

Uses and Gratifications of Space: A look at how and why college students do or do not engage with NASA social media

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Abstract: Throughout its existence, NASA has enjoyed overall support from the American people.

However, this does not translate to public knowledge of the space agency or active engagement with NASA's communications efforts by a majority of the general public (Launius, R. 2003). It is understood there is a small segment of the population, which pays very close attention to the agency (National Academy of Science 2014). NASA would benefit from knowing what new segments of the population might be reached, outside of the relatively small group of NASA devotees. This could be useful for gaining an increase in public and political support. A focus group discussed these communication issues in the frame of uses and gratifications. There were specific suggestions given during the focus group which could serve NASA in finding uses and gratifications when seeking a wider audience. Some of the negative attitudes helped to understand the problems the agency faces when overcoming communication barriers. The broad implications of the focus group were the problems of relevance and availability which NASA has yet to overcome. NASA is on the right track in many ways, using its strengths to find gratifications for its current audience and new messaging to find new followers.

Introduction: NASA has throughout its existence enjoyed overall support from the American people.

However, this does not translate to public knowledge of the space agency or active engagement with NASA's communication efforts by a majority of the general public (Launius, R. 2003). As NASA prepares to implement its plans to send humans to Mars in the 2030's along with a large number of unmanned missions, public engagement is more critical now than ever in the agency's history, particularly with the advent of web 2.0 social media. There is a lack of information on why the public would or would not engage with NASA's social media communication. It is understood there is a small segment of the population which pays very close attention to the agency (National Academy of Science 2014).

Ascertaining what new segments of the population might be reached outside of the relatively small group of NASA devotees could be useful in gaining increased public and political support.

Problem: How can the uses and gratification theory help NASA understand why people do and do not use their social media? Further, there is a severe lack of research on the public opinion of NASA and why the public does or does not pay attention to their content. This research seeks to add to this small body of public opinion research.

Question: Why do college aged students use or not use social media content which pertains to science education, specifically NASA?

Theory The uses and gratifications theory applies well to the new age of social media on the web (Ruggiero 2000). Uses and Gratifications can be defined as an attempt at understanding how and why people actively seek out specific media to satisfy specific needs.

Literature Review: In 2010, the National Academy of Science was congressionally mandated to report on the rationales and approaches for the U.S.'s future human exploration of space, as part of the National Aeronautics and Space Administration (NASA) Authorization Act of 2010. Part of this report focused on public opinion of the space program, specifically human exploration and Stakeholder's opinion. In the report, stakeholders were defined as people with interest in and plausible ability to exert influence over NASA's direction. The report "Pathways to Exploration: Rationales and Approaches for a U.S. Program of Human Space Exploration" National Academy of Science, (2014) outlined current and past support for space exploration. For the purposes of this study, under the frame work of Uses and Gratifications theory, the most current opinions of the public are the most relevant. Stakeholder opinion is relevant to this study for understanding the disposition of the expert community's motives and biases when serving as opinion leaders to the general public. In "Pathways to Exploration: Rationales and Approaches for a U.S. Program of Human Space Exploration" National Academy of Science, (2014) found that no more than 10 percent of the American public felt very strongly about space exploration. Roughly 33 percent of the public would strongly support a human mission to Mars and another 30 percent felt moderate support for the mission. Overall support for NASA is at 73 percent, one of highest for any government agency. When funding was not part of the question or was framed as a small cost to the individual, 1/3 of respondents felt strongly about a mission to Mars, and 40 to 60 percent of people surveyed felt supportive of the endeavor.

In the list of policy priorities, the public frequently ranked space exploration at or near the bottom. When asked about funding increases to the space program people were generally against it. It must be noted that in both National Academy of Science (2014) and Launius, R. (2003) found there is a clear lack of public knowledge concerning the space program in general and critically its levels of funding in the overall federal portfolio. When information on the cost of programs is presented, it usually is in whole numbers which total in the billions of dollars. This makes space exploration sound expensive. (National

Academy of Science 2014) when the cost was put into terms of what each person would pay, support for the mission to Mars was not only supported more, but funding increases were also supported. National Academy of Science (2014) concluded that stakeholders felt that discovery or expanding human knowledge was the most common and strongly felt rationale for space and human exploration. When given open ended answers, the experts also cited encouraging the nation's youth to pursue Science Technology and Mathematics (STEM) as a reason to go.

In this climate of public opinion, NASA is attempting to get the attention of the general public to inform them of NASA's activities. This is in hopes of garnering more public support. Finding out what the uses and gratification are of current followers of NASA social media and what the uses and gratifications are of people who don't follow NASA social media could be critical in understanding how to gain more attentive interest from the public, in the current climate.

Within the federal government, to insure that political activity does not interfere in the work place or with a federal agency's' fiduciary responsibilities, the Hatch Act was passed in 1939 (Congress 1939). The main goal of this law was to govern the actions of civil servants so as not to create political conflicts of interest in the work place. With this law (Congress 1939) and the fiduciary responsibilities NASA has means it is unable reach the public through advertising that a private entity has free access to. Usage of private opinion leaders is not prohibited, but it is difficult to secure the necessary permission to work with them to disseminate NASA's message.

"Reimagining NASA: A cultural and Visual Analysis of the U.S. Space Program" Williams, M. (2012) is a content analysis of the NASA.gov website which was temporarily redone in 2010 for the 50th anniversary of NASA's creation under the Eisenhower administration. The analysis focuses on the images used to communicate NASA's 50 year history. The author, Miriam Williams, uses Barbatsis's Narrative Theory and Sontag's "On Photography" to frame her arguments. Narrative Theory has its origins in Aristotle's

thinking found in his poetic work and according to Ohio State University's Project narrative "is currently enjoying a major burgeoning of interest."

