



Gamification in Transportation

Los Angeles County Metropolitan Transportation Authority
Information Technology Services Department

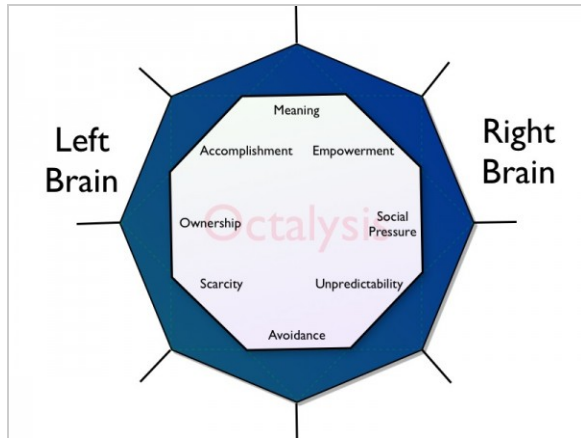
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2014-2015 Coro Southern California
Fellows

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Introduction

Gamification, in the most literal sense, is the application of game mechanics in non-game settings to enhance user participation and satisfaction. In the context of a public transit authority, gamification is the application of game mechanics to improve rider engagement and satisfaction, and provide riders with information and rewards.



Yu-Kai Chou, a world-renown gaming expert, is an international keynote speaker for a TEDx series around gamifying daily life tasks and is presently a lecturer at Stanford University. After years of researching, Chou created a system to address the most effective ways to gamify every-day tasks to harness the power of playing. According to Chou, gamification starts with motivating a person's core drive by

challenging the person to think creatively and freely.

Octalysis (a framework invented by Chou) teaches gamers effective tactics for gamification. This design framework is based on an octagon shape with eight core-drives (meaning, accomplishment, empowerment, ownership, social pressure, scarcity, unpredictability, avoidance). These eight core drives motivate humans to achieve their goals while playing games in their everyday lives.

Core Drives' and Meanings

Epic Meaning & Calling

The Core Drive where a player believes that he/ she is doing something greater than himself or that he/she was chosen to do something. As a result, the player devotes a large amount of his/her time to maintaining a forum or helping to create and facilitate things for his/her entire gaming community.

Development & Accomplishment

Development and accomplishment is an internal drive to making progress, developing skills, and overcoming challenges. A badge or trophy without a challenge is not meaningful.

Development and accomplishment is the easiest design to implement and is what most badges and leaderboards use in gamification.

Empowerment of Creativity & Feedback

Empowerment of creativity and feedback occurs when users are engaged in a creative process where they repeatedly have to figure things out and try different combinations.

Humans need this to express creativity and see the results of their creativity, receive feedback, and respond. An example of this feature is Legos.

Ownership and Possession

Studies show that ownership is a key drive to gamification. People want to improve what they own. This drive deals with many virtual goods or virtual currencies within systems. If a person spends a large amount of time customizing their profile, they automatically feel more ownership. This drive can relate to people's passions to collect stamps or do puzzles.

Social Influence & Relatedness

Social influence and relatedness incorporates all social elements that drive humans.

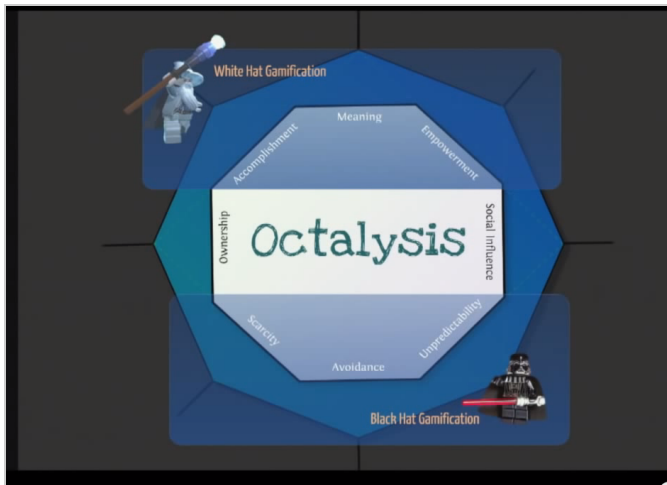
Examples are: mentorship, acceptance, social responses, companionship, competition and envy. When humans see their counterparts achieve at something, they become driven to reach the same level. This drive also encompasses a need to draw closely to people.

Scarcity & Impatience

Scarcity is an element that ties into humans wanting what they can't have. Many games encompass appointment dynamics, stopping the game and forcing players to come back after a certain amount of hours.

Unpredictability & Curiosity

When humans don't know what is going to happen, their brain becomes more engaged. Examples of human engagement of unpredictability and curiosity are raffles, lotteries, and gambling.



Loss & Avoidance

Loss and avoidance is a drive that promotes negativity in brain cells. Examples of this can range from losing employment to rewards fading away on a gaming system. This drives humans to act immediately. ¹

In his research, Chou explains that gamification should want to create a “white-hat” experience, the top half of the octagon. Experiencing things such as

scarcity, avoidance and unpredictability will only result in the gamer discontinuing their game.

For the purposes of this project, Coro Fellows divided gamification into two categories: games and incentives. Literal games is the use of game mechanics on public transit systems, and incentives are rewards and bonuses given to riders to encourage use of public transit and increase rider satisfaction. The two are not mutually exclusive, and can often heavily overlap. Using this understanding of what gamification is, Coro Fellows Sean Kiernan and Shelbi Augustus, conducted research over a four year period, administered surveys to riders, and interviewed gamification transportation experts in order to assist Metro Los Angeles as a guide for bringing gamification to Los Angeles.

Psychology of Gamification

In order to break down psychological factors of gamification, one must first explore the psychology of motivational factors that contribute to the need for gaming. Motivation can be

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<http://www.yukaichou.com/gamification-examples/octalysis-complete-gamification-framework/#.VTCUCF5H3II>

divided into two separate subtypes: intrinsic and extrinsic. Intrinsic motivation drives humans to complete a task for personal enjoyment. Intrinsic motivation is the best approach with gamification because it helps foster long term engagement, enjoyment, and creativity within humans.² Extrinsic motivation drives humans to complete a task to earn an external reward or avoid punishment.

In order to stimulate humans, human brain signals release a neurotransmitter called dopamine that regulates motivation and causes individuals to attempt to obtain something. Dopamine's chemical signal passes from one neuron to the next in human brains interacting with various receptors.³ When dopamine neurons fire unpredictably, humans get a rush of pleasure. Gamification attempts to tap into a higher release of dopamine through rewarding completions of small goals in order to inspire motivation. The more goals achieved, the more dopamine human brains release. This is why gamification tactics tend to be more successful than setting goals.⁴

Project Approach

During week one of the project, Coro Fellows conducted preliminary research to serve as a foundation in order to survey and identify examples of other transit authorities' gamification use. The Fellows consulted with their supervisors at Metro, game developers at UCLA Game Lab, Dr. Kari Watkins of Georgia Tech University, RideAmigos, and identified examples of successful gamification use in transit around the world. From this, survey questions were developed, in consultation with Metro, based on what the Fellows believed Metro needed to know about its rider base to implement gamification successfully.

Weeks two and three consisted of Fellows traveling on both Bus and Rail Line, as well as canvassing Metro stations to interview a broad range of Metro riders and administer the

2

<https://community.lithium.com/t5/Science-of-Social-blog/Gamification-101-The-Psychology-of-Motivation/bap/21864>

3

http://www.researchgate.net/publication/264495468_Gamification_in_Psychology_A_Review_of_Theory_and_Potential_Pitfalls

⁴ <http://lifehacker.com/how-to-harness-your-brains-dopamine-supply-and-increas-1496989326>

survey. During week four, Fellows synthesized and analyzed survey results and produced this report.

Information From Interviews



Coro Fellows were able to speak with some of the experts behind research on the effectiveness of gamification. Dr. Kari Watkins of Georgia Tech University (pictured on the left), in addition to her research, has spoken at gamification forums and been featured in the transportation blog Mobility Lab.

According to Paul Goddin's article on *Gamification, Technology, and Improving Transit Rider Satisfaction* covering the Innovation in Public Policy Summit in which Watkins was a panelist, "Kari Edison Watkins, assistant professor of engineering at Georgia Institute of Technology, Kari began by acknowledging that riders avoid certain transportation modes due to perceptions regarding comfort and safety. Watkins' research at Georgia Tech demonstrated how providing real-time information about transit arrival times can positively affect both riders' *perceived and actual* wait times, and increase rider satisfaction levels. Systems such as the open-source OneBusAway, which operators can implement on the back end, have the potential to get more people to use transit. But technology, contends Watkins, is not enough. At its most basic level, getting consumers to choose one form of transportation over another involves making that option more attractive than the others. If a ride is uncomfortable, or the infrastructure poor, then riders probably won't choose it no matter how much real-time information they are given. Transportation policies need to ensure that these vital systems are properly funded and maintained."

Sean Kiernan spoke with Watkins about her research. The conversation covered Watkin's suggestions and guidelines for using gamification successfully, and the questions riders should be asked to yield useful information to Metro.

According to Watkins, what riders are and are not willing to do is an important distinction to understand when using gamification. At its most basic level, gamification enhances rider satisfaction and participation in activities they are already inclined towards or enjoy

participating in. Gamification will most likely not be effective if used in an attempt to push people to do something they are not going to do in the first place.

When dealing with something riders already participate in, or have demonstrated some level of interest in, gamification can be used to provide the extra push needed to produce participation, or extend average participation time or level of engagement. A notable example of this Watkins cited was Portland, Oregon's "gamified" mapping of the entire public transit system.

Portland provided the public with a way to become engaged in determining their public funds were going to be used. In a SimCity-style game, users could determine how they would want the public transit system mapped out (with future proposals being seriously considered as the bank of options). According to Watkins, making a game out of seeking public input did not create participation among people who were not interested in this in the first place, but it did foster increased participation from those who were interested in giving input. Someone who normally would have spend one minute doing it would likely spend five or ten minutes if the process were made into a game.

