Centralization and Agency in Digitally Crowdsourced Arts Projects

Jana Fredricks, Raj Vaibhav

Arts Management & Technology Laboratory

Carnegie Mellon University

Centralization and Agency in Crowdsourced Digital Art Projects

INTRODUCTION

In November 2017, the annual museum-tech conference Museum Computer Network visited Pittsburgh.[1] This conference included a panel entitled *Becoming Digital Age Storytellers: Questions and Strategies*, at which representatives from four museums around the country shared their journey to create digital storytelling projects at their organizations. They shared insights, hardships, tips and tricks as they developed and implemented their respective projects. Chelsea Bracci from the Future Tenement Museum in New York shared *Your Story, Our Story* — a project wherein US immigrants new and old share their immigration stories through an online map-based platform.[2] Images and stories are uploaded by users from around the country, aggregated, and visualized. One visualization of these thousands of contributions is an interactive map wherein one can explore the images and stories through the current location of the sharer.

This is an example of a compelling institution-led digital art project, but they are few and far between due to internal resistance and capacity limitations. Staff buy-in to digital projects tends to be scarce at arts organizations, and resources to support such projects even scarcer. Further, the technical expertise required to design, implement, and maintain projects like *Your Story, Our Story*, is often lacking. In an effort to remain relevant and accessible, however, many arts organizations are devoting brainpower to cultivating audiences in digital spaces — far beyond the scope of their traditional local purview. On one hand, it is noble and imperative that arts organizations seek to reach wider audiences by innovating current practice. On the other hand, truly innovative initiatives are beyond the capacity of most arts organizations and further hampered by the endless bounds and leaps of the technology industry. For many arts organizations, lagging at rear end of the technology race has led to ill-conceived and mis-designed efforts to participate in digital spaces they know little about. The arts are traditionally local, and while misfires are understandable, they pose a significant risk to resource-strapped organizations.

There has been a shift in recent years, evidenced by conference panels like the one referenced above, creating a vibrant discourse about the impact of technology on the arts. In 2018, many if not most upcoming museum professionals must consider the development digital programming and digital audience engagement strategies that extend beyond

[1] Museum Computer Network. (n.d.). Retrieved May 9, 2018, from https://conference.mcn.edu/2017/about.cfm

[2] Your Story, Our Story. (n.d.). Retrieved May 9, 2018, from https://yourstory.tenement.org/

the reach of a strong social media presence. The industry query is: how can art that exists in physical space be transcribed to digital space, and how does this evolution affect the way audiences want to engage with it? This is new territory for the majority of arts organizations, and many are still getting their footing as they evaluate prospective digital projects in their organizations.

This research and analysis project began in the hopes of providing arts organizations with a resource to understand important facets and indicators of success for digital arts programming. What evolved is the first step in a much longer sequence of inquiries. Nonetheless, it is our hope that this research and analysis might be further developed to build an understanding of what elements of digital arts programming are crucial in the engagement of digital audiences. In this analysis we have focused on the participatory, rather than the interactive. We have seeked to analyze projects wherein audiences become artists by participating in the creation of a piece of art by making one or more creative contributions.

METHODOLOGY

Existing research in this field is scarce, but we conducted a small literature review of related topics including crowdsourcing, arts engagement, and arts participation. In particular, we seeked inspiration from arts engagement literature, and modeled the criteria discussed below based on scales of audience involvement in arts participation.[3] From there we endeavored to identify four crowdsourced digital art projects for deeper analysis.

In preliminary research it became clear that institution-led projects like The Future Tenement Museum's *Your Story, Our Story* were not at the forefront of crowdsourced digital art projects. Projects led by independent artists, however, were much more prevalent, achieved larger reach, and more recognition. This observation was the first indication that centralization — the level of centralized control in defining the perimeters of the project — would be an important feature of our analysis.

Additionally, in our preliminary scan of crowdsourced digital art projects we encountered a vast array of projects that represented every possible iteration and combination of variables. Projects were in all different art mediums, solicited a multitude of types of contributions from participants, and varied significantly in scope and size. It became apparent that we needed to identify perimeters to distinguish projects that fit within the scope of our research from those which did not.