This paper gives an important look into how NASA presents its online message to the public. What they present to the public and why, will help to understand what uses and gratifications people who engage with NASA social media are fulfilling.

The paper Williams, M. (2012) surmises that NASA focused on two major areas: triumphs and tragedies. The paper looks at the political and social implications of the images which were presented.

Understanding why images of President Kennedy were chosen is not hard. Other images of the triumphs are also plainly obvious like the Apollo 11 moon walk. However, many of the images were ones which are not popularly thought of when people have used images of the moon landings and walks in the past.

This was likely not only to showcase things never before seen by the general public, but to also give this section of the narrative a quality of specialness which added to the triumph aspect of this portion of the narrative. More interesting is her side focus on African-American contributions to the space program.

Later parts of the narrative particularly during the Space Shuttle program, views social diversity in space as a triumph. A question was raised as to why during this time (1981-2011) the first African American head of NASA and President of the United States were not included in the photo montage. In her

analysis of the tragedies, she notes there is a great deal of deference for the lost crews of Apollo 1,

Challenger, and Columbia. The images mourn without assigning blame, particularly in the case of

Challenger in which there were clear management failures. Instead of acknowledging this, the images

presented show a picture of ice on the launch pad. Williams (2012) states that this almost absolves the

human errors which led to the loss of Challenger and blames just the ice. More research on NASA

outside of the tragedies and how the agency communicated to the public is necessary. Since most

research focuses on the subject of tragedies and crisis communication. Furthermore, given the emphasis

on the Shuttle Program's racial, gender, and national inclusiveness, more research should be conducted

in this area as well. Looking at achievement, tragedies and social diversity shows what NASA wants to put out into the public (Williams, M. 2012). Based off this information and the survey information from National Academy of Science, (2014) the message NASA puts out according to Williams, M. (2012) would help to fulfill the uses and gratifications of some of the public already interested in space exploration. This messaging does not do the same for any significant amount of the stakeholders of NASA who are also opinion leaders for NASA (National Academy of Science 2014).

In the paper "Space policy responsiveness: The relationship between public opinion and NASA funding" by Steinberg (2011) puts forth the idea that NASA's future funding may be directly correlated to public opinion, and through the methodology, explains factors that influenced public opinion. One of the factors included the media, through which the government used to report what was going on during the early stages of NASA's space program (Steinberg 2011). This connection between public opinion and the media's influence on it is based on McCombs and Shaw's Agenda Setting Theory, which suggests that the media sets the public agenda. For example, if there is a major accident in the NASA program, the government would not want the public to panic about the catastrophe. Instead, the government would rather let the people know that everything was going to be fixed and re-tested immediately to provide more safety measures for future astronauts. The media would dutifully report on this, which in a short term sense would relieve an anxious public about the safety of the NASA program. In short, the media would not be telling the public what to think, but instead what to think about.

As for how NASA's funding related directly to public opinion, Steinberg (2011) concluded that over time, the executive branch of the government (the president) lost control over decisions regarding NASA to Congress, because of budget concerns. There was also a push for the public to become more informed about what was going on with NASA in order to influence their legislators to be more alert towards public opinion on issues regarding the space program.

The methodology of Steinberg (2011) is a historical analysis of space policy and public opinion from the 1960s to the 2000s, creating a dynamic connection between its budget and the ebb and flow of public support for the program throughout five decades. The conclusions of Steinberg (2011) were that funding for NASA is not always dependent on public opinion, "First, space policy funding is responsive to public opinion at some times and less at others. Second, when looking at two different metrics of spending, it seems that policy funding is both responsive and non-responsive at the same time" (Steinberg 2011). Implications of this research show that there is not a clear-cut answer to these public opinion questions, and the issue has not been solved yet. There is clearly a lack of further research about this topic, perhaps Steinberg (2011) is just the tip of a proverbial iceberg when learning about how public opinion affects NASA's budget. This illustrates that there are clearly other political forces involved with NASA policy. With the advent of web 2.0 communication, social media has become a powerful force which can topple governments and move the actions of those in the halls of power. Understanding where these forces of agenda setting (Steinberg 2011) and uses and gratifications (Ruggiero, T. E. 2000) compete or cooperate, may be critical to message creation by NASA when the general public has so little information about space exploration (National Academy of Science 2014).

Scholars are trying to explain why the communication with the public is much more essential than before in "Public communication strategy for NASA's planetary protection program: Expanding the dialogue" (Billings, Linda 2006). The possibility of extraterrestrial life and the exploration of the solar system are NASA's majority responsibility. All of that information is interesting to people. Therefore, the planetary protection program needs to communicate with scientists, government offices, non-government organizations and normal audiences efficiently and effectively. However, this program has to be aware of some special organizations' concerns, such as antinuclear organizations, because every spacecraft contains numerous nuclear sources.

When looking at effective communication and understanding of science, Polman (2014) and other co-authors' point of view for especially young people's sense of science in daily life, science journalists would contribute significant efforts. At the early part of this paper, the authors emphasize that science thinking is everywhere in a person's daily life, such as the weather, medical treatments of older generations and even how to build muscle efficiently. Although people could learn science when they were in school, the knowledge they learned is too basic. The purpose of science education is to help students to establish science thinking. However, the development of science is a quick process and the core content has 180° change sometimes. Therefore, people have to absorb updated science knowledge from outside. Most people do not have enough understanding of academic science terms, so they prefer to receive information from mass media rather than science journals. Science journalists have become more important in media industry today. A science journalist is like a gatekeeper they normally have a science background, can read science journals and even conduct interviews with some scientists in a certain field. Additionally, these kinds of journalists work primarily for Internet-based media. Among all adults in the United States, one quarter (40 million) say they get most of their science news and information from the Internet, and by 2006 87% of the Internet users had at one time gone online to get some piece of information about science. There is a need for improvement in proven science information on the Internet or social media

