furthermore, various community dynamics may dictate how the community environment should operate. Instead of user or group levels, an entire social media community could *level up* once a critical mass of voting has been reached. Instead of social media companies releasing features as they are created, those features could be released in response to the level of the entire community. Furthermore, dynamics such as the oscillation frequency of a shared sine-stream voting system may be partially dependent on variables such as the size of the overall community. In this way, there is incentive to participate so that the whole community benefits as a result.

Algorithms which make such determinations ought to ultimately seek overall community health (measured by various factors of engagement), and make stochastic changes to the environment in order to create a minor sense of uncertainty in users. Furthermore, weighting variables could also be used to influence surge participation via challenges. Such challenges could be created by managers, or could simply be

stochastically regulated by an algorithm which pays attention to various indicators. Ideally, challenges would be a combination of weighting adjustments in an algorithm and specific goals or questions generated by managers or users. For example, if there is a particular question highly relevant to the business at a given moment, that question could be posed to the entire community and participation incentivized through increased weighting of voting. The challenge could be time dependent and spontaneous, so as to create excitement and energy without warning. This uncertainty both in random variable fluctuations and specific challenges makes play via communication more interesting, as chance always adds a level of intrigue to any game.

Octalysis Strengths and Weaknesses of Proposed Strategies

Perhaps the most important octalysis motivator in the strategies discussed so far is *social influence & relatedness*, since users earn point through recognition and appreciation from and towards other users. Group identification is also a powerful force in these algorithms. This is the most obvious motivator for any system that gamifies communication via social media technologies, but also probably the most important to influence given its overall purpose. *Epic meaning and calling* is unfortunately not heavily influenced by these strategies, since they lack narrative or framework for a grander vision. Nonetheless, it's worth noting that these methods allow for clearer evaluations of the success of large groups or companies. Those company scores could be compared to other companies and play on a user's corporate pride in the same way that patriotism might for a citizen's participation in a country.

Development & accomplishment and *ownership & possession* are probably most influenced by Dynamic Profiling. Expertise is a powerful force in this strategy and can only be generated through participation and appreciation by others. Experts have more power in the community, but also need community involvement to be deemed experts. Experts accumulate expertise by recognition from other experts voting on their posting, and then themselves are empowered to act as experts in the community for others.

Challenges that create surge participation in specific domains have the potential to influence *Empowerment of creativity & feedback*, but this is heavily dependent on the quality of challenge topics created by management. Making challenges time-constrained, certain types of voting finite, and dynamic profiling constrained to limited self-promotion creates a strong motivation via *scarcity & impatience.* Additionally, if

challenges are unpredictable, and fluctuations in shared sine-stream oscillations is stochastically influenced, users will also be influenced by motivators of *unpredictability & curiosity*. Finally, allowing downvotes or negative voting, especially in an investment-voting model creates a sense of *loss & avoidance*, which is important for any workplace social media environment since it encourages only quality submissions. If users place too much emphasis on quantity rather than quality, the platform will be difficult to use as an information repository, but if posting runs the risk of having a negative score people will post more carefully.

Testing Social Media Gamification Strategies in Business

Some of the strategies discussed here will probably fail. Large group communication dynamics are notoriously difficult to predict. However, this paper asserts that at least a few strategies presented could positively influence the dynamics of discourse in businesses that participate. To approach this problem more scientifically it is important to gather data on each strategy and evaluate it in comparison to a control group. However, one should note that any strategy for gamification that is specifically aimed at information sharing via a social media outlet will probably also need to be combined with other mechanisms beyond communication. The current state of gamification suggests that businesses will only be interested in whole-package solutions, and social media gamification mechanisms offered in isolation wouldn't be as competitive as technologies that combine information sharing incentives with other behavior incentives that are based on industry specific KPIs.

There are two levels of testing necessary for the strategies discussed in this paper. First, each approach ought to be tested in isolation for a specific business game campaign. Then, a similar campaign should be offered for a similar company without the strategy being tested. In other words, a basic forum space should be created in a game campaign without some of the bells and whistles discussed in this paper, but for which game participants of their own volition may choose to use without incentive. At the end of each campaign the participation of users should be compared across a variety of different metrics including (amount of posting, frequency of site visits, voting, etc.) and users should be surveyed about their experiences. After each strategy is evaluated in isolation, combinations of strategies should be tested against control groups, as it may end up being the case that a specific combination of approaches works better than all approaches combined. The DGC

group is in a unique position to do this kind of testing, as our main client involves multiple clubs within AAA. Each club offers very similar products, but operates almost completely autonomous of the others. By running similar campaigns, but using different game mechanics as strategies for incentivizing communications it should be possible to test the potential success of these programs. After each approach has been properly tested, the right combination of strategies will be combined into a platform with a better user-interface, more marketing, and the potential to be scaled for other clients in different industries.