[3] Wolf Brown, W. (2011). *Getting In On The Act*. James Irvine Foundation. Retrieved from https://irvine-dot-org.s3.amazonaws.com/documents/12/attachments/GettingInOntheAct2014_DEC3.pdf?1418669613

Definitions

We shaped the perimeters of our research using the following distinctions and definitions:

First, we differentiated **crowdsourced artwork** from **interactive artwork**. In the scope of this analysis, we define crowdsourced artwork as the aggregation of large-scale, intentional digital contributions made by individual participants to an artistic process as defined by the project initiator. We define interactive artwork as an art product that audiences can engage with and possibly temporarily alter, but not make any lasting contributions to. Crowd-sourced processes cannot be interactive, but crowd-sourced products may or may not be interactive.

We needed to define the main phases of each project, separating the **process of the project** from the **final product**. In our analysis, the process of a project is defined as the period in which participant contributions are solicited and collected via the system or structure defined by the project initiator. The product of the project is the point at which the quantity of contributions is substantial enough to achieve the purpose or idea of the project initiator. It is possible for the product and process to exist simultaneously.

There are three distinct roles in crowdsourced digital art projects:

Project Initiator: The artist, group, or institution that creates the process and defines the product.
Participant: An individual that makes an intentional contribution to a crowdsourced digital art process.
Audience: An individual that observes a crowdsourced digital art process, or observes or engages with a project's product.

In crowdsourced digital art processes, project initiators and participants occupy roles of centralization which are defined by the project initiator, or, in absence of definition may evolve organically. These roles are defined below from most to least centralized:

Project Initiator as Curator: a project initiator that changes or morphs crowdsourced individual contributions.
Project Initiator as Mediator: a project initiator that accepts or rejects crowdsourced individual contributions, but does not change them.
Participant as Curator: a participant that changes or morphs crowdsourced individual contributions.
Participant as Mediator: A participant that accepts or rejects crowdsourced individual contributions, but does not change them.
Participant as Individual Contributor: A participant that

makes an intentional digital contribution to a crowdsourced digital art process as defined by the processes system or structure established by the project initiator. The most basic and foundational building block of crowd-sourced digital art projects.

Project Selection

Once these parameters had been defined we identified four projects for deeper analysis. After a review of crowd-sourced digital art projects we selected four projects based on key similarities and differences. These projects are all based on the visual art medium, simultaneously representing the variety we observed in the field. That the art medium is consistent across these projects allowed differences in centralization, agency, and motivation to become more apparent. We chose the following projects:

1. **Aaron Koblin's *The Sheep Market.***[4] This is a project wherein artist Aaron Koblin paid Amazon's Mechanical Turk workers $.02 to draw a single sheep facing to the left. These drawings were compiled and exhibited at a public exhibition. The project now lives as an interactive product online.
2. **Google's *Quick Draw.***[5] This project combines game play with research, by prompting participants to draw an item. The participant must try to finish the drawing before the computer guesses what the item is. This is a tool to improve machine learning, while creating an open-source, participant-managed doodling database.
3. **Reddit's *Place.***[6] This is a project wherein Reddit administrators created a blank canvas for participants to draw on, one pixel at a time.
4. **Moon Art Groups's *Moon Drawings.***[7] This project solicited line drawings from participants around the world via the Moon Drawings website. These drawings were then inscribed on a disc that will travel on a rover to the moon. One part of the rover will draw some of the drawings from the disc on the surface of the moon.

Criteria Development

In analyzing these cases, we realized that the level of centralization and control in each project varied. We realized that there was an inherent difference in the product of the project depending on the control mechanisms established by the project

[4] Koblin, A. (n.d.). The Sheep Market. Retrieved May 9, 2018, from http://www.aaronkoblin.com/work/thesheepmarket/

[5] Google Quick Draw. (n.d.). Retrieved May 9, 2018, from https://quickdraw.withgoogle.com/

[6] Place • r/place. (n.d.). Retrieved May 9, 2018, from https://www.reddit.com/r/place/

[7] Moon Drawings. (n.d.). Retrieved May 9, 2018, from http://www.moondrawings.org/

initiator. For example, in Reddit's *Place* no contribution was sacred: participants could easily work over other participants work, or add to an emerging image in the canvas. On the other hand, projects in which the project initiator could choose which drawings to accept, such as in *Moon Drawings* or *The Sheep Market,* the product was more stagnant and the line between product and process more clear — more dependent upon the creativity of the product initiator in defining the structure of the project, and less dependent upon the creativity of contributors. We developed a preliminary scale to capture the range of centralization in the case projects (*Figure 1*).