Some of the strategies which have been investigated may give some insight to both the issues NASA has with the reach of its message and understanding the dynamics of effective social media communication. There are various adoption strategies for web 2.0 brand communication. The typical strategies used are attaching the brand to opinion leaders, listening to engagement with stakeholders and direct interaction or group interaction. There are varying levels of interactivity this correlates to effective strategy (Vernuccio, M. 2014). By the coding of Vernuccio, M. (2014), NASA would likely fall into the category of Selective Strategists (this category has a tendency for less openness compared to other categories and is

selective in the publics it engages with) with some trends in its practices, such as NASA's openness and prolific content creation, could lead NASA to be a Rising Star (this category uses social media prolifically and partially relies on opinion leaders, and has a medium level of interactivity). The strongest category Confident Communicators entails prolific use of opinion leaders and great amounts of interactivity (Vernuccio, M. 2014). There are both cultural and legal hindrances to NASA being a Confident communicator, and on the positive side its trends of becoming a Rising Star show promise for the current and future effectiveness of NASA's social media.

The probability of a viral social media campaign to be effective relies on several factors (Lis B., Schulz J., 2014). NASA's brand has some aspects which are helpful in a viral campaign. Its brand recognition tends to give it more forward ability. On the negative side, the current level of interaction and understanding of NASA's relevance (National Academy of Science 2014) means it could be harder to get more interactions and forwards to facilitate any viral strategies (Lis B., Schulz J., 2014). People seek to interact with likeminded individuals. Audience targeting is key to increasing the reach of campaigns to new publics (Lis B., Schulz J., 2014). Given the relatively small audience that is high engaged with NASA, this could also be a hindrance to reaching a wider audience. Quality and easily accessible content could change the negatives into positive thus leading to more success of social media campaigns (Lis B., Schulz J., 2014).

Along with the rapid discoveries in space, which are becoming more and more common. Audiences are seemingly more eager to know what's going on in the universe, yet barriers still exist. How does NASA communicate with the scientific community and general public? Mass media could be the key (Billings, Linda 2006). The ideas presented here will be applied to the communication methods of social media and web 2.0 technology to frame an understanding of the focus group results.

History and Current Uses of Focus Groups

Researchers use the focus group to analyze little known phenomena because this technique is capable of providing detailed information (Acocella, I. 2012). This is why the focus group was necessary to understand how uses and gratifications of social media use can be applied in an esoteric subject like NASA (National Academy of Science 2014). The purpose of this research was to bring depth to the broader survey information found in National Academy of Science (2014). This in-depth information is something NASA is hard pressed to acquire due to the nature of civil service. To alleviate this pressure, this research chose a focus group method.

The focus group method is a group information technique and the heuristic value lies within the ability to create discussion (Acocella, I. 2012). The two main aims of this focus group were to facilitate interaction between participants and to maximize the quality of information in a short amount of time. Overall, the focus group method is the most appropriate technique for gathering the information this research paper needed in the short amount time allowed and at low cost. The focus group was necessary to try to examine phenomena more in-depth than a simple survey. It started broad and narrowed down to the exact research topic. The information found in Acocella, I. (2012) served as the guide by which this paper selected and conducts its focus group.

Methodology: A 45-minute focus group was held September 22, 2015 and was conducted with 8 Texas State University students. The students were from different disciplines and classifications which was helpful in determining what uses and gratifications could be or are not being filled by engaging with NASA social media. The subjects were found by a convenience sample of the university's student body. This helped to ensure that the subjects were from a diverse set of backgrounds and disciplines. The participants had different subject interests, but had similar perspectives as students in college to share common ground. The focus group for this paper was comprised of college students enrolled at Texas

State University, so they share common ground in this aspect. The participants gathered were comfortable, and confident. The focus group gathered, experts were not necessarily actual professionals, but those who had enough knowledge about the research topic to participate in the focus group. The participants needed to have similar experiences toward the research topic at hand.

This demographic is important for NASA to consider as these participants are just entering voting age, and will be adults throughout NASA's human exploration of Mars, which could constitute a future highly skilled employment base, and they are also the first of the Internet generation. Therefore, learning what they use the Internet for will likely be useful in drawing conclusions for the future use of social media.

This research aimed to fill a void in not only the use of Uses and Gratifications theory (Williams 2000), but also serve to help NASA answer questions it cannot ask in a research or public opinion polling setting due to the nature of civil service.

The networks which were used to form the focus group consisted of the Supplemental Instructors of the Student Learning Assistance Center (SLAC) of Texas State University, professors in the School of Engineering at Texas State University, the School of Mass Communication & Journalism at Texas State University and various personal networks affiliated with Texas State University. This sample of participants from these networks constituted a convenience sample for the focus group.

The participants were approached through the convenience sample and were asked through email to use a group sign-up via Google Forms. This helped keep the limited personal information that was gathered about each participant password protected. Google Forms is a free service from Google which allows users to create their own forms and distribute them. Once the form (Figure 1) was filled out, the information was collated into a spreadsheet automatically (Figure 2). This information on the spreadsheet was also password protected through the user's Google account password. Students filled out the online form with their names, majors, classifications, and which social media, if any, they used and their permission to use their comments for the focus group. For the purposes of privacy, Figure 2 has had the

names deleted. The social media listed are the social media channels and services used by NASA. These consisted of Facebook, YouTube, Twitter, Instagram, Vine, Tumblr, Flickr, Foursquare, SlideShare, SOUNDCLOUD, Google+ and an, other option, which the subject could enter manually.