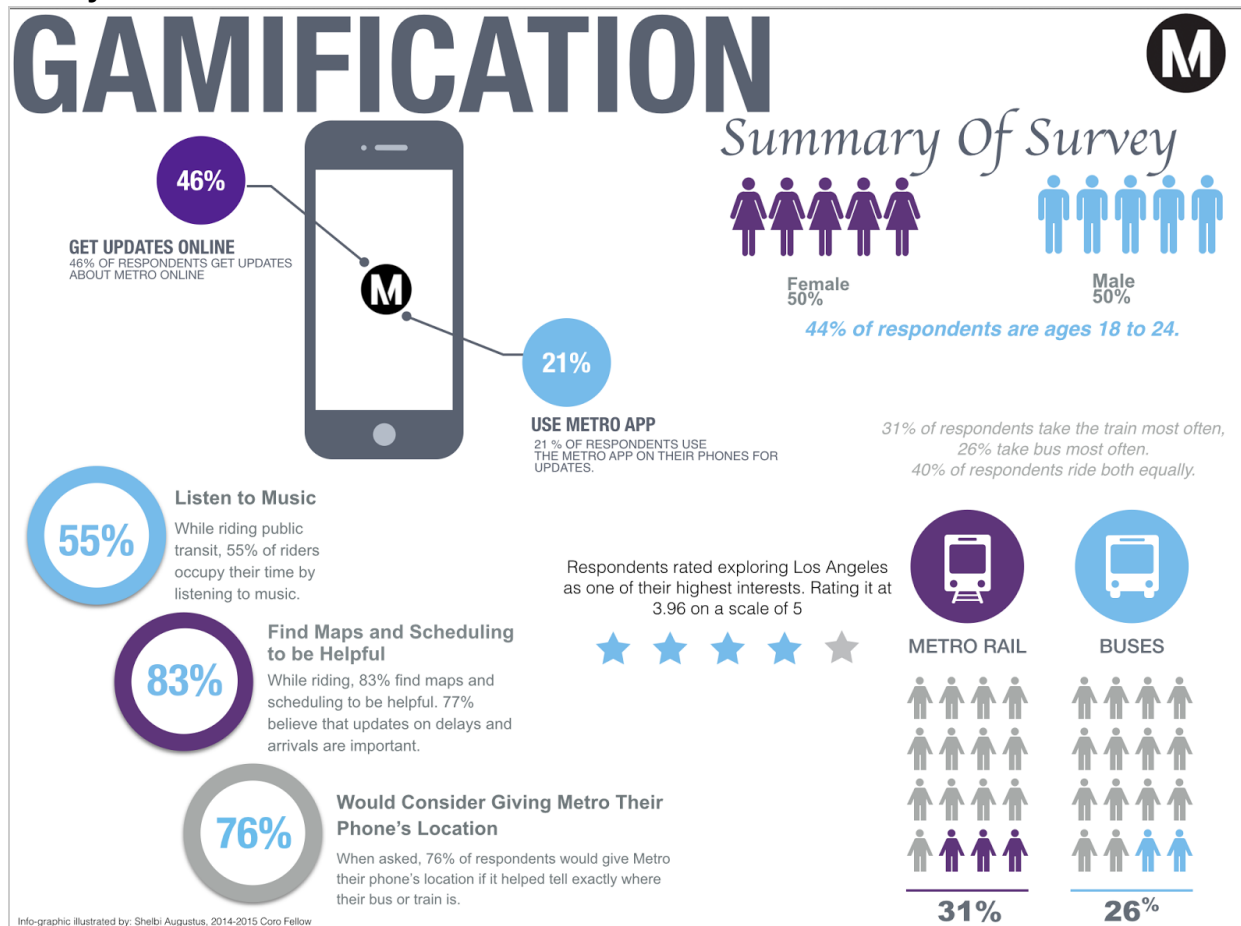
Shelbi Augustus interviewed Jeffrey Chernick, the CEO of Ride Amigos. According to their website, Ride Amigos is a web-based, multimodal transportation solutions, providing regional commuter networks, multi-modal travel dashboards, certified transportation commute surveys, trip trackers, reward systems, and GIS reporting tools. During the interview, Chernick spoke on the importance of creating an experience for riders. "Think about it, Virgin America is twice the cost of many other airlines, people ride it because of customer service and appearance. That's what gamification is all about, a breath-taking experience," Chernick said.

Chernick also spoke about how the creation of experience is the toughest part of implementing gamification. He stated that Ride Amigos is presently in the process of creating an App that will gamify transportation through the speed of a gamer's movement. An application such as this is essential for gamifying transportation through incentives. Both Fellows met with Eddo Stern at The University of California Los Angeles. Stern spoke about the different gaming approach that his students in the gaming lab take. "UCLA Game Lab approaches gaming as an art as opposed to something for-profit. Our students are taught

to cultivate the gamer through things that can range from life lessons, education, to race-relations, and feminism,” Stern said. The Fellows also met with The University of Southern California’s (USC) Game Lab. USC has a number of internationally successful games, some of which are: Darfur is Dying, Cloud Flow, and Night Journey. Some areas of game design that students in gaming at USC study are: experimental game design, narrative play, and game aesthetics.

After meeting with both USC and UCLA, our recommendation is that a limited partnership is enabled amongst the two universities. Both gaming labs have very different approach in how they want to captivate their gamers. Requesting extensive partnerships may result in games not being produced to their full potential. If Metro would prefer the two schools to partner together, our recommendation is that each school produces its own game and both be featured on buses and rails. Metro should not ask the labs to collectively produce one game.

Survey Information



Survey Locations:

- North Hollywood
5373 N. Lankershim Blvd. North Hollywood, CA 91601
- Vermont/Beverly
301 N Vermont Ave, Los Angeles 90004
- South Pasadena
805 S Meridian Ave, South Pasadena 91030
- Union Station
801 N Vignes St, Los Angeles 90012
- 7th St/Metro Center
660 S Figueroa St, Los Angeles 90017
- 37th St/USC Station
(USC, LA Coliseum, California Science Center)

Important Results to Note

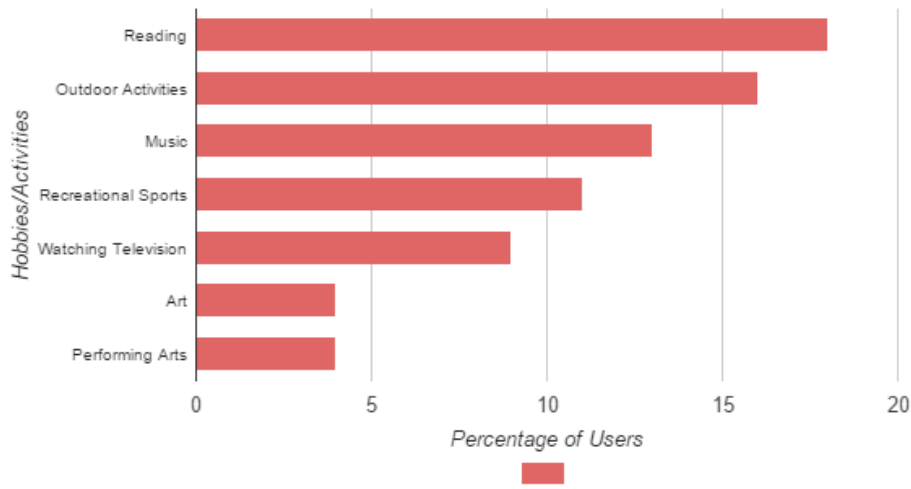
In this section, notable results are displayed which Fellows believe have important implications for how Metro should go about implementing gamification. The full data set from all survey questions and the password for the Survey Monkey account used can be found in the appendix.

Coro Fellows used two surveys with very similar questions. The first survey, with 54 responses, will be used in this report for data on how long riders would prefer a literal game to last if implemented (played across multiple rides or in one ride). The second survey, with 153 responses, will be used to for all other analysis in this section.

Rider Gaming Preferences

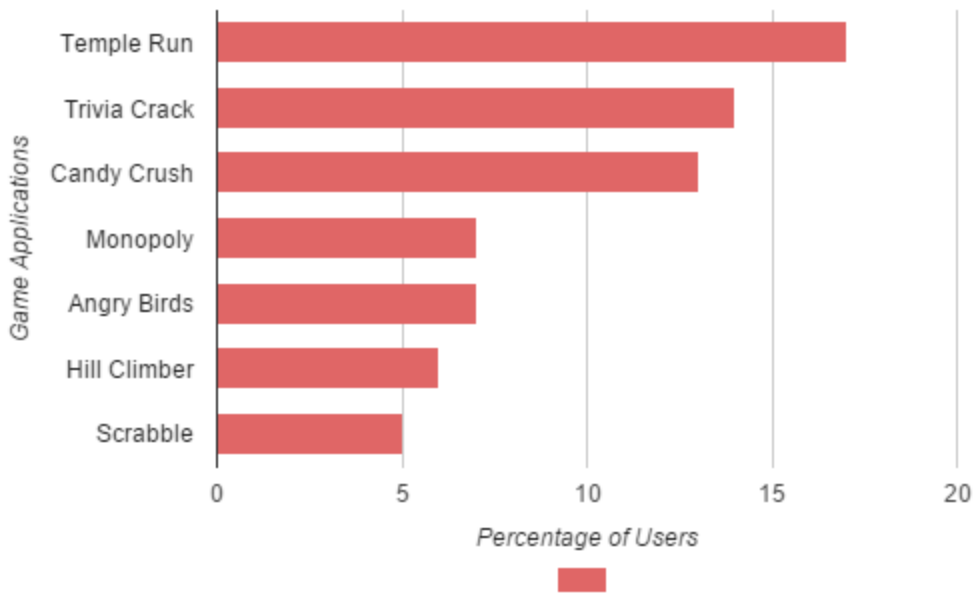
In order to implement a literal game or entertainment system of any type for riders, it is vitally important to understand what riders consider to be their hobbies, what games they play, and how they typically occupy their time while riding public transit. The following data is based on 153 respondents. The Y (vertical) axis displays the responses and the X (horizontal) axis displays the percentage of respondents who chose that answer.

What are your top two hobbies?



“Recreational sports” represent hobbies such as surfing, hiking, golfing, and tennis. “Outdoor activities” represent hobbies such as running, any form of exercise, bike riding, etc...

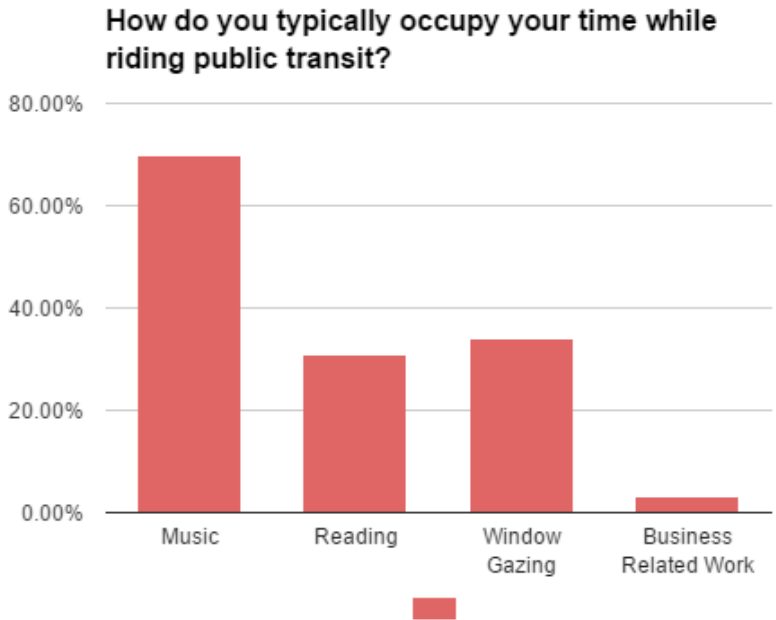
Game Apps Played on Cell Phones



Metro and its game-development partners should consider using game mechanics similar to the popular cell phone games noted above if it is to implement literal games or entertainment systems for its riders.