The scale moves from least controlled and centralized to most controlled and centralized. The least centralized projects do not afford anyone, neither participant nor project initiator to accept, reject or alter contributions made my participants. In our research we did not encounter any projects that fit within this sector of the scale, but our sample was very small. From there we move to level 2, wherein participants can either accept or reject other participant's contributions. This is the case in *Quick Draw*. In level 3, participants can accept, reject, or alter other participants' contributions, as is the case in Reddit's *Place*. Level 4 represents the ability of the project initiator to mediate participants' contributions by accepting or rejecting them. Two of our projects, *Moon Drawings* and *The Sheep Market* fit within this sector. The highest level of control and centralization, level 5, wherein project initiators curate the process by accepting, rejecting, or permanently altering participants' contributions, is also not represented in our selection of cases. We found during our project review, however, that this highly centralized structure for crowdsourced digital art projects is present in the field, though frequently with unintentional contributions such as personal data or found DNA.

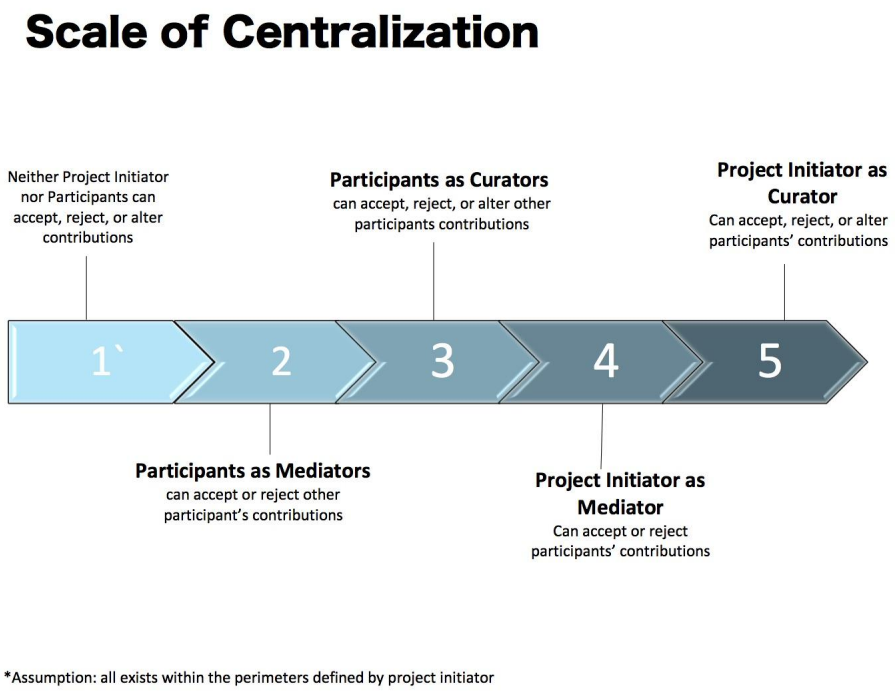


Figure 1, Scale of Centralization

In examining the varied levels of centralization in our case projects, we also observed a difference in types of participant contributions that impacted the level of engagement or facility a participant had in the project. In our literature review we examined audience engagement and the evolution of participatory art. From this, we developed a scale of participant agency (*Figure 2*). Initially this scale encompassed observation and interaction at the lowest end of the spectrum. After further evaluation, we realized that observation and interaction only pertained to audiences and eliminated observation and interaction so that our scale of agency speaks specifically to the involvement of participants.