The next step was to conduct the focus group. 8 questions were asked, along with 2 follow-up questions pertaining to social media use, what kind of content participants usually looked at, and if it pertained to science, education, or entertainment. The majority of the questions focused on NASA Social Media, and why or why not participants used both science education social media and/or why they used NASA Social Media (Figure 4). If they did not use it, what might have enticed them to do so, and if they did, what enticed them to do so. Their answers were examined and conclusions were drawn about the uses and gratifications that were fulfilled, or could have been fulfilled, by engaging with NASA related social media content.

This moderated focus group lasted 45 minutes, and was filmed by one camera. The minutes of the discussion were also written down. The moderator conformed to the example given in Acocella, I. (2012) and helped stimulate conversation and ideas through the questions (Figure 4). If there had happened to be too many subjects that attended the group, the contingency plan was to split the group in two, or to hold follow up interviews. This was determined not to be necessary on the day of the focus group. The determination was based on the available space and the group size did not warrant the implementation of any contingency plans.

Results: In NASA tradition, for purposes of anonymity and IRB compliance in quotes the names of the participants have been changed to those of Roman gods and goddesses. A more in depth summary of each participant's opinions can be found in Appendix A.

Over all Group Opinion and Demographics

The interest level in the group is broken down with four of the eight uninterested, and the other four showing varying levels of interest in NASA. Two of the interested participants show mild interest in NASA and its content. The other two both had a direct fascination with NASA, though only one followed NASA directly. Her purposes in following NASA directly was for the pictures NASA produced which she had a harder time gaining access through other content providers.

Interest or disinterest did not break down along gender lines, or education discipline. There was a greater likelihood of engagement if a participant was a graduate student. Of the eight participants, three were male and five were female, the interested participants had half male and half female in the group of four who engaged with space related social media. Given the small sample size and the uneven representation of gender, classification, and discipline firm results of the how the demographics were distributed are likely inaccurate.

NASA/Science Followers and Why

The reasons why four of the eight participants follow NASA directly or have indirect contact with its content is due to the participants interest in science, finding the subject of space entertaining and the entertainment of the esthetics found in NASA's imagery. Of the four which were interested in the subject only one directly followed NASA's social media for the esthetic of the images presented. She did this since being introduced to the images through her social network. She followed NASA since legacy media does not present these images with adequate frequency for the participant to find gratification through viewing the images on legacy media (Lis B., Schulz J., 2014). Another participant engaged directly with NASA and scientific journals for both personal and professional use. Other participants sought out science and space related content or used social networks to acquire space content via friends to fill the gratification of learning and entertainment. The other uninterested participants noted

some interest in exploration of new worlds, but mostly focused on the technologic advances of consumer products as their interest in science related content.

Minerva: "I follow a lot of the science articles. So I'm an archeologist. So I like to find out what they are finding around the world on a constant basis."

Fortuna: "I follow NASA. I don't know what it all means but the pictures are really cool."

Vulcan: "I also follow like Neil Tyson and stuff like that. But yeah he'll do a talk every now and then like he did one with Colbert. Cause like I guess that's entertaining to see them up there and it's also entertaining to see the actual science. "

Non NASA/Science Followers and Why

For the most part, the four participants who were the least interested in NASA regarded its social relevance as an afterthought. They also questioned whether in the current media climate people, particularly of the younger generation, would pay any attention to NASA. The interest of these participants noted an opportunity for NASA to find links of uses and gratifications, to a variety of other popular aspects of society, like sports or music. Some of the participants perceived lack of relevance to everyday life which came from a somewhat jaded attitude of space exploration. Participant Pluto stated "They haven't done anything in a long time, except spend money on big rockets to shoot white guys into space." Some of the relevancy issues also stem from differing areas of interest. These attitudes are reflections of the National Academy of Science, (2014) overall analysis of the general public's opinions on NASA.

Victoria: "I've honestly never thought about it. My top priorities is like sports, I think like learning about peoples experiences I want to follow now. I mean like I get my news from USA today and they would talk about NASA and have the pictures already. So I'm like why do I need to go to NASAs website when I got USA today telling me like all the new updates."

Diana: "It's just not interesting."

Pluto: "It's not relevant I just I mean kind of feel like the same stuff. We're not in the race to space anymore. Like there was a time when people follow like will it be Russia or US to get to the moon first. Now like they've been up there, they're looking for stuff, it's just kind of boring."

Victoria: "The only thing I heard in the news is the astronauts watch the Martian for the first time in space before anyone else in the world could that was all I heard."

Ideas and Issues of Communication

In order to attract a larger audience some recommendations that were put forth either had merit or were already being practiced by NASA. The issue with the participants suggesting things NASA has done or is currently doing to generate content, underlies the problem of reach, and NASA's ability to penetrate communication barriers. To find a use or gratification in following NASA social media the public must first be brought to the table. On the positive side of the issues of reach NASA is on the right track by producing content that interests people. The general public has a positive opinion of NASA and space exploration (National Academy of Science 2014). This certainly would fall under gratification for viewing content of a space related nature. Another segment of the public which was cited as a possible target for communication is the youth. This lines up with one of the reasons stakeholders think space exploration should be undertaken (National Academy of Science 2014). With the focus group and stakeholder synergy of opinion, increasing youth targeted uses and gratifications in communication is a strong area for greater consideration.