In this final stage of development (and preferably during certain periods of market testing prior) certain software verification techniques will need to be performed to measure the accuracy of the software itself when compared to the intentions and specifications of the strategies. The exact specifications of such a process are beyond the scope of this paper, but it is helpful to look at an example of how one component could be measured. Consider for example, the basic aspect of upvotes with an infinite supply vs. badges with a finite supply. The purpose of such a system, as has already been briefly mentioned, is to incentivize participation and prioritize information for easy access by information consumers. There are three categories of specifications that must be taken into account when designing such a forum: Game Rules, Participation Rules, and Search Rules. Below a couple rules in each category are highlighted and discussed in terms of the process of logical specification for verification purposes.

In the first category (Game Rules), a point is given for new topical posts and when credit is given by other users for that post. Credit can be given by a simple upvote which each user has an infinite supply of or by the assignment of an appreciation badge such as “Big Idea!” or “I’m Going to Do it in My Branch!”, for which each user has a finite supply. Whether or not a post is topical is determined by the use of keywords specified in the original topic question. For example, if the topic of the forum question is, “How do you coach your employees on Trip-Tiks?”, posts that don’t include words like ‘Trip Tik,’ ‘Employee,’ or ‘Coach’ will get flagged to be evaluated by a moderator. If flagged, the post is not necessarily excluded outright, but will be evaluated to determine its topicality. This is to help minimize spamming or irrelevant posting. Each user is limited in the number of badges they can award. For example, a user may begin the game with 10 “Big Idea” badges and 15 “I’m Going to Do it in My Branch!” badges, for which they must use sparingly when evaluating other posters. A user cannot give more than one of any badge to a single post. So, one logical property to be

evaluated would be, “No user may give more than one of a single type of badge for a single post.” This general rule could be formalized using the following expressions:

- All badge points of badge-type x for a post p from user z are unique.
- All badge point assignments of badge-type x by user z for any post p may be only given once.
- After assignment by user z, the number of badge points (other than upvotes) belonging to user z of badge-type x will be reduced by one.

Here there are three key variables to be evaluated: the post itself, the badge or upvote assignment, and the user doing the assigning and receiving the assigned credit. These statements can all be expressed in second order logic using basic set theory and classical logic notation.

In the second category (Participation Rules), the goal is to minimize threat of improper use of identifiable information. For example, no full names may be used, no users without login access may post or read posts, and no posts can be made anonymously. Fortunately, such specifications are fairly standard and turnkey solutions of this type can be found without too much difficulty. The last category (Search Rules) are designed to optimize the ability for users to find information posted by other users. This will involve tagging restrictions. Any post made in response to a forum topic will automatically be tagged according to that topic, and other tags will be restricted to a list that prevents redundancies. The desired effect is that users who wish to find ideas may easily search by forum topic, tag, or badge reward. The variables in this category: are tags (their quantity and redundancy), topics, and how badges and upvotes prioritize search results.

Each of these specifications could be initially setup in a model checker that runs on an automatic theorem prover. The model checker could then evaluate the effectiveness of software according to these rules by posting in various ways, assigning upvotes and badges in various ways, and doing so from various user perspectives. Finally, traces of behaviors can be matched up to final scores to evaluate whether or not behaviors appropriately correspond to scoring intentions, searches could be done to evaluate the ease of finding relevant information, and checks could be done to ensure initial specifications are not violated by the code itself. Using ATP’s as part of development or verification afterwards will prevent cheating, and will ensure the usefulness of the forum as a repository for ideas.

Conclusion

The goal of this paper is not to simply defend or advocate a particular strategy in workplace social media, but rather highlight the incredible untapped potential that still exists in this field. In the early days of social media development, a similar craze to the one happening now with gamification occurred in many businesses. This led to a surge in "expert consultants" who ultimately contributed very little but were well paid. Synthesizing the advantages of social media and gamification into tools that improve *how* we work could have extraordinary effects on our economy, which is why it is worth the attention of HCI researchers. As the economy transforms into more decentralized models where employees no longer need to be present in offices, we will see growing emphasis on technologies that enhance alternative means of communication. Companies that think creatively in the development of communication strategies that improve efficiency and intrinsic motivations for idea-sharing will prosper in this new environment. For that reason, gamification via social media technologies in workplace environments is likely to have a powerful impact in how we work, and thus also the quality and speed of what we make.

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