This scale moves in opposite direction from the scale centralization, indicative of our observation of the inversely proportional relationship between centralization and agency: we hypothesize that as centralization and control increases, participant agency decreases. At the lowest end of this scale, a participant completes a predefined task independently. This is the case with *The Sheep Market*, wherein Aaron Koblin asks each participant to draw a left-facing sheep. Level 2 represents projects wherein participants choose from a selection of options what to contribute. This also happens on the individual level, where each participant operates independently from other contributors. *Quick Draw* is an example of level 2, where participants can choose from a variety of predefined items to draw. In level 3 of the scale of agency participants have the ability to choose what

to contribute. This is the case with *Moon Drawings,* where participants must operate within the website portal, but they can choose to draw any item they want. The highest level, the level with the greatest amount of participant agency is level 4, where participants work together to choose what to contribution. Reddit's *Place* is an example of this collaboratively-defined contribution.

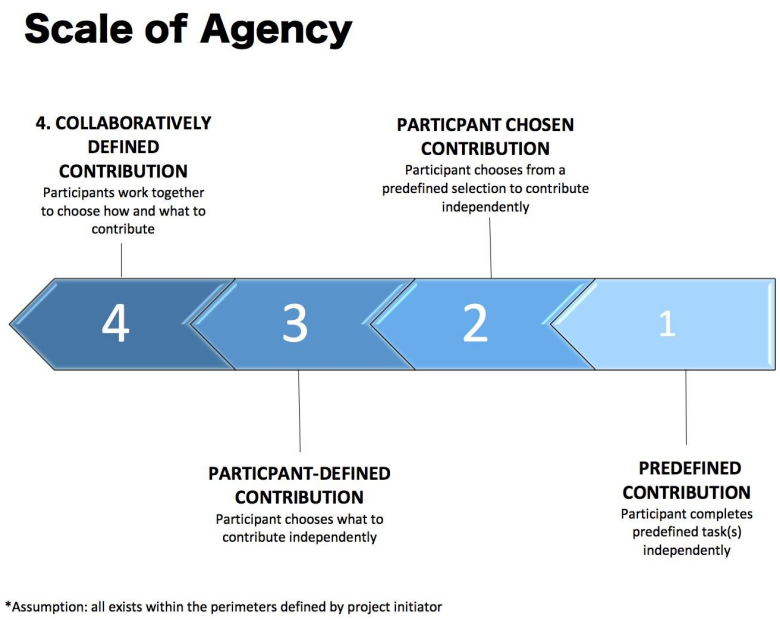


Figure 2, Scale of Participant Agency

Our analysis of the cases strongly focuses on these two scales, as the cases largely informed the development of the scales. There are other elements of these projects that are important to consider, including the motivation of the project initiator in creating the project, the scope of the projects, and incentive structures. These topics are examined in our small case study, but the predominant focus of this research became agency and centralization. There is certainly room for deeper analysis into these less-explored criteria.

Positioning

In effort to understand the relationship between these projects we attempted to position the projects based on specific variables. The objective is to develop a system to clearly position the projects in a way that provides useful information about these projects. This attempt is somewhat futile with such a small sample, but nonetheless we found it useful to experiment with positioning techniques.

First , we used Gartner Magic Quadrant methodology to position the art projects of our analysis. Gartner Magic Quadrants offer "visual snapshots, in-depth analyses and

actionable advice that provide insight into a market's direction, maturity and participants. Magic Quadrants compare vendors based on Gartner's standard criteria and methodology. Each report comes with a Magic Quadrant graphic that depicts a market using a two-dimensional matrix that evaluates vendors based on their Completeness of Vision and Ability to Execute."[8]

We have adapted this Gartner Magic Quadrant base to suit our subject of analysis, positioning art projects instead of vendors.
Sequential steps followed to obtain project positioning:

1. Identify the criterion to be used in positioning from the criteria development stage.
2. Evaluate each project based on the criterion and attribute estimated raw values to these criteria for each project
3. Group the criteria into two related subgroups that denotes the two axis of the positioning graph
4. Provide weight to each criterion based on the its priority or impact. This is known as criterion multiplicative factor
5. Find the product of criterion multiplicative factor and estimated raw values for each criterion of a project
6. Find the summation of calculated product of each criterion identified as subgroup in step 3. The values from two subgroup forms the coordinates on the positioning graph.
7. Plot a graph using subgroup values as coordinates for each project and subgroups as axis. This graph is represented as Project Positioning Graph

Second, we took a simpler approach by graphing each project's position on the scale of agency on the x-axis and their position on the scale of centralization on the y axis.