Some of the more notable suggestions that NASA has either has undertaken on a limited basis or is doing in a similar fashion would be to make videos of 15-30 seconds in length with links to longer, more detailed videos. While NASA does do this in some ways, to the knowledge of the research team, it does not combine short videos as enticements to its longer length content, or produce videos of such short length on a regular basis. As noted by one participant, the articles are sometimes long and too unintelligible. It was suggested in the focus group to use Instagram videos as the enticement and link to

more information in a longer video. Much like a movie trailer entices people to go to the movies. The idea of answering questions about phenomenon similar to “Minute Physics” is a good suggestion. NASA does do similar things such as “ask a climate scientist.” This program however, is not on a consistent basis and does not cover a variety of other space science related topics such as Black Holes. The difference between NASA and content produced outside of NASA is the format and tone are very different. NASA, according to the focus group having the “boring” and less approachable format and tone than content produced outside of NASA (Lis B., Schulz J., 2014). This was a common comment from both NASA/science followers and non-interested participants, approachability is according to the focus group an area for improvement (Polman 2014). Without high approachability and intelligibility to the information consumers will be hard pressed to find a use in or gratification from engaging with NASA social media. Other participants seemed very interested in celebrities and opinion leaders. Attaching the gratification of following a celebrity on social media to information on NASA would widen NASA’s reach. Given how one participant came to follow NASA social media through her social network and the nature of social media’s similarities to off-line social networks. Social Media opinion leaders could have profound ability to create new gratifications tied to engagement with NASA. This discussion on opinion leaders included both use of the astronauts and people outside the agency. Some of the participants felt the astronaut’s generated content was too hard to find and others felt that it was niche content that people who want it will seek out. The participants felt more accessible information from the astronauts themselves and making their profiles more popular overtime will likely help bring new viewers to NASA content. Provided the information about the astronauts is humanizing, (Polman 2014) the perception of stodginess must be avoided. Other Ideas were to more frequently present outside opinion leaders. While it is understood that this is difficult for NASA to do; utilizing bloggers and other popular science and non-science online personalities is key. Improvements in NASA’s ability to work with celebrities and creating NASA celebrities will be necessary given how often the subject was raised (Vernuccio, M. 2014).

An area of communication tactics raised in the focus group which NASA has had numerous successes with, is taking over social media events such as the Oscars in 2013. Given this trend of success and the mention of it as a tactic in the focus group this should be perused with greater frequency and at a wider variety of social media events to help tie the gratification of other social media events to NASA.

Juno: "I feel like if they had just the snippets on Instagram and it just is the most fascinating stuff in that 12 seconds and just like capture someone's attention and they provide the link below so the viewer can read the rest of the article or watch the rest of the video. On YouTube or on NASA's website."

Victoria: I feel like it's hard to find thoughts astronauts now social media you don't really know their names unless you know NASA and follow them.

Vulcan: "With the YouTube thing I feel like I don't think I have ever watch a NASA video but I know like a channel I am subscribed to is minute physics and so they will explain a whole deal of something in like a minute. Maybe if they did something like that even a minute I don't think is too long. Minute physics gives a short explanation of a random concept. I don't think you could explain everything about space but you could still explain something and not spend half your day."

Victoria: "get it trending on social media use celebrities to back up those ideas tens of millions of people follow them and people like me who don't normally care about NASA. Who would I ever know about it?"

Pluto: "I think I read a study a while back that like a majority of what people consume on the Internet has like a humor aspect to it to make them laugh. Maybe if they (NASA) were not so serious all the time. Like astronauts posing or something weird or something to get more of an audience so it's not just like always the same up there space and space suits you know what I mean. Just kinda build and audience a little better."

Fortuna: "I don't think that's their job really I think that would be a waste of their time when they could be finding... Sorry to say that. Be finding cool new things."

Mercury: "I think to counter act a little bit I think it's important to create awareness of what you're doing and let that go ahead and help facilitate it because if there is not interest and people don't care then there is a chance the funding and thing that are provided for that organization may fall through because we are not seeing the people we are not getting the support they need so in some ways you might need to make concessions in order to get the popularity in to where your able to fund yourself."

Vulcan: "This might seem open-ended ish but answers, there seems like so much about space that we don't know we advance things change like with the whole Pluto thing now like oh it's a planet and now it's not a planet and it's stuff like that things change over time but I still feel like there is so much of space and all that, that we don't know."

Minerva: "I was going to say get a big celebrity like Neil deGrasse Tyson or if you have Bill Nye because I know a lot of people follow him just because they know him from childhood so if people like him comment on something people will be more likely to look it up if you have a big name."

Mercury: "I think part of the problem when you can't really identify or can't really address it. It's like science and progress, they take time. You know, you talk about Mars exploration how we're closer, but it seems like years and years down the line. It's hard for us in the instant gratification of social media time to be like, Well when is that going to happen?"

Data of Signup Form

The data gathered by the sign up form gave a small sample of various demographics and media habits of the participants. Though the sample size is small and therefore unreliable, the information it presents is still of interest when examining the participant's comments and attitudes. The numbers in the charts reflect the total number of people who attended the focus group. Out of the eight responses 50 percent are Undergraduate Seniors, 25 percent are Graduate Students and 25 percent are Undergraduate Juniors. The participants' uses of social media were collected and the responses indicate that Facebook is the most ubiquitous social media platform at with 100 percent of the respondents indicating its use. Tied for the first most common social media is YouTube 100 percent. Instagram had 87.5 percent, next is Twitter with 75 percent, Vine has 50 percent, SOUND CLOUD and Other have 37.5 percent and finally Tumblr with 25 percent. The sample size is eleven and this is not a large enough sample size to draw any statistically significant conclusions from this data alone. (Figure 3.1 & 3.2) The numbers of which social media platform is used is indicative at least of the common use of Facebook, Instagram, Twitter and YouTube found in other larger sample sizes. Little other information of statistical value can be drawn from the sign up data set due to its small size.