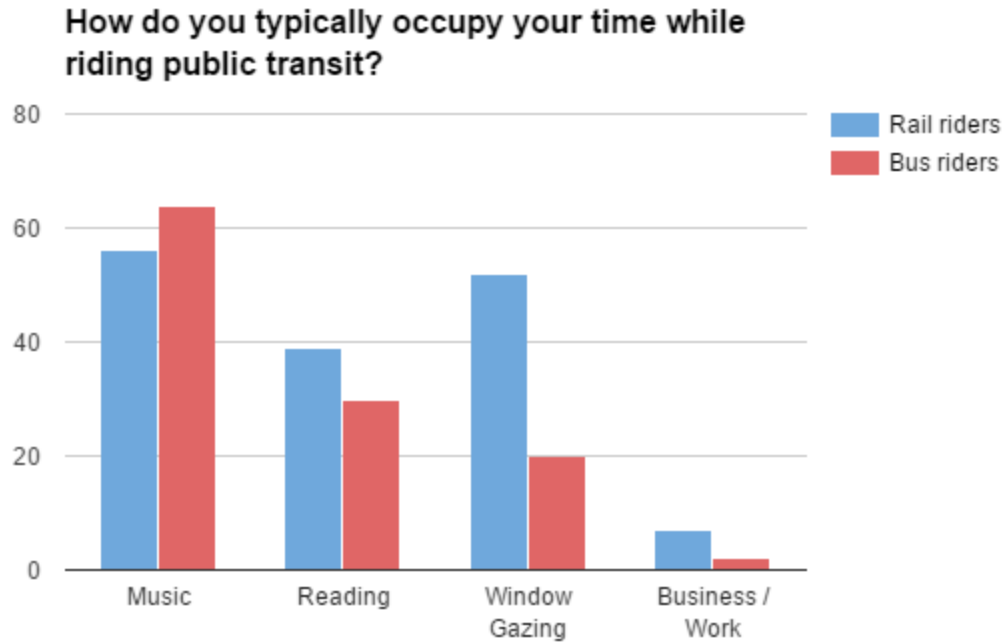
Fellows asked riders how they typically occupy their time while riding public transit. The results were noticeably different between millennials and non millennials. Below you will find data displayed in two separate charts, for each demographic.

Millennials (24 years old or younger)



Non-Millennials (over 25 years old)

Upon breaking down data from this question between those who typically ride the bus versus those who typically ride the Metro Rail, Fellows discovered there is a noticeable difference in response to this question between bus and rail riders. *Numbers displayed on the below graph are based on a percentages.*

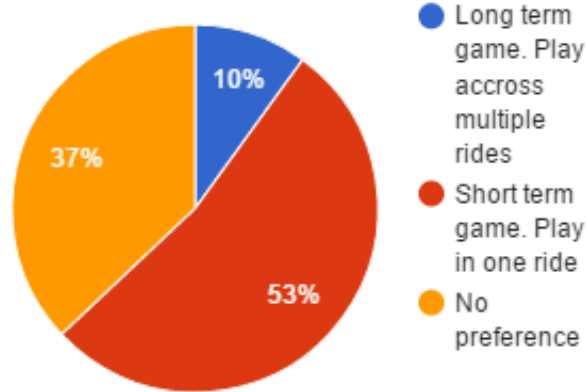


Any game or entertainment system should be designed to capitalize on what riders enjoy doing while riding transit and in their spare time. Metro should keep in mind preferences among different demographics of its ridership.

Rider's Preference - How Long Should a Game be?

It is important to note a majority of riders would prefer a short term game that lasted the duration of one ride, rather than a long term game spanning across multiple rides. This data is based on the first survey with 54 respondents.

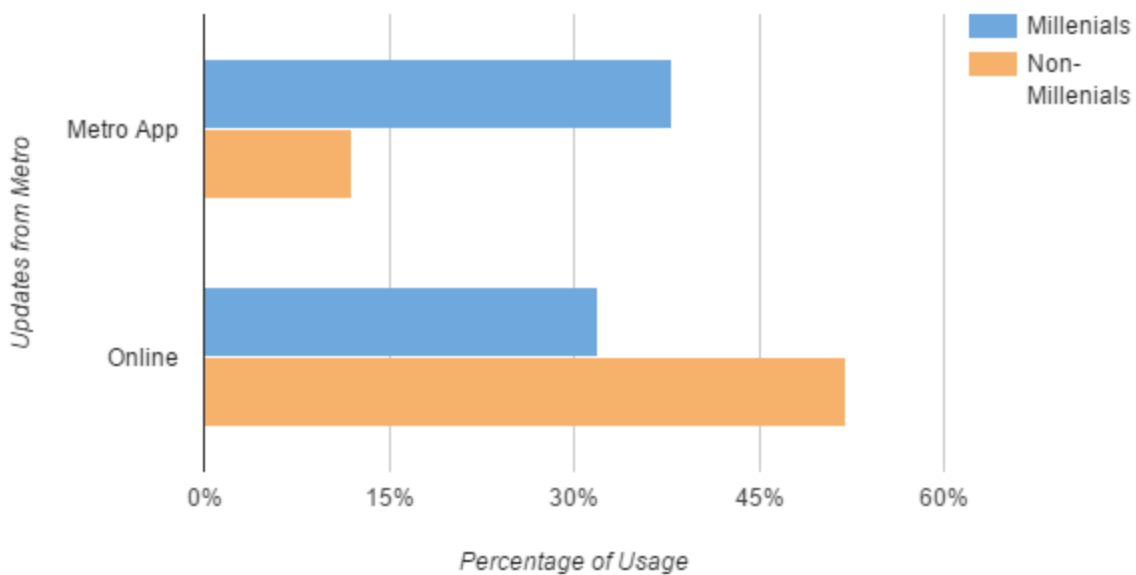
Would you prefer a long term game played accross multiple rides, or short term game played in one ride?



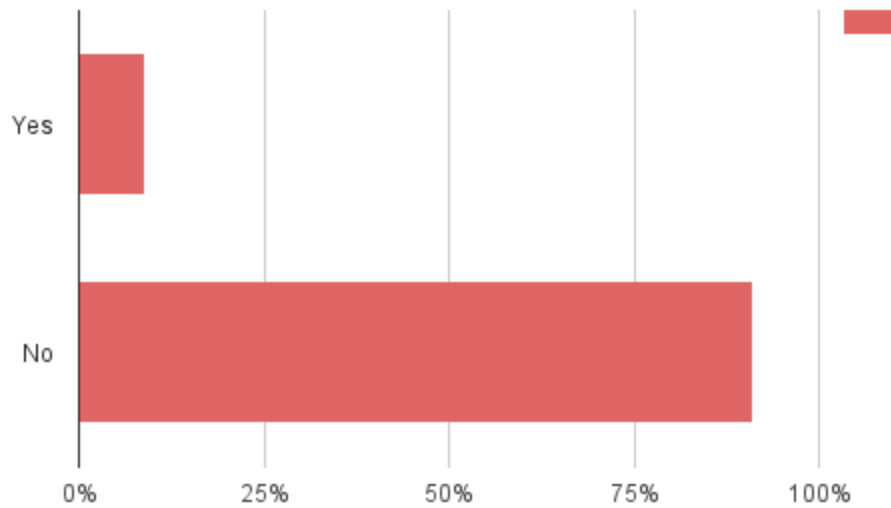
Rider's sources of information

Younger riders use the Metro App for information far more than other riders. Metro should consider what demographics are likely to receive information based on what platform it is being distributed through.

How do you get updates from Metro?

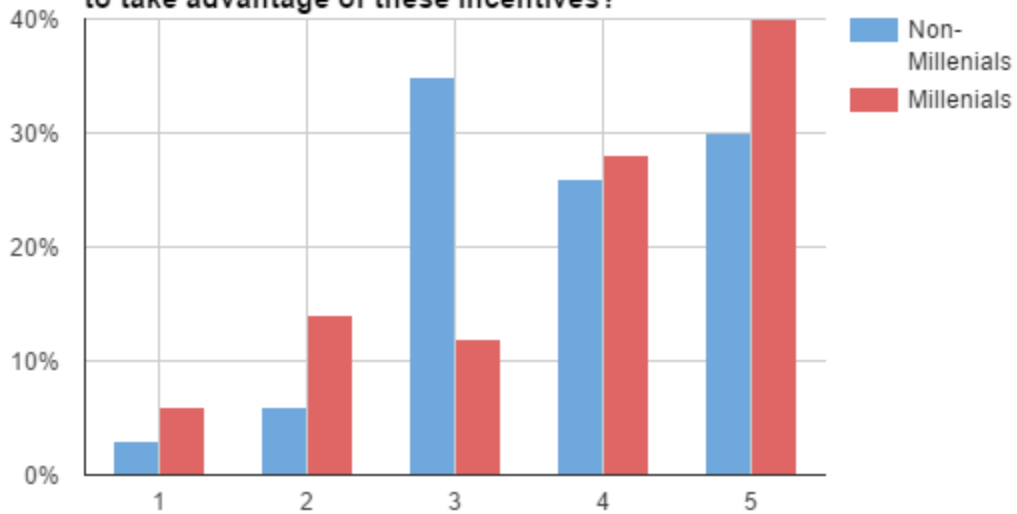


Are you aware of the incentive programs Metro currently offers?



Hardly any riders are aware of the incentive and reward programs currently offered by Metro. However, riders are generally receptive to a rewards program such as the one described in the question below. Metro should consider the avenues which riders typically receive information and advertise the existing Rider Rewards program.

If Metro were to launch a point program for ridership in exchange for rewards at restaurants and stores on a scale of 1 (lowest) to 5 (highest) how likely would you be to take advantage of these incentives?



Incentives and Gamification

As stated previously, for gamification to be effective, the gamer must have a large amount of emotional buy-in for the game. After researching, Fellows found that the most effective way of creating emotional buy-in through incentives is creating a ridership game that incorporates landmarks, fitness goals, rewards and incentives. Below you will find a sample game of ways to incorporate a rider's personal goals (i.e., health, earth-preservation goals), along with ways to incorporate Los Angeles' famous landmarks and present rewards offered by Metro.