RESULTS

Aaron Koblin's *The Sheep Market*

This is a project wherein artist Aaron Koblin paid Amazon's Mechanical Turk workers $.02 to draw a single sheep facing to the left. These drawings were compiled and exhibited in public and online. The project took place in 2006, and the artist was motivated by a curiosity in Amazon's new Mechanical Turk service. This crowdsourced digital art project was an iconic first delve into using crowdsourced power to create a work of art. The project was highly publicized, and Koblin discusses his philosophy and process in a publicly available thesis.[9]

[8] *Magic Quadrant*. Gartner, Inc. Retrieved from https://www.gartner.com/it-glossary/magic-quadrant

[9] Forrest, B. (2006, November 30). *The Sheep Market Thesis*. Oreilly. Retrieved from http://radar.oreilly.com/2006/11/the-sheep-market-thesis.html

Number of Contributors: 7599 unique IP addresses[10]
Scale of Agency Score: 1; Participants contribution is pre-defined by project initiator
Scale of Centralization Score: 4; Project Initiator can accept or reject participants contributions
Duration of Contribution Collection: 40 days

Google's *Quick Draw*

This project combines game play with research, by prompting participants to draw an item. The participant must try to finish a drawing before the computer guesses what the item they are drawing is. The result is an interactive database of doodles. If you visit the Quick Draw website you have the opportunity to play the game, or to browse the database featuring thousands of drawings of the same item. Participant's manage this database by reclassifying misclassed items, as well as contributing new drawings. The motivation of the project initiators was to improve machine learning, and the database of doodles was a byproduct. The drawings of participants were used to create an open-source, participant-managed database which has been used and implemented into other artists' projects.

Number of Contributors: 15,000,000[11]
Number of Contributions: 1,000,000,000[12]
Scale of Agency Score: 2; Participants choose from a selection of pre-defined contribution options
Scale of Centralization Score: 2; Participants have the ability to accept, reject (in this case reclass) the contributions of others
Duration of Contribution Collection: Ongoing

Reddit's *Place*

This is a project wherein Reddit administrators created a blank canvas on Reddit for 72 hours. This is a recent project from 2018. Participants could contribute to this canvas one pixel at a time. The project initiators continued to tweak the structure of the process in reaction to participants contributions. For example, quite early in the process project initiators added a grid on which participants could contribute pixels of various colors. This provided enough structure to develop cohesive collaborative images, whereas before the grid there was not enough structure to achieve the project initiator's goal of creating a cohesive, creative, digital canvas. As the project moved through it's 72-hour lifespan, factions of participants evolved to work on particular elements (or overtake other elements) of the canvas. This was a very interesting project because it gave participants a large amount of agency and the ability to collaborate with one another.

[10] Ibid.
[11] Garun, N. (2017, May 19). *Google made a site that shows how millions of people draw the same object*. The Verge. Retrieved from https://www.theverge.com/tldr/2017/5/19/15662784/google-quick-draw-data-dragon-artificial-intelligence
[12] Ibid.

Number of Contributors: 1,000,000
Scale of Agency Score: 4; Participants work together to choose what and how to contribute
Scale of Centralization Score: 3; Participants accept, reject, and alter contributions
Duration of Contribution Collection: 72 hours

Carnegie Mellon University's *Moon Drawings*.