Conclusion: NASA has consistently been the most popular social media in government. This fact in consideration with the findings of National Academy of Science, (2014) on public opinion and the comments of the focus group leads to an understanding there is still a large portion of the public who is not engaging with NASA social media, but can be reached and engaged with by NASA. There are a variety of reasons both why and why students do not follow NASA's social media or intake related space content. Those that engaged with NASA did so out of an interest in the subject of space exploration, a

desire to be connected to that part of the scientific community, and the esthetic apportion of NASA's content. Those that did not find NASA to be irrelevant, and felt that if anything significant happened in space exploration they would be made aware of it through more traditional new media (Polman 2014), (Lis B., Schulz J., 2014).

Within NASA there are both positive forces for communication and there are prudent rules that constrain the types of communication that can be conducted. The laws and rules of conduct that concern communication must be understood to see how NASA breaks the "federal fire wall" to communicate its message to the public. NASA has two fiduciary responsibilities; the first is to carry out the policy of the President of the United States of America and Congress. The second responsibility is to inform both public officials and the American people of the agency's activities. These two responsibilities can come into conflict. There could be an instance when policy is being made by a political figure that would be a hindrance to the agency's progress. All of these factors have in some instances lead to a more insular culture at NASA, exemplified by the term "federal firewall."

Understanding the legal and cultural aspects of NASA is important when looking at how people in communications at NASA, who work to communicate effectively, attempt to do so.

This in addition to the notable surge in nerd culture, in popular culture are all communications opportunities and net positives for NASA. During this study the film "the Martian" was released in theaters and is now the top grossing film for the Oct. 2-4th 2015 weekend. One film is not a trend; nevertheless, this film's popularity and other films note an appetite for this content.

The specifics of content format and tone may help bring in new consumers of NASA content and form new gratifications from following NASA social media. One area where NASA has a great strength is the job it does in capitalizing on its unique mission and capabilities. Across the spectrum of enthusiasm was the acknowledgment in one form or another for the special nature of NASA content. Returning to the

fascination with imagery, while this was only directly mentioned as a reason for following NASA by one participant. The group consistently talked about videos. This leads to the conclusion people are interested in the unique imagery NASA is capable of obtaining and find a use or gratification in the content's unique nature. This could also mean videos are the most popular way of relaying information on the Internet.

The broader implications of the focus group were the problems of relevance and availability. NASA does a good job of producing content, but some of its publishing methods, tone and the issues of perceived irrelevance in the general public were the main barriers to a wider audience finding a use or gratification in NASA's social media. More research and possible testing of the suggestions of the focus group will determine if new uses and gratifications can be found to draw in segments of the public who are so far unengaged with NASA. It is the hope of this study that NASA can use the information from the focus group to help inform its content generating decisions to better find uses and gratifications for its content with the public.

To anyone within NASA an anonymous transcript of the focus group is available. If there is interest please contact Carl Clark via email cwc48@txstate.edu

Appendix A. Participants

In NASA tradition, for purposes of anonymity and IRB compliance the names of the participants have been changed to those of Roman gods and goddesses. This is an overview of each participant's most significant comments and ideas concerning the questions which were asked.

Participant Minerva is an anthropologist who followed school clubs on social media. Her reasoning to follow these groups was that these groups were on Texas State's campus and by following them she would know what was going on in the clubs of which she was involved. Minerva also followed a lot of

the science articles. Being an anthropologist, she said she liked to find out what fellow anthropologists were finding around the world on a constant basis and the only way she could keep track of that news was checking BBC's website and/or Facebook on her phone or computer. She also followed email and article updates from the science publications, such as journals, to keep track of the science as it pertained to anthropology. When speaking on her interests with NASA, Minerva mentioned the hands-on experimental and interactional parts of science, stating that her best days in high school were getting to watch Bill Nye and doing experiments. As for NASA social media, Minerva didn't follow Twitter or Instagram but she did get email updates and article updates from NASA. That way, she could keep in touch by reading the articles that she was interested in because of her archeology background. She felt less of a need to constantly follow NASA social media, but suggested that NASA publish short video clips of 15-30 seconds to attract online interest of what NASA was doing. Minerva also suggested that consumers might prefer personal and humanizing information on NASA personnel, and prompted the possible use of celebrities to promote NASA social media. One of the most important things this participant said, was for NASA to attract younger consumers there would have to be an emphasis on entertainment to get consumer's attention.

Participant Mercury follows science for entertainment and thought people would follow science for fun. Mercury used a useful analogy. He mentioned that NASA is a lot like baseball, in the sense that in Baseball, successful teams take a really long time to build and that most fan bases have to be very patient with their team. In this comparison, NASA is the same way, with things taking so long to build, yet always being there. There is also less urgency for people to engage with NASA, just like in Baseball. With both NASA and baseball, relevancy is key, and people must communicate effectively to make NASA or a team more popular and thus gain support. As with baseball, science and progress take time to build successfully. When it comes to uses and gratification of social media, it's hard for people to be instantly gratified when NASA's future successes are more long term than short term. When NASA goes to Mars,

Mercury brought up that this event will excite and gratify future generations of our children. Using the event of going to Mars in the future, Mercury suggested that future parents are going to involve their child in more education in science in the future.

Participant Diana did not talk much, despite being a bio-major. While she said NASA social media wasn't very interesting to her, she offered up a few solid suggestions for NASA social media, including the need for finding a balance between entertainment and education.

Participant Victoria used social media for sports networking and interactivity while following her friends' social network. She stated that she does not follow any science since it is not relevant to her. Victoria also talked about not needing to go to NASA social media, especially to hear what is going on there, because she could go to other major news outlets that she already followed on social media, and get her news from there. NASA cannot make news about themselves exclusive to their own social media.