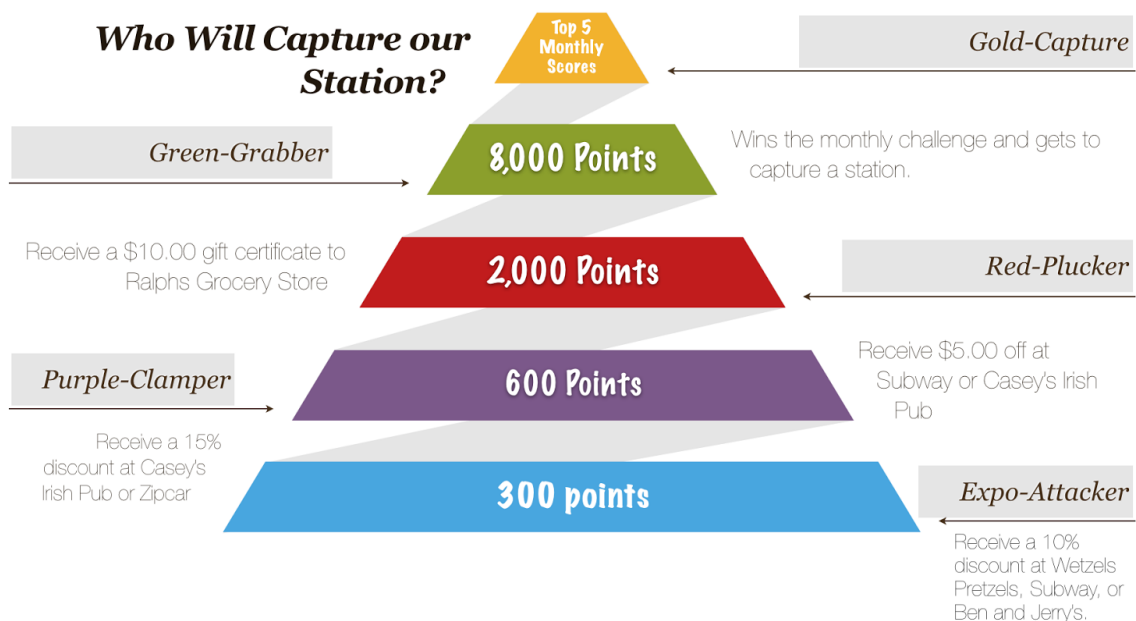
Incenti-Max

This is an example of a game where Metro users compete for the highest amount of points through accomplishing their personal goals, riding Metro, and visiting weekly Los Angeles places of interest.

Each rider interested in participating will enter a website where they are greeted with survey questions asking about their passions and goals (i.e., health and wellness, saving the environment, time management, etc.). The website will then generate a number of monthly goals for the rider to accomplish based on his/her survey results.

Four points will be awarded to every rider for every public transit ride taken. Two points will be awarded for every mobile-check-in at weekly attraction hubs in Los Angeles. Two points will be given towards personal goals that are achieved.

The five top monthly winners will be given the opportunity to capture the station of their choice. The capturer will get a photo posted of them at the station with their points achieved and their monthly nickname for the station. Rewards will be given out on a tier system. Where gamers are allowed to choose what reward they want depending on points achieved. These rewards can potentially incorporate present rider rewards programs Metro offers.



Because 90 % of respondents did not know about present incentives Metro offers, we recommend that new games be heavily advertised at Metro stations, on Metro’s website, and at partnership locations.

Potential Partners:

Company’s Name	Information
Ride Amigos	Ride Amigos is presently in the process of creating an App that can tell if the user is using public

	transportation. http://rideamigos.com/
Mudlark	Mudlark invented London's first Oyster card powered travel game, Chromaroma. Mudlark built Chromaroma from the ground up using only the timestamped swipes in/out of London Underground stations by people playing in the real world. http://wearemudlark.com/projects/chromaroma/
The Alternative Travel Project	The Alternative Travel Project is an initiative that encourages people to go car free for one day. ATP also encourages public planners and policy makers to provide safe, viable alternative travel infrastructure to support alternative travel choices. http://www.alternativetravelproject.com

Potential Attractions to Incorporate:

Landmark	Address	Phone #	Brief Information on Location
Hollywood Walk of Fame	Hollywood & Highland, Hollywood 90028	N/A	Historic "Hall of Fame" sidewalk in Hollywood
Universal Studios/ Paramount	100 Universal City Plz, Universal City, CA 91608	(800) 864-8377	Amusement / Theme park
Griffith Park	730 Crystal Springs Dr, Los Angeles, CA 90027	(312) 913-4688	Large municipal park at the eastern end of the Santa Monica Mountains in the Los Feliz neighborhood of Los Angeles
Santa Monica Pier	Santa Monica Pier, Santa Monica, CA 90401	(310) 458-8901	Large double-jointed pier located at the foot of Colorado Avenue in Santa Monica, California and is a prominent, 100-year-old landmark.
Staples Center	1111 S. Figueroa Street, Los Angeles, CA 90001	(213) 740-7100	Staples Center is a large multi-purpose sports arena in Downtown Los Angeles
Los Angeles Zoo	Griffith Park, Los Angeles, CA	(323) 644-4200	The Los Angeles Zoo and Botanical Gardens is a 133-acre zoo founded in 1966 and located in Los

			Angeles, California. The City of Los Angeles owns the entire zoo, its land and facilities, and the animals.
Hollywood Sign	3000 Canyon Lake Drive, Hollywood, 90028	N/A	The Hollywood Sign is a landmark and American cultural icon located in Los Angeles, California. It is situated on Mount Lee in the Hollywood Hills area of the Santa Monica Mountains.
Griffith Observatory	2800 East Observatory Road, Los Angeles, CA 90027	(213) 473-0800	Griffith Observatory is a facility in Los Angeles, California sitting on the south-facing slope of Mount Hollywood in Los Angeles' Griffith Park. It commands a view of the Los Angeles Basin, including Downtown Los Angeles to the southeast, Hollywood to the south, and the Pacific Ocean to the southwest.
The Grammy Museum	800 W Olympic Blvd Ste A245, Los Angeles, CA 90015	(213) 765-6800	The GRAMMY Museum, is an interactive, educational museum devoted to the history and winners of the Grammy Awards. The Museum strives to inspire its visitors to learn about musical genres and history through interactive touch-screens, videos, and recording booths.
Dodger Stadium	1 Stadium Way, Los Angeles CA 90012	(855) 716-7743	Home field of major league baseball team the Dodgers
Hollywood Wax Museum	6767 Hollywood Blvd, Los Angeles, CA 90028	(323) 462-5991	Hollywood Wax Museum is the only wax museum in the country devoted entirely to celebrity figures. That means a visit to the Hollywood Wax Museum puts you face-to-face with icons of the silver screen, recreated so faithfully that

			you'd swear they were alive.
Universal City Walk	100 Universal City Plz, Universal City, CA 91608	(800) 864-8377	Amusement / Theme park

Physical Games

Gamification strategies have been implemented with some success in other parts of the country and world. Coro Fellows researched these gamification strategies, including literal games, incentives, and shared open data, and in some instances spoke directly with primary researchers responsible for assessing the effectiveness of these ideas. Below is an outline of notable ways gamification has been implemented, a list of the tools and assets necessary to bring it to Los Angeles, and Fellow’s analysis as to what made it effective.

Singapore Rider Congestion Reduction Incentives ¹

The National University of Singapore (NUS) and Stanford University are jointly conducting a 6 month study that aims to reduce peak period travel by ten percent. This study is called INSINC (Incentives for Singapore's Commuters).

The study is incentivized and gamified by a reward system where commuters earn credits proportional to the distance travelled on the rail system, with extra credits for shoulder-peak travel. The more one travels during off-peak hours, the more credit he/she gets. The credit can then be used to redeem rewards or converted into money credited straight into Singapore’s equivalent of a TAP card.

Do any Metro stations or transit lines have issues with overcrowding? Coro Fellows noticed many buses and trains (especially the red line) with standing room only during rush hours. This is to be expected and should come as no surprise to riders. Metro could still reduce some of the peak hour ridership similarly to Singapore’s transit. It would require the existing TAP card system and an electronic tracking mechanism to allocate credit to riders during shoulder peak hours. ‘Shoulder peak’ means the hour or two immediately before and after peak times. It would be difficult for Metro to change rider’s work schedules or alter their

preference as to when they arrive at home or any other destination. But Metro could incentivize riders to leave slightly earlier or later to mitigate peak hour congestion. ⁵

Washington / Baltimore Area Real Time Data ^{2,3}

OneBusAway allows riders to access real-time and scheduled transit data for nine of the region’s nearly two dozen transit agencies. OneBusAway is a suite of software packages for aggregating, transforming, and disseminating transit route and schedule information, including real-time information where available. ^{2,3}

At present, OneBusAway is able to show real-time information for ART, Montgomery County Ride On, and VRE. It also has the necessary infrastructure to show real-time Metrobus arrivals.

Route	Departs
12 Downtown / Via K-Tel	Due
17W Wash St NE / To 27th NE	3 Min
21E Lake St / To 27th Av	3 Min
6 Downtown / Via Xerxes	4 Min
21A Selby-Lake / St Paul	9 Min
17 Downtown	13 Min
12 Downtown / Via 17Av	14 Min
21E Lake St / To 27th Av	18 Min
6U Oak St-Univ / Via France	19 Min
6 Downtown / Via Xerxes	4:13

< Back to Stop Selection • Real Time
• Scheduled

St. Paul, Minnesota Real Time Data ⁹

St. Paul has a similar system in place, although it combines real time data from neighboring transit agencies. NexTrip provides real-time bus departure times for all Metro Transit buses and most regional buses to help you better plan your commute. Simply choose your route, direction and stop location - NexTrip will list up to the next 10 buses leaving that stop.

Each stop has a unique number. Enter any Stop Number in NexTrip to see predicted departures for all routes serving that stop. Find Stop Numbers using Services Finder or the Interactive Map.

⁵ <http://www.totalcustomer.org/2012/06/20/singapores-public-transpo>

² <http://mobilitylab.org/2013/10/25/onebusaway-demo-app-offers-best-transit-info-yet-for-dc-users/>

³ <http://mobilitylab.org/2014/06/17/gamification-technology-and-improving-transit-rider-satisfaction/>

⁹ <http://www.metrotransit.org/about-nexttrip>

Every bus has an onboard computer that tracks its GPS location. As a bus travels along a route, NexTrip tracks its location in relation to specific timepoints. It updates automatically every few seconds.

If a bus is expected – based on its current travel speed – to leave a stop within the next 20 minutes, NexTrip displays **in black the number of minutes to departure ("6 Min")**. **Outside the 20-minute window, NexTrip displays scheduled times in red ("2:17")**.

Rider change in satisfaction after real time schedule data was available⁷:

A survey of 488 OneBusWay users was conducted, posing the question, “Now that you are using OneBusWay, how has your satisfaction with public transit changed?”

48% Much more satisfied

44% Somewhat more satisfied

7% No change

1% Less satisfied

One rider stated, “I no longer sit with a pitted stomach wondering where is the bus. It's less stressful simply knowing it's nine minutes away, or whatever the case.”