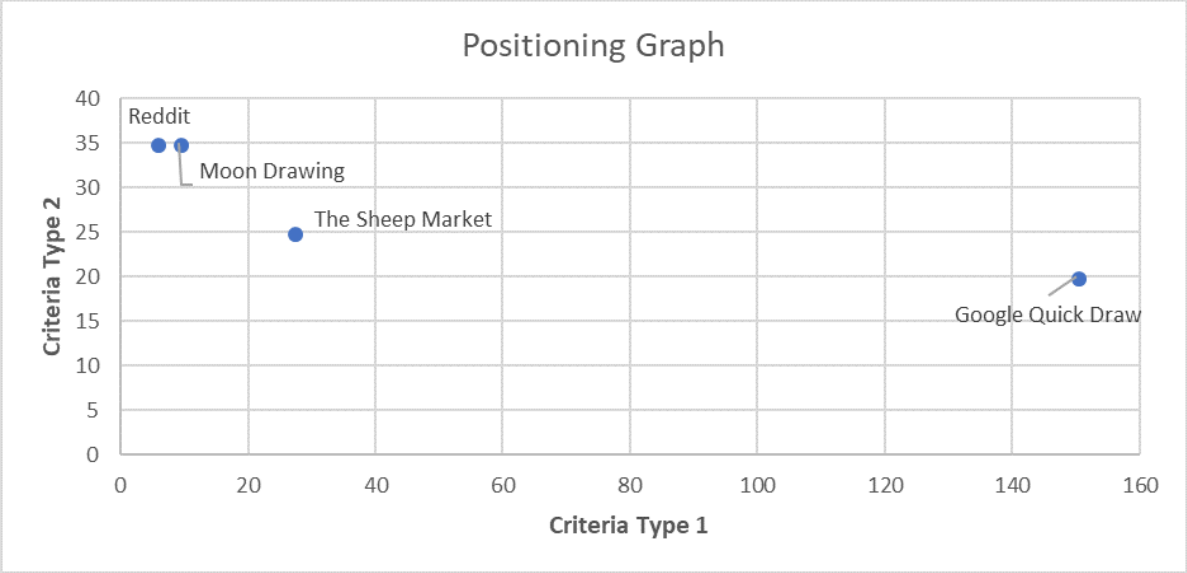
In 2015 this project solicited line drawings from participants around the world via the Moon Drawings website. Each person was able to contribute one drawing only, and they had the ability to accept or reject their own drawing, but not that of others. Of the 16,000 drawings that were contributed, 9,000 of them were inscribed on a disc that will travel on a rover to the moon. The rover will draw some of the drawings from the disc on the surface of the moon.

Number of Contributors: 16,000
Scale of Agency Score: 3; Participants choose what to contribute individually
Scale of Centralization Score: 4; Project Initiator can accept or reject contributions
Duration of Contribution Collection: 7 days

Positioning Charts

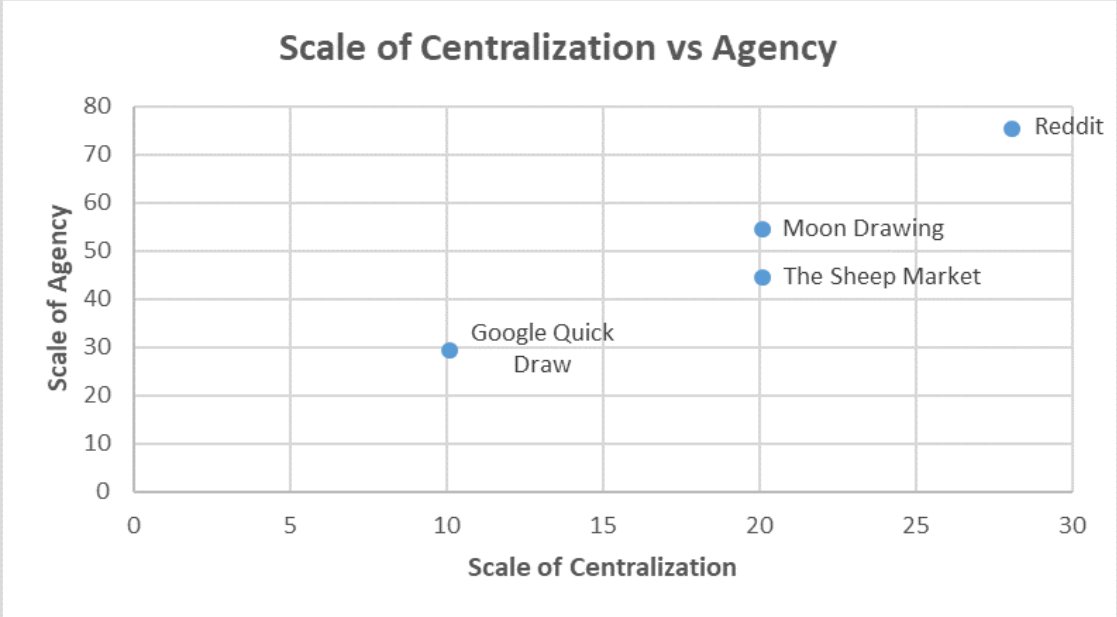
For first positioning we selected number of participants, Quantity of contributions, and duration of contribution collection in one sub group and scale of centralization and scale of agency in the other subgroup.