Victoria also talked about how it's hard to find the personal accounts of astronauts and other NASA personnel, and suggested that NASA use more of the short Instagram 15 second videos with links to full length video, and having a live camera (which NASA actually has, so question answered) in space to film what NASA is currently working on. Victoria brought up a question of NASA's diversity asking why only why white men tend to be astronauts. Research team member Carl stated NASA's 2013 astronaut class had a lot of diversity along gender lines, that there are other systemic issues outside of NASA that can contribute to demographics of people having a harder time becoming astronauts. As society improves these issues, the old white male astronauts will become a stereotype as more people get better opportunities in early life to take advantage of bigger opportunities later in life. Victoria said she heard about astronauts on the International Space Station (ISS) being able to view the upcoming space film, "the Martian", before anyone else on Earth had. She also advocated for the use of celebrities as opinion leaders "...tens of millions of people follow them [celebrities] and people like me who don't normally care about NASA." Victoria mentioned that somehow, NASA had to get their content trending on social

media, and that as a mass communication major, she didn't feel like science was a priority. Victoria also talked about how it would most likely take a huge space event to get most people to talk about NASA. "If there were a meteor to come to earth then I would think about it [science and NASA]. Victoria also advocated for more marketing of NASA related toys and products, and getting more women in stem education programs. Lastly, Victoria raised the question of hearing about what NASA was doing on a daily basis, and how NASA is not necessarily being transparent on what they were working on is not gratifying for most consumers. In her case, even on the national news, she rarely heard news related to NASA unless something major was happening.

Participant Juno did not talk as frequently in the discussion as her fellow participants, but used social media for keeping track of the news, using websites like ABC and CNN. Juno also liked the videos of NASA tech and the progress NASA has made and the search for life on other planets. Though she did state, "I mean they travel to different planets and see what's like the life out there." Possibly indicating a lack of knowledge of NASA's search for life. As for social media suggestions, Juno felt like if NASA had just the snippet videos (15 seconds or less) on Instagram, and it is fascinating stuff, it could possibly capture someone's attention. As long as NASA could provide a link below so the viewer can read the rest of the article or watch the rest of the video on YouTube or on NASA's website.

Participant Vulcan gave a number of useful insights to some of the issues NASA faces when finding an audience's uses and gratifications for engaging with its media. He enjoyed NASA & space related content, but he said he also looks for more interactivity to engage the public, particularly the younger public. While he had never seen a NASA video, he did like watching other science related videos such as the "Minute Physics" an educationally entertaining video channel. These are things which NASA actually has started to do more frequently; however, some of Vulcan's ideas are not the same content format which NASA produces in his suggestions for short videos dealing with "answers to questions" concerning phenomenon like black holes. Vulcan brought up that he had been hearing about human Mars missions

for many years and that to him nothing seems to be happening. If a lot more people feel the same way that could possibly be why the general public seems to be indifferent towards NASA social media.

Vulcan also watched science videos that explain phenomenon, including videos on black holes. He said he finds those videos entertaining and still informative, which NASA could possibly start doing in the future. As for why children aren't educated in more science related content, Vulcan felt that it's almost a lost cause, because when he was in the elementary school, there was nothing space related to learn about and science class was not fun.

Participant Pluto made many successful attempts at humor, but what he said periodically was outlandish, possibly to bring attention upon himself. He had a negative point of view on the world and it is possible he was playing Devil's advocate with some of his statements. Pluto used social media for music and tracking bands he liked, and technology related news on social media. He said he followed Neil deGrasse Tyson on various social media platforms, and brought up a good point on why younger generations might not follow NASA or science related social media "because science doesn't seem cool to the young generation." He felt that these young people follow more celebrity related events than science and feel that science was only for "nerdy people". Pluto did not pay attention to science unless there was anything significant that happened in the national media, because if it was important, then the media would report it and he would hear about it. Pluto also said "all they [NASA] are doing is spending money on big rockets." When talking about what would make NASA more interesting, Pluto mentioned that electronic dance music, or EDM, is popular, and if science or NASA related videos used EDM in a few of their videos, then consumers wouldn't see NASA as being "so stiff all the time". Pluto brought up a question about NASA's ethnic diversity in its astronaut corps, which was answered by research team member Carl. Pluto also mentioned hearing about space exploration and mentioned how NASA should use more advertising for more funding. He felt NASA was not relevant anymore, since America is no longer in the race to space with the Soviet Union and is currently "boring". He suggested

that NASA needed to be competing again for it to be relevant, which would make things more entertaining to get and keep attention. Pluto also brought up a change in societal norms of what constitutes legitimate entertainment, “we live in a time when people like Donald Trump is running for president,” and that is what people want to see, things that tie to them and celebrities that serve as opinion leaders. “Unfortunately that is what people are consuming,” and Pluto felt that NASA had to grab their attention in an ostentatious way.

Participant Fortuna gave a voice space advocacy, and follows NASA and Science related social media. She followed NASA for the interest in the pictures, but had little understanding for what all the specifics meant. She followed specifically Instagram and twitter of NASA for the pictures, and when she needed to fill time throughout her day, she would read the full science article that came with the picture.. Most of the time however, she would only pay attention to the ones with pretty pictures. She suggested that NASA needed a Snapchat, which could increase their presence on social media. Fortuna countered many of the negative arguments or things she felt would be detrimental to NASA. For example, when Pluto mentioned that NASA and their astronauts needed to make things more entertaining, Fortuna responded by stating that making things entertaining is not NASA’s job and takes away credibility. She also brought up an insightful idea, when she said that she follows NASA to bypass the “filter” of the news outlets to get NASA information directly from the source. Since her interest is the pictures and the news rarely show pictures from NASA this makes sense. Fortuna also asked about how funding decreases, and mentioned that it is the people’s responsibility to pay attention to NASA or science based social media. She also stated that she started to get interested in following NASA and science related social media when she learned from her friends about what was going on. This gave her a basic understanding of what NASA is doing, and she formed the opinion that interest in NASA is all about awareness.