According to the same research, a rider's perceived wait time is typically longer than the actual wait time without real time arrival data. With real time data, the perceived wait is typically the same as the actual wait. The study concludes the value of real time data to riders exceeds the value of more frequent service. Even if this were an exaggeration, real time data still provides scheduling certainty to riders, and thus improves their riding experience.

Metro currently has real time schedule updates that are displayed on monitors at Union Station and other major transit stations. How could Metro make real time data available to riders? An App such as One Bus Way or NextTrip would make the information available to riders with smart phones. How could this real time information be made available to all riders? Could at least one monitor with arrival time updates be installed at every bus stop?

CicLaVia Gamification ⁴

CicLAvia has partnered with the City of Los Angeles Department of Cultural Affairs and Dutch Culture to commission a sonic “walkscape” for pedestrian participants. This soundscape is featured on the Walk With Me App (available for free on Apple IOS devices). It blends interviews, music, historic sound clips, natural sounds and “live noise” into an interactive

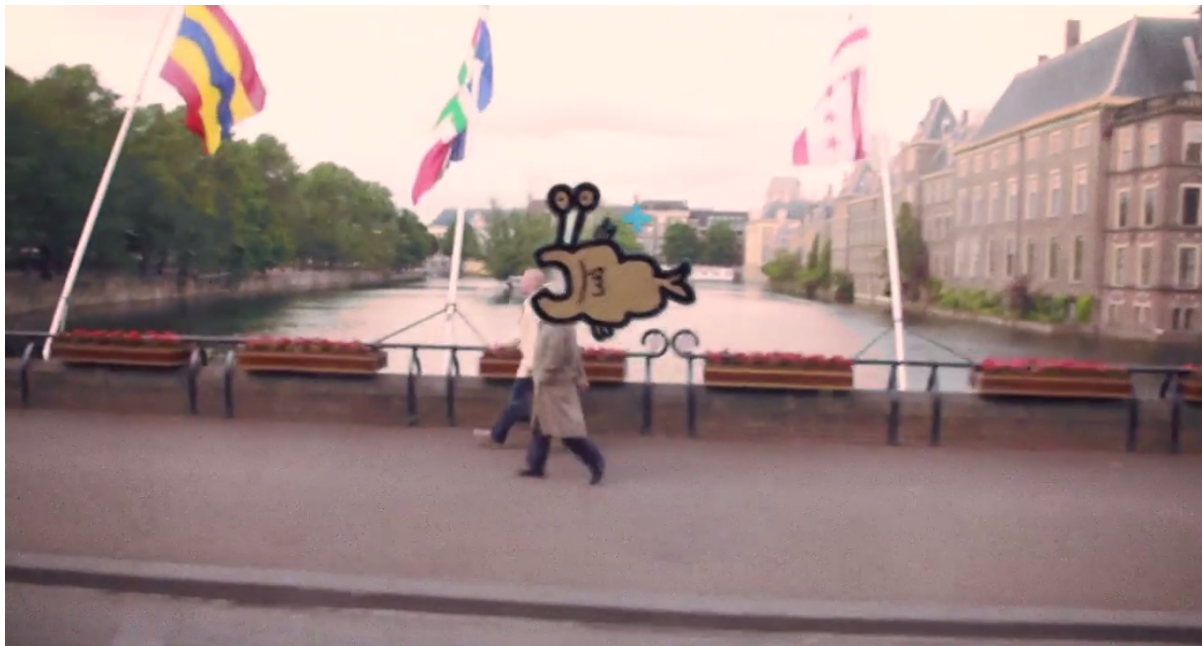
walking art installation that reveals itself differently for each user. As people walk the CicLAvia route their phone's GPS will access data points that will allow them to hear an evolving soundscape unique to their CicLAvia experience.

Something similar could be done for Metro bus and subway riders. An App that tracks their location and tells riders about points of interest, historical sites, etc as they pass by it. This could even be implemented by playing the soundscape over the intercom in one of the subway cars or a select few buses for riders who do not have smart phones.

Such a 'game' would likely be more popular among travelers and people riding to a sightseeing, vacation, or tourist destinations.

Netherlands Gamification ^{5 6}

Instructions are placed on the back of the seat in front of you and the only tool needed, the "Man-eater," was a sticker left stuck to the window. The goal is to make the little character eat as many pedestrian heads as you can to advance levels. A video can be found here [here](#).



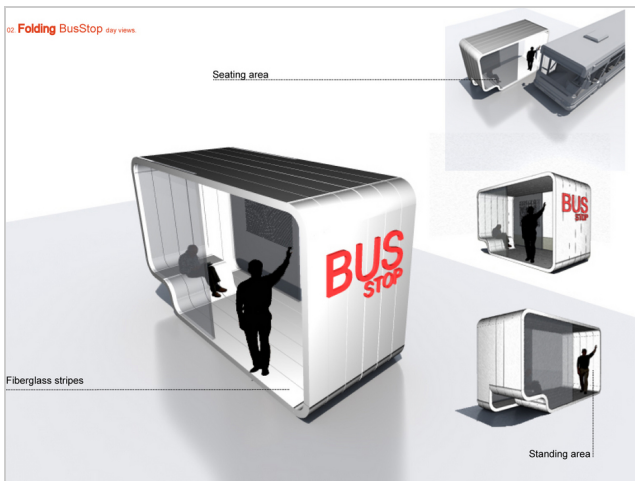
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[4] http://beta.ciclavia.org/walk_with_me_app

[6] <http://danieldisselkoen.nl/man-eater/>

This is a fun mini-game that could be implemented on buses and trains at very little cost, and would be no disturbance or inconvenience to riders not wanting to participate. ⁷

According to Coro Fellows survey data, over 30% of respondents list 'window gazing' or 'people watching' as something they occupy their time with while riding public transit. This idea would likely be well received by those riders.



Utah Bus Stop Innovation ^[8]

Next Stop Design was a crowdsourcing contest for transit planning activities that took place in 2009-2010. Members of the public would submit ideas, a select few 'winners' would earn prizes and have their designs implemented, or at least piloted at certain stations for testing. Two iterations of the contest were launched. The first iteration dealt with the design of bus stop shelters for a bus stop on the University of Utah campus in Salt Lake City. The second

iteration dealt with the planning of an intersection in the Sugar House neighborhood of Salt Lake City.

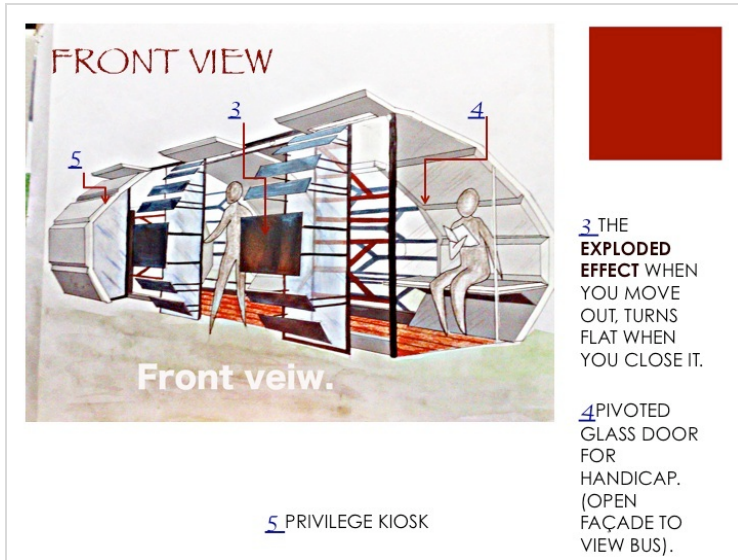
Examples:

Folding Bus Stop

Six stripes which are exactly the same size (length and width), put next to each other, being stretched and given various shapes form the bus stop. These stripes do not just repeat and vary though. Having the same perimeter when their ends come together, the stripes form a system, consisting of 6 modules. The stripes react to stretching and folding and so does the whole system. A modulated shelter is the new bus stop introduced.

Sustainable Climate

[8] <http://nextstopdesign.com/>



Considering the extreme variation in weather, the design is made collapsible.

A) Fabric shutters – The shutters are design to collect snow during the winter and water when it rains. The collectors collapse down by the weight of the snow/water collected over it..thus protecting it from cold /rain. When the water evaporates during spring /summer the fabric moves up(due to elastic coil) and thus providing good ventilation. During winter as the fabric encloses the bus stop, green-house effect takes place in

which the cool air enters from the bottom (cold air being heavy).

Warm air created due to green-house effect remain collected due to the CAP effect ,a smaller outlet is provided at the top (as a vent).

B) METAL panels- These panels are inclined over the main concrete structure to collect the snow during winter which acts as an insulator. These panels are not in total contact with the structure, so even if the metal gets heated up in summer, the heat is not transferred to the internal environment.

C) Solar panels to provide energy to the privilege kiosk

The design for innovative bus stops such as this already exist, as shown above. In addition to being more comfortable for riders, a monitor showing real time arrival data updates would be placed inside. It would also serve to beautify bus stops, making them look more 'high tech' and possibly making bus travel appealing to a broader audience.

Potential Partners (Excluding UCLA and USC):

Game Company	Phone	Address	Notable Works
Activision (Contractor producing games for Xbox and Sony)	(310) 255-2000	3100 Ocean Park Blvd, Santa Monica, CA 90405	Skylander's Swap Force, Spider Man 3
Adhesive Games (Multiplayer combat games)			Hawken

Aksys Games (translates Japanese games to English markets)	(310) 212-6724	365 Van Ness Way, Suite 510 Torrance, CA 90501	Bit Trip Fate
Alchemic Productions (consulting services for existing game developers)	1 (805) 415-5252	11534 WILDFLOWER CT, MOORPARK, CA, 93021	State of Emergency II
Amazon Game Studios (Amazon.com's division that develops comics, movies and television shows from online submissions and crowd-sourced feedback)		Irvine	
Blizzard Entertainment (Massively Multiplying Online Games, Real Time Strategies)	(949) 955-1380	16215 Alton Pkwy, Irvine, CA 92618	World of Warcraft, Diablo
D3 Publisher (Simple and low priced Japanese games)	310-268-0820	11500 W. Olympic Blvd., Suite 460, Los Angeles, CA 90064	Adventure Time Card Wars
DICE LA (Battlefield series, first person shooter)			
Disney Interactive Studios (Games based on Disney Movies)		500 South Buena Vista Street, Burbank, California 91521	Club Penguin
F84 Games (Mobile App and Social Media games)		5350 Riverton Ave., North Hollywood 91601	
Infinity Ward (Call of Duty franchise)	(818) 386-0072	15821 Ventura Blvd, Encino, CA 91436	

Conclusion

What should Metro do next?