Criteria Type 1	Weights	Reddit	P1 Score	Moon Drawing	P2 Score	Google Quick D	P3 Score	The Sheep Market	P4 Score
Number of participants	5	0.66	3.3	0.0106	0.053	10	50	0.005	0.025
QTY of contributions	7	0.01	0.07	0.0016	0.0112	10	70	0.0001	0.0007
Duration of contribution collection	3	0.75	2.25	3	9	10	30	9	27
Total			5.62		9.0642		150		27.0257
Criteria Type 2	Weights	Reddit	P1 Score	Moon Drawing	P2 Score	Google Quick D	P3 Score	The Sheep Market	P4 Score
Scale of Centralization	5	3	15	4	20	2	10	4	20
Scale of Agency	5	4	20	3	15	2	10	1	5
Total			35		35		20		25



For the second positioning graph, we removed all other criteria to create a comparison between scale of centralization and scale of agency only, keeping both of them on different axis.

Criteria Type 1	Weights	Reddit	P1 Score	Moon Dra	P2 Score	Google Qu	P3 Score	The Sheep Mar	P4 Score
Scale of Centralization	5	3	28	4	20	2	10	4	20
			28		20		10		20
Criteria Type 2	Weights	Reddit	P1 Score	Moon Dra	P2 Score	Google Qu	P3 Score	The Sheep Mar	P4 Score
Scale of Agency	5	4	20	3	15	2	10	1	5
			76		55		30		45



The second chart, featuring values of the scale of agency on the x axis and the scale of centralization on the y axis was more informative given the simplicity of our scales and the size of our sample. Gartner's Magic Quadrant, however, may be useful at the point when the criteria are further developed. At this stage it is more advanced than needed.

DISCUSSION

This has been an incredibly insightful though preliminary set of analyses. The development of scales for centralization and agency are useful, but do not yet account for the variance and nuance between crowdsourced digital art projects. Though the projects we reviewed varied significantly, there were some commonalities to be found. We think the most valuable commonality is, unsurprisingly, that centralization or control and participant agency are unavoidable facets of crowdsourced digital art projects. Though the mechanisms of centralization and agency vary, they must be present in order to unify large scale contributions across digital spaces.

Though the sample of cases we analyzed in this research was too small to determine correlation between centralization and participant agency, we do believe that the two are correlated. Perhaps it is an inverse relationship, or perhaps it is multi-directional. Further analysis is needed, and the scales will need to be adjusted to increase sensitivity to a larger range of projects.

Additionally, we believe the relationship between a project's "product" and "process" requires deeper analysis. The fact that a project's process and product can coexist is something we did not consider fully as we began this analysis. The line between "product" and "process" is often blurry, particularly in projects like *Quick Draw,* which has two processes: one for participants to play the game, and one for participants to monitor and upkeep the database.

This analysis has lead to a clarified perception regarding what we know, what we do not know, and what we are on the way to understanding. It is our belief that with further analysis, a larger sample, and continued development of our existing criteria, that a conclusion might be drawn about the relationship between centralization and participant agency. We believe that additional features of crowdsourced digital art projects are significant such as further delineation between process and product. Deeper analysis of these features and criteria will yield the ability to diagnose the success of crowdsourced digital art projects — the first step toward informed design and strategic digital programming.