Figure 1

Focus Groups Sign Up

Please fill out all areas and only RSVP if you can attend the 9/22 focus group at 7:30 pm in Old Main room 234

Last Name

First Name

Major

What are you getting your degree in?

What is your classification

Which if any social media services do you use?

- Facebook
- YouTube
- Twitter
- Instagram
- Vine
- Tumblr
- Flickr
- Foursquare
- SlideShare
- SOUNDLOUD
- Google+
- Other:

Will you be willing to attend the focus group and be recorded for the purposes of the study only

Please give you digital signature below

Add Item

Figure 2

	A	B	C	D	E	F
1	Timestamp	Last Name	First Name	Major	What is your classification	Which if any social media services do you use?
2	9/3/2015 16:05:16			Occupational Workforce and Leadership	Graduate Student	Facebook, YouTube, Twitter, Instagram, Vine
3	9/9/2015 21:42:02			Biochemistry	Undergraduate Junior	Facebook, YouTube, Instagram
4	9/17/2015 15:34:26	No Show	No Show	Electronic Media	Undergraduate Senior	Facebook, YouTube, Instagram
5	9/20/2015 12:40:28	No Show	No Show	International Business	Undergraduate Senior	Facebook, YouTube, Twitter
6	9/21/2015 13:21:13			anthropology	Graduate Student	Facebook, YouTube
7	9/21/2015 15:39:31			Mass Comm electronic media	Undergraduate Junior	Facebook, YouTube, Twitter, Instagram, Vine, Tumblr, SOUNDCLLOUD
8	9/21/2015 15:58:40			Public relations	Undergraduate Senior	Facebook, YouTube, Twitter, Instagram, Vine
9	9/22/2015 16:39:00			Electronic Media	Undergraduate Senior	Facebook, YouTube, Twitter, Instagram, SOUNDCLLOUD
10	9/22/2015 19:30:44			Advertising	Undergraduate Senior	Facebook, YouTube, Twitter, Instagram, SOUNDCLLOUD
11	9/22/2015 19:31:39			Electronic Media - Mass Communication	Undergraduate Senior	Facebook, YouTube, Twitter, Instagram, Vine, Tumblr

Figure 3.1

Undergraduate Freshmen	0	0%
Undergraduate Sophomore	0	0%
Undergraduate Junior	2	25%
Undergraduate Senior	4	50%
Graduate Student	2	25%
Ph.D. Student	0	0%

Figure 3.2

Facebook	8	100%
YouTube	8	100%
Twitter	6	75%
Instagram	7	87.5%
Vine	4	50%
Tumblr	2	25%
Flicker	0	0%
Foursquare	0	0%
SlideShare	0	0%
SOUNDCLLOUD	3	37.5%
Google+	0	0%
Other	3	37.5%

Figure 4

Focus Group Questions

Social Media Use Related

1. How do you use social media and how find people/organizations to follow?

Science Topics on Social Media

1. What fields of science are most interesting?
2. What if any science related social media do you follow, and why do you follow it, if you don't follow any, why not?

NASA Related

1. Which if any of NASA's social media content do you follow and why?
(Follow up if answer is no) Why is NASA's social media something you don't follow?
2. If you followed NASA what types of content would you like to see?
3. What content would you like to see from NASA that would persuade to follow their social media
4. How relevant do you think NASA is to your everyday life?
5. What could NASA do to make itself be more relevant in your everyday life?

References

- Acocella, I. (2012) "The focus groups in social research: advantages and disadvantages" *Quality & Quantity*, 46(4), 1125-1136. doi:10.1007/s11135-011-9600-4
- Billings, Linda (2006) "In Remote Sensing of Oceanographic Processes and Land Surfaces; Space Science Education and Outreach", *Advances in Space Research* 38(10), 2225-2231
- Congress (1939). Hatch Act, 5 U.S.C. §§ 7321-7326. Washington DC: U.S. Office of Special Counsel
- Launius, R. (2003) "Public opinion poll and perceptions of US human space flight", *Space policy* 19, 163-175
- Lis B., Schulz J., (2014) "Determinants of Passing on Viral Messages Empirical Analysis of Viral Marketing Campaign on Facebook" *Online Journal of Communication and Media Technologies* Vol. 4 Issue 4
- National Academy of Sciences Committee on Human Spaceflight, Aeronautics and Space Engineering Board, Space Studies Board; Division on Engineering and Physical Sciences, Committee on National Statistics; Division of Behavioral and Social Sciences and Education, National Research Council. (2014). "Pathways to Exploration: Rationales and Approaches for a U.S. Program of Human Space Exploration", Washington D.C. Retrieved from http://www.nap.edu/catalog.php?record_id=18801
- Joseph L. Polman, Alan Newman, Ellen Wendy Saul, Cathy Farrar (18 August 2014), *Adapting Practices of Science Journalism to Foster Science Literacy*, Wiley Online Library (wileyonlinelibrary.com).
- Ruggiero, T. E. (2000) "Uses and Gratifications Theory in the 21st Century", *Mass Communication and Society* Vol. 3, Issue 1 3-37 Retrieved from http://www.tandfonline.com/doi/abs/10.1207/S15327825MCS0301_02#.VeiD9PIVhBc
- Steinberg, Alan. "Space policy responsiveness: The relationship between public opinion and NASA funding", *Space Policy*, vol. XXVII, no. 4 (Nov. 2011), p. 240-246.
- Vernuccio, M. (2014) "Communicating Corporate Brands Through Social Media: An Exploratory Study", *International Journal of Business Communication* Vol. 51(3) 211-223
- Williams, M. (2012) "Reimaging NASA: A Cultural and Visual Analysis of the U.S. Space Program", *Journal of Business and Technical Communication* vol. 26 no.3 368-389