In implementing gamification, Metro first and foremost needs to identify what riders enjoy and are passionate about. According to Dr. Watkins, and as other gamification examples suggest, gamification should be used to enhance rider participation and satisfaction in activities they already find valuable, not force participation in something riders are not interested in. For this reason, questions regarding what rider’s typically do to occupy their time on the bus and what their hobbies are were added to the Gamification Survey. Metro should keep the results of these question in mind.

Metro should also consider, and perhaps further investigate, the variations between different demographics in what they enjoy as a hobby or game and how they typically find the information they need from Metro.

Metro already offers generous rewards and incentives to riders, although Coro Fellows found hardly anyone knows about them. Using the data in this report regarding how riders receive information from Metro, Metro needs to make more riders aware of the discounts they are eligible for as a Metro rider.

Questions to Consider Moving Forward

This report begins to scratch the surface of the questions below. Coro Fellows believe these are among the most important questions for Metro to consider in beginning to implement gamification.

How will different incentives appeal to different demographics?

How can riders be made aware of existing incentives?

What modes of communication are most effective? For which demographics?

If games are to be implemented, what platform will be used? Is the cost effectiveness of using riders phones worth leaving out the rider base that does not own a smartphone or have the necessary data plan?

Should gamification begin with a literal game, or an incentives program? Or both?

What transit habits and behaviors do riders currently exhibit that could be increased by gamification? How could gamification be used to improve rider satisfaction?

I. Appendix

All Survey Results

Coro Fellows spent two full weeks canvassing Metro stations and riding trains and busses to survey riders. Some surveys were also collected online. A total of 207 surveys were collected, comprising two separate data sets, both with similar questions. 54 responses were collected from survey one. Upon consultation with Metro supervisors and UCLA Game Lab, Coro Fellows revised and expanded the survey creating survey 2 with 153 responses. The questions asked plus raw results data are shown below:

1. What is your age?
 - Multiple Choice
2. What gender do you identify with?
 - Multiple Choice
3. What are your top two hobbies?
 - Single Textbox
4. What are your top two favorite mobile Apps?
 - Single Text box
5. What games do you play on your smartphone?
 - Single Textbox
6. While riding public transit, what do you primarily do to occupy your time?
 - Music
 - Reads Newspaper/Book
 - multiple choice answers? w/ other option
7. How many times do you get on Metro Rail per week?
 - Multiple Choice
 - 1-2 trips per week
 - 2-4 trips per week
 - 4-6 trips per week
 - 6 or more trips per week
8. How many times do you get on the bus per week?
 - Multiple Choice
 - 1-2 trips per week
 - 2-4 trips per week
 - 4-6 trips per week
 - 6 or more trips per week

9. On a scale of 1-5 how interested are you in connecting/communicating with other riders during your trips?
 - Drop box of scale

10. On a scale of 1-5 how interested are you in learning fun facts about Los Angeles?
 - Drop box of scale

11. On a scale of 1-5 how interested are you in discovering different attractions in Los Angeles?
 - Drop box of scale

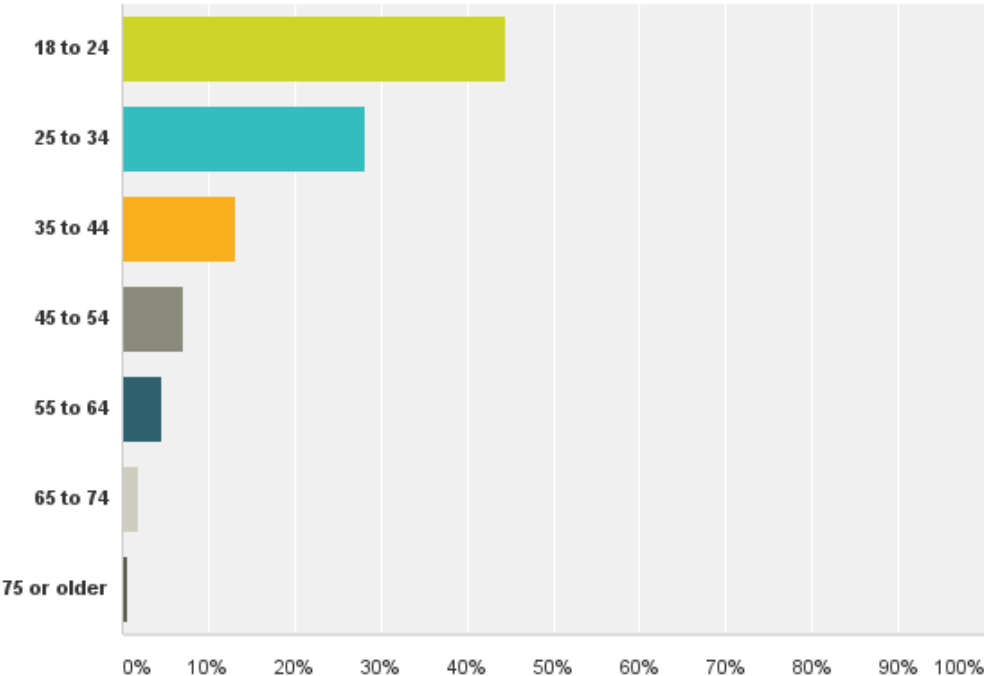
12. A number of Airlines presently have a point-reward system where for every flight a passenger takes, they can get points that translate into rewards or free flights in exchange for ridership. If Metro were to launch a point program for ridership in exchange for rewards at restaurants and stores how likely would you be to take advantage of these incentives?

13. Are you aware of the incentives program that Metro presently has for riders?

14. How do you familiarize yourself with services Metro offers? example: Incentives, news/alerts from Metro.
 - Multiple Choice: Online, Metro App, Advertising at Station, Advertisement on Bus/Train, Other

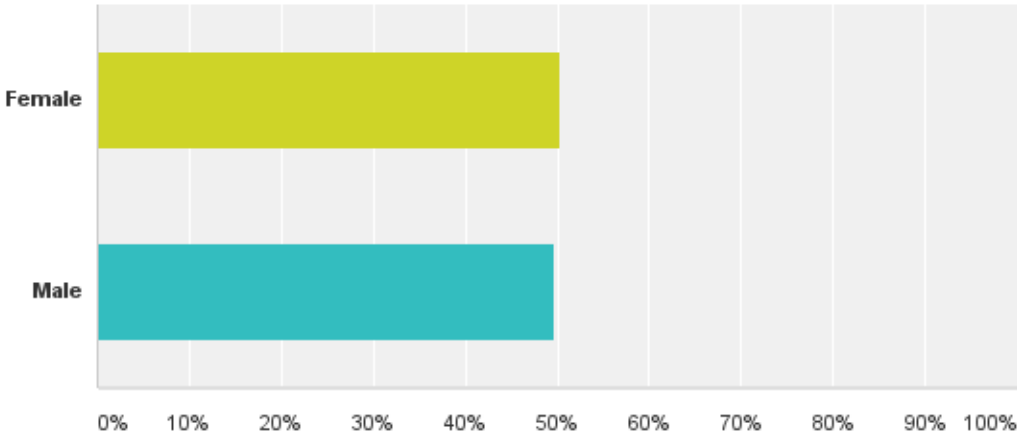
Q1 What is your age?

Answered: 153 Skipped: 0



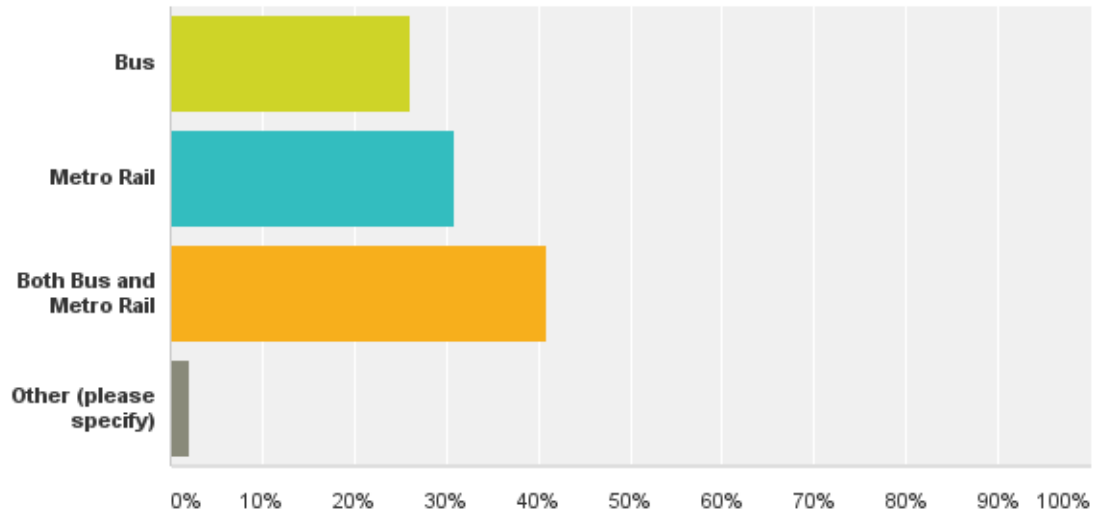
Q2 What is your gender?

Answered: 153 Skipped: 0



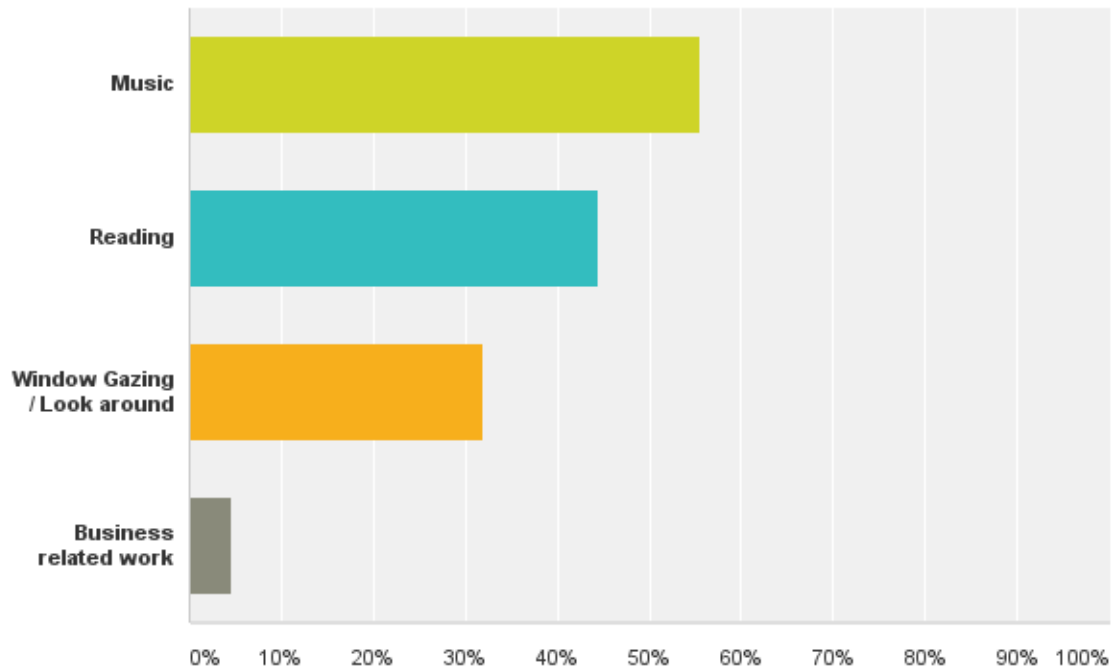
Q5 What form of public transportation do you take most?