Bibliography

Burgess, M. (2016, November 16). *You can now play a Pictionary-style game called Quick Draw against Google's AI*. retrieved from https://www.wired.co.uk/article/google-draw-ai-artificial-intelligence-experiments

Doan, A. Ramakrishnan, R. and Halevy, A. (2011). *Crowdsourcing Systems on the World-Wide Web*. Communications of the ACM. Retrieved from https://cacm.acm.org/magazines/2011/4/106563-crowdsourcing-systems-on-the-world-wide-web/fulltext

Forrest, B. (2006, November 30). *The Sheep Market Thesis*. Oreilly. Retrieved from http://radar.oreilly.com/2006/11/the-sheep-market-thesis.html

Garun, N. (2017, May 19). *Google made a site that shows how millions of people draw the same object*. The Verge. Retrieved from

Google Quick Draw. (n.d.). Retrieved May 9, 2018, from https://quickdraw.withgoogle.com/

Johnson, I. Friday, (2017, December 8). *Drawings in the Cloud: introducing the Quick, Draw! dataset*. Retrieved from https://cloud.google.com/blog/big-data/2017/12/drawings-in-the-cloud-introducing-the-quick-draw-dataset

Kaufman, G. Flanagan, M. and Punjasthikul, S. (2016). *Investigating the Impact of 'Emphasis Frames' and Social Loafing on Player Motivation and Performance in a Crowdsourcing Game*. Retrieved from https://dl.acm.org/citation.cfm?id=2858588

Koblin, A. (n.d.). The Sheep Market. Retrieved May 9, 2018, from http://www.aaronkoblin.com/work/thesheepmarket/

Lu, W. (2016, Nov 23). *How Does Google "Quick, Draw!" Work? This Game Makes Learning About Artificial Intelligence Fun*. Retrieved from https://www.bustle.com/articles/196717-how-does-google-quick-draw-work-this-game-makes-learning-about-artificial-intelligence-fun

Magic Quadrant. Gartner, Inc. Retrieved from https://www.gartner.com/it-glossary/magic-quadrant

Moon Drawings. (n.d.). Retrieved May 9, 2018, from http://www.moondrawings.org/

Museum Computer Network. (n.d.). Retrieved May 9, 2018, from https://conference.mcn.edu/2017/about.cfm

Place • r/place. (n.d.). Retrieved May 9, 2018, from https://www.reddit.com/r/place/

Qian, H. and Scott, C. (2007). *Anonymity and Self-Disclosure on Weblogs. Journal of Computer-Mediated Communication*. Retrieved from https://academic.oup.com/jcmc/article/12/4/1428/4583041

Sudoscript. (2017, April 4). *When Pixels Collide.* Retrieved from http://sudoscript.com/reddit-place/ Golan Levin, David Newbury, and the CMU Moon Arts Group 2015 Moon Drawings Retrieved from http://www.flong.com/projects/moon-drawings/

Surowiecki, J. (2004). *The Wisdom of Crowds.* Anchor. Retrieved from https://www.amazon.com/Wisdom-Crowds-James-Surowiecki/dp/0385721706

Tang, J. Cebrian, M. Giacobe, N. Kim, H. Kim, T and Wickert, D. (2011). *Reflecting on the DARPA Red Balloon Challenge. Communications of the ACM.* Retrieved from https://cacm.acm.org/magazines/2011/4/106587-reflecting-on-the-darpa-red-balloon-challenge/fulltext

Williams, B. (2017, MAY 19). *Google's quirky sketch game in these addictive GIFs*. Retrieved from https://mashable.com/2017/05/19/google-quick-draw-data/#IRH2MdjzZ5qx

Wolf Brown, W. (2011). *Getting In On The Act*. James

Irvine Foundation. Retrieved from https://irvine-dot-org.s3.amazonaws.com/documents/12/attachments/GettingInOntheAct2014_DEC3.pdf?141869

Your Story, Our Story. (n.d.). Retrieved May 9, 2018, from https://yourstory.tenement.org/