Answered: 149 Skipped: 4



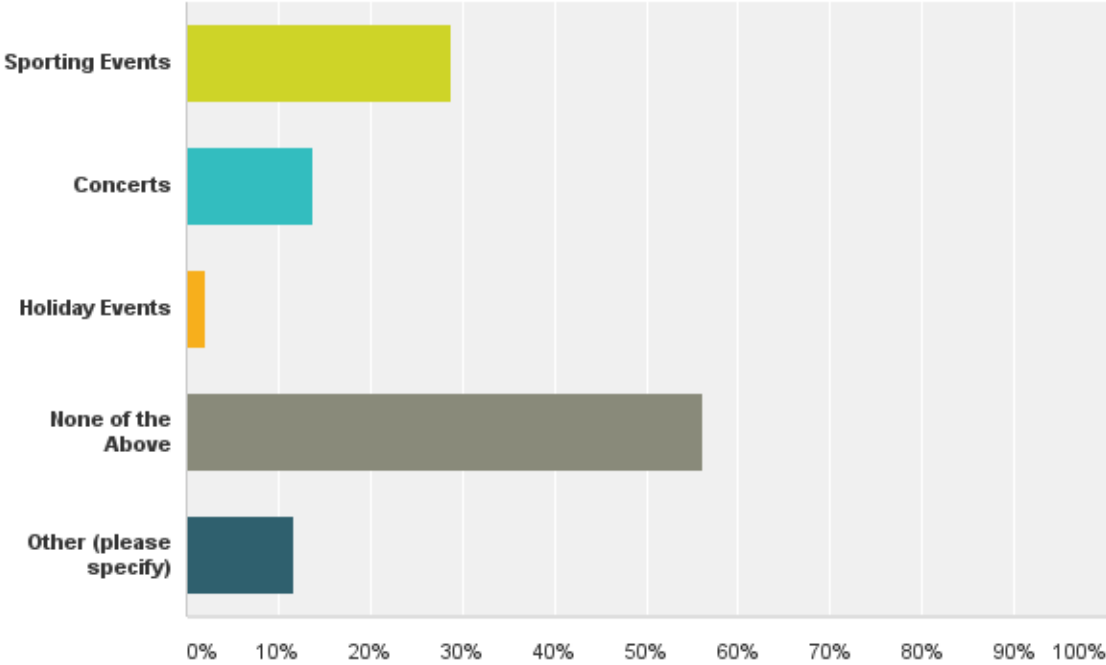
Q6 While riding public transit, how do you typically occupy your time?

Answered: 153 Skipped: 0



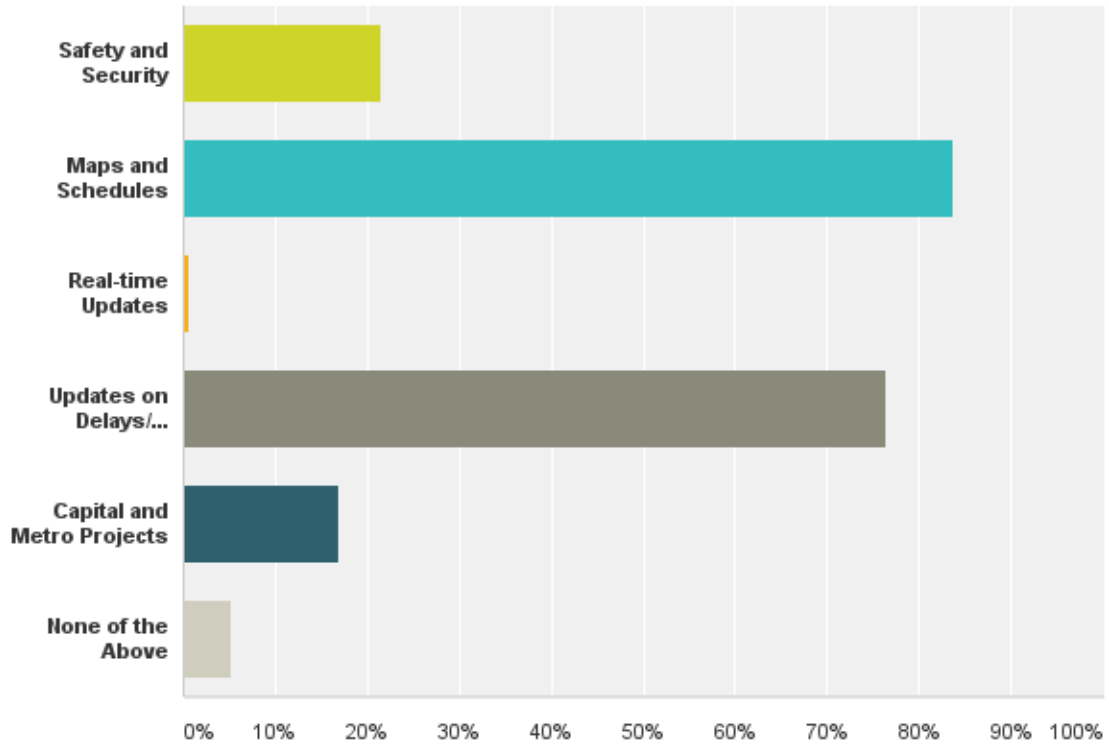
Q7 What recreational events do you take Metro to?

Answered: 146 Skipped: 7



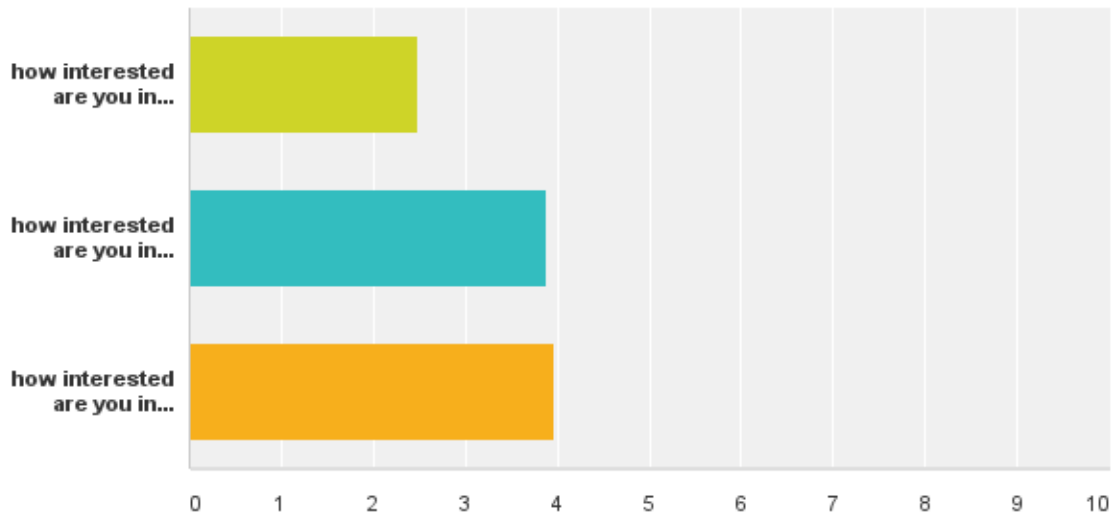
Q9 What types of information do you find helpful while riding? (Check all that apply.)

Answered: 153 Skipped: 0



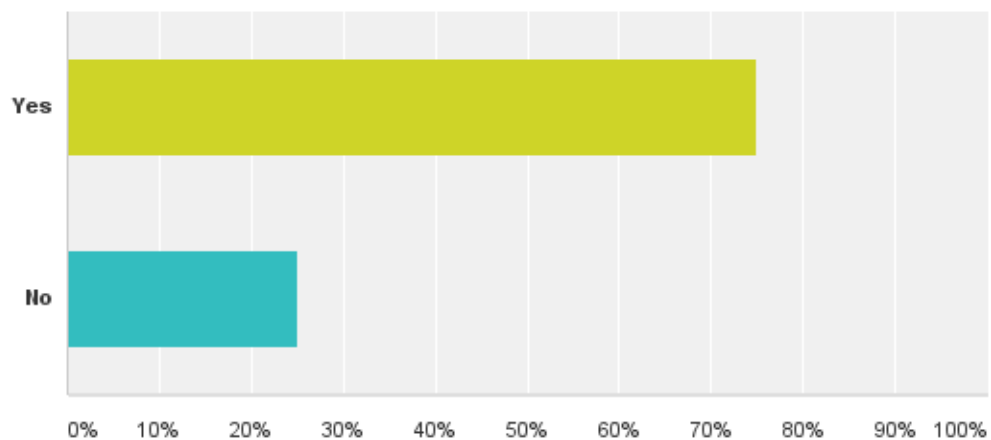
Q10 On a scale of 1 (lowest) to 5 (highest)

Answered: 153 Skipped: 0



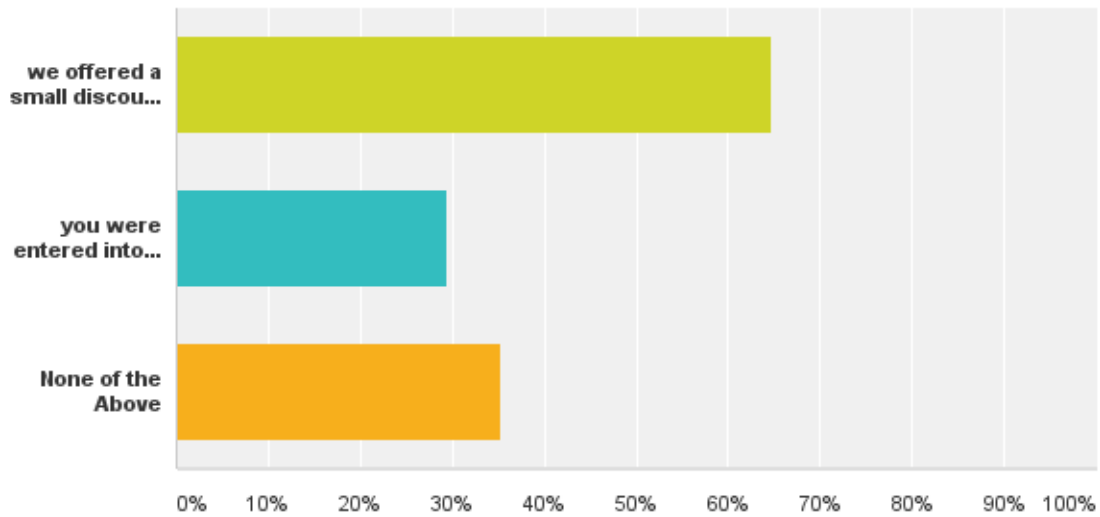
Q11 Would you consider giving Metro access to your phone's location if it helped you and others tell exactly where your bus was?

Answered: 68 Skipped: 0



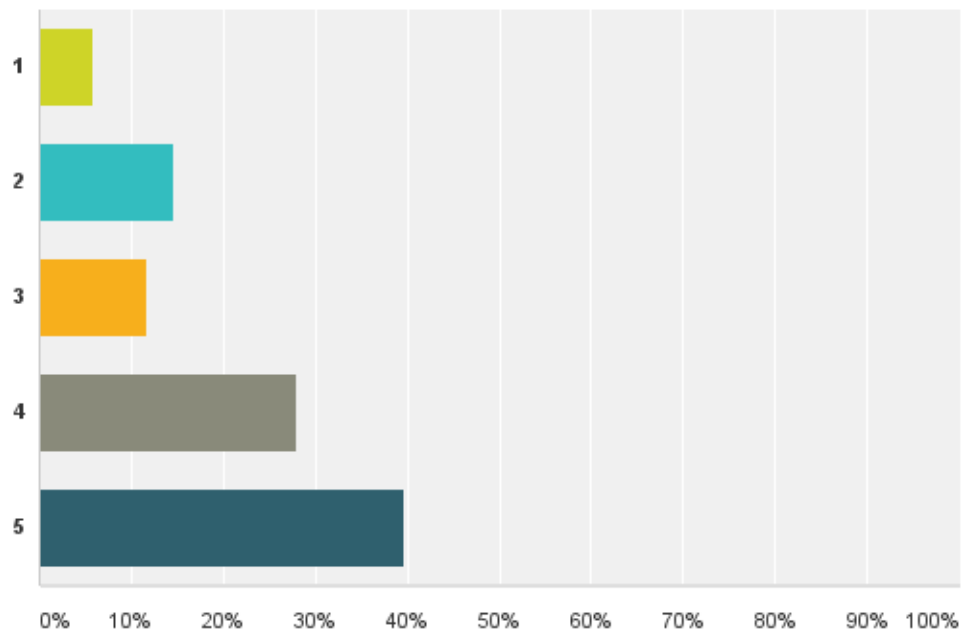
Q12 If you answered NO to the previous question: Would you consider giving Metro access to your phone location if (check all that apply)

Answered: 17 Skipped: 51



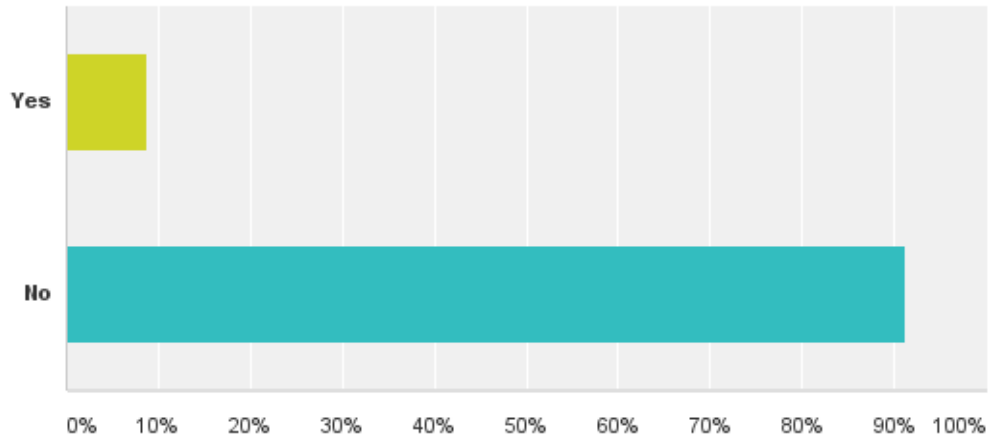
Q14 A number of Airlines presently have a point-reward system. For every flight a passenger takes, they can get points that translate into rewards or free flights in exchange for ridership. If Metro were to launch a point program for ridership in exchange for rewards at restaurants and stores on a scale of 1 (lowest) to 5 (highest) how likely would you be to take advantage of these incentives?

Answered: 68 Skipped: 0



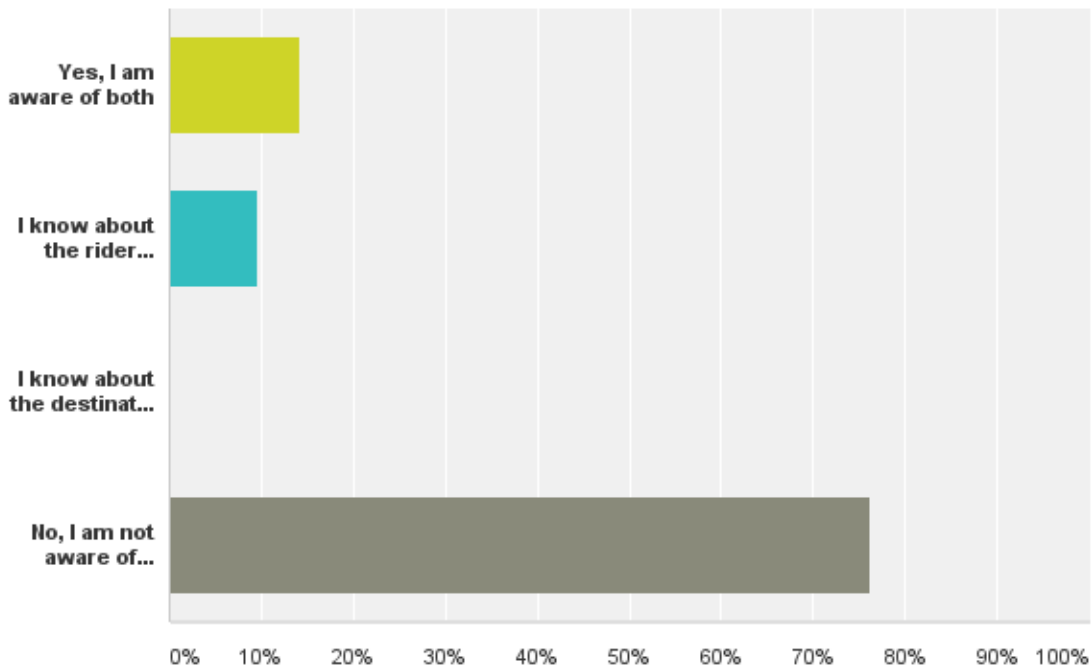
Q15 Are you aware of the incentive programs Metro currently offers?

Answered: 68 Skipped: 0



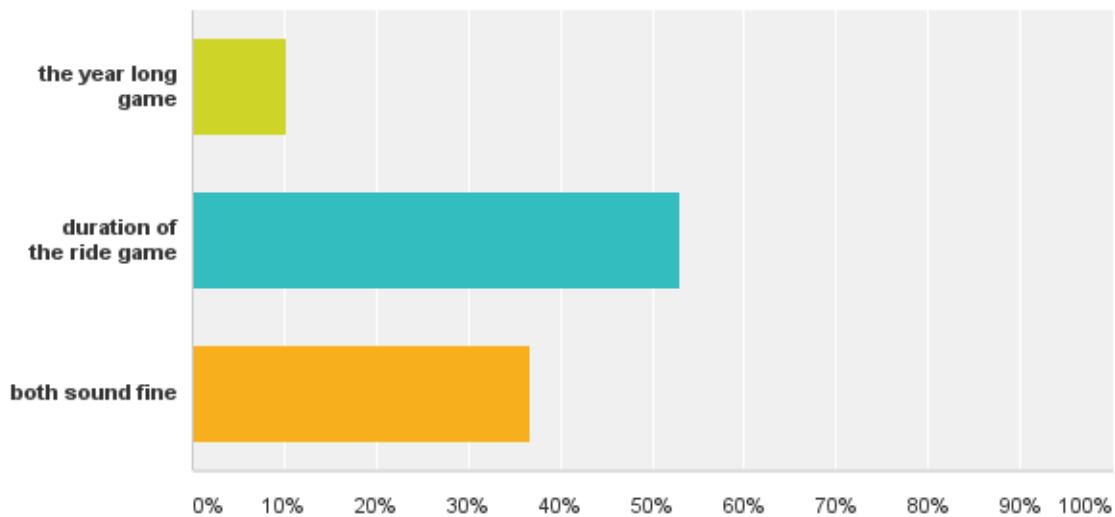
Q16 If you answered yes to the previous question: are you aware of the destination discounts/ relief rider subsidy program?

Answered: 21 Skipped: 47



Q10 Would you be interested in playing a game that can last for a year while you're riding the bus? Or for your duration of the ride? (Speak more into context on what the game would entail)

Answered: 49 Skipped: 5



Project Proposal

PROJECT GOAL AND SCOPE OF WORK

The goal of the project is to identify the top gamification ideas for Metro to successfully implement in order to increase bus riders' satisfaction and transit experience. This will specifically include the viability of different games for various riders. These findings will help Metro create a Gamification Strategic Plan that will advance Metro's goals and vision for the future of public transportation in Los Angeles.

DELIVERABLES

Fellows will include the following components in a final white paper:

- Implementation Strategies
- Survey data outlining
 - Rider's receptiveness to gamification ideas
 - Rider's willingness to serve as crowd sourcers on an opt in basis to help integrate metro with Taxi, Uber, Lyft, and Waze, and incentives that would effectively facilitate their participation

Fellows will also poll riders on whether an incentive is needed in order to opt-in and what type of incentive would make them more likely to serve as crowd sourcers

- A list of potential partnerships throughout Los Angeles that could assist in the implementation of a gamification strategy
- A list of existing tools and assets that can be utilized in service of gamification, such as technologies and geographical landmarks

Establish a Knowledge-Base on Gamification

- Explanation of gamification methodology. Fellows leverage their interpersonal skills to elicit various gamification possibilities through Fellows-led dialogue with gamification experts, including USC and UCLA to Peter Marx. Most research on gamification will come from conducting interviews with experts in the field of gamification. This will ultimately yield a fruitful brainstorm with partners at USC and UCLA.
- Research on standard gamification theory, goals, and tactics to connect these elements to the agency's needs and goals and to serve as a foundation for surveying and Metro's future work on gamification.

Recommendations and Further Questions

- A description of effective tactics to implement gamification, incorporate research findings, interviews with experts, survey data, potential partnerships and existing assets
- Key considerations for future design and implementation phases, including essential questions

Survey Monkey Login and Password

Surveys can be accessed online at <https://www.surveymonkey.com/home/>. The login is Corokiernan. The password is wilshire10.