MBARI diving into social media

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ABSTRACT

While MBARI has been active on different social media outlets in the past few years, it is still difficult to see how MBARI is benefiting from it and how the use of social media could be monitored and improved. The objectives of this internship were to investigate if the efforts are appropriately focused and if there are some other potential venues and/or uses of social media that could be used. After implementing new strategies and starting to test their efficiency the preliminary results seem to indicate that social media outlets such as Facebook and Twitter can help MBARI to fulfill its education goals; becoming a trusted ocean information source and stimulate interest in science, engineering and ocean literacy by showcasing MBARI's cutting-edge technology and research.

INTRODUCTION

Online social media is defined as websites where people can interact, share and discuss while using a wide range of media such as photos, videos (Curtis, 2011). The first online social media to allow creation of a profile and list of friends (SixDegrees) was launched in 1997. This kind of website became widely popular around 2002 with Friendster then followed by MySpace in 2004 and Facebook in 2007 (Borders, 2009; Bianchi 2011). Today, there are several different kinds of social networks and more than 66% of adults worldwide are connected to at least one of them (Pew, 2012). While demography and ethnicity vary between social media, two parameters are similar across all of them. First

college students represent the majority of users, secondly women use social media more than men.

As a non-profit organization, the Monterey Bay Aquarium Research Institute, also known as MBARI, needs to be visible to the public in order to cultivate its presence as a valuable source of information about ocean science and technology. Social media offers a new venue to reach that goal. In the past 2 years, MBARI joined some of the main social networks in order to evaluate their potential benefits. At present MBARI is active on four social media outlets: YouTube, Facebook, Twitter and Tumblr. While they are all based on the same idea of sharing, discussion and interaction between users, these outlets have very different purposes and are used in different ways.

YOUTUBE

Youtube is a video-sharing website founded in 2005 where users can upload, view, share and comment on videos. YouTube streams about four billion videos each day and continues to grow bigger as video streaming has increased by 25% between April and December 2011. Despite its obvious popularity, users only spend about 15 minutes a day watching videos on YouTube (compared to four or five hours a day watching TV for the US population) (Wasserman, 2012). In 2009, MBARI launched its own YouTube channel with videos featuring underwater imagery from MBARI's Remotely Operated Vehicles (ROV's) as well as videos focusing on equipment developed by MBARI. Some of MBARI's videos play a crucial role in providing valid information about deep-sea species unknown by the public such as the video of the Barreleye fish[1] that created a buzz on the Internet and was viewed more than 3 millions times. Another example is the video created by Dr. Steve Haddock on *Deepastaria*[2] as a reply to the speculation about the identity of a mysterious blob displayed on YouTube. As of August 2012, MBARI's YouTube channel counts about 3000 subscribers and the videos have been viewed more

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[1] http://www.youtube.com/watch?v=RM9o4VnfHJU
[2] http://www.youtube.com/watch?v=EwCgcwuFsBk

than 4.5 million times. These videos generate a large amount of comments ranging from very relevant to insulting.

Despite the important education value of MBARI's videos, they are seldom used in the classroom setting since YouTube is blocked by U.S. schools districts and thus cannot be used in the classroom. MBARI's channel was recently accepted as a YouTube EDU channel, which could potentially help us reach k-12 students around the country.

FACEBOOK

Facebook is an online social network with over 900 million active users, more than half of them using Facebook on a mobile device. After registration users create a personal profile, add other users as friends, and exchange messages, including automatic notifications when they update their profile. Additionally, users may join common-interest user groups (wiki, 2012). According to Joinson (2008) people mainly use Facebook as a way to reconnect with former acquaintances or friends. But while on Facebook users have different kinds of activities such as interacting with their network, or joining groups with people with common interests in and which define their online identity. Facebook is dominated by 18 – 34 years old users (Fig.1) and is dominated by Caucasians with 78 percent. Females represent 57 percent of the users (Pew, 2011).
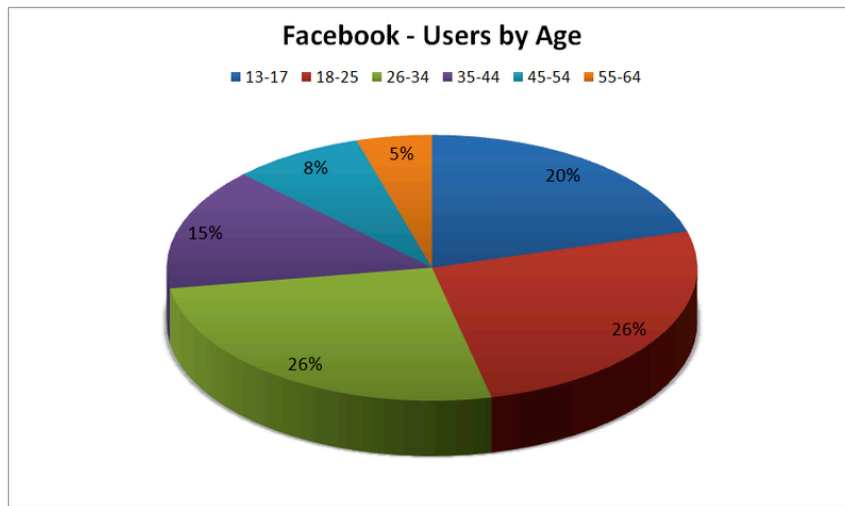

Figure 1. Percentage of Facebook users by age.

Facebook is often described as a virtual place to promote social identities and thus a good outlet to promote MBARI's work. The content posted on Facebook is typically timeless and can trigger interaction for hours or even days (Elowitz, 2012).

MBARI created its Facebook page on February 2011 and gathered about 1800 fans by the beginning of the June 2012. On MBARI's Facebook page, women are overrepresented as they are in Facebook in general. The more active age range of MBARI's fans are 25-36 years old and mainly located in California.

TWITTER

Twitter is an online social networking and microblogging service that enables its users to send and read text-based messages of up to 140 characters, known as "tweets". While created in 2006, Twitter's popularity increased rapidly. Today, Twitter has over 500 million active users and generates over 340 million tweets daily. Users may subscribe to other users' tweets – this is known as following and subscribers are known as followers (Wikipedia, 2012). Thirteen percent of US adults online use Twitter and half of them consult it on their mobile phone (Pew, 2012). While African-Americans and Hispanics account for eighteen percent of all the US Internet users, they make up 30 percent of the Twitter users (Danzico, 2012).

Compared to Facebook, Twitter is less about friendship. Twitter allows users to follow important topics, influential people, and conversations that are relevant to them leading to a much more detached connection. The timespan of the content is also very different since Twitter is basically centered on real-time conversation. Moreover, the information on Twitter is always here and now, important and relevant, and constantly changing.

MBARI joined Twitter in February 2009 and as of early June 2012 counted about 650 followers.

TUMBLR

Tumblr is a blogging platform as well as a social networking website allowing users to post multimedia and other content to a short-form blog (but longer than the 140 characters allowed on Twitter). Users can follow other users' blogs, as well as make their blogs private. As of July 2012, Tumblr had over 64.7 million blogs with Asian Americans being the most represented race (Danzico, 2012).

OBJECTIVES OF THE INTERNSHIP

While MBARI has been active on different social media outlets in the past few years, it is still difficult to see how MBARI is benefiting from it and how the use of social media could be monitored and improved. The objectives of this internship were to investigate if the efforts are appropriately focused and if there are some other potential venues and/or uses of social media that could be used. This internship was also the opportunity to engage members of the Information Technology Dissemination (ITD) department at MBARI in discussion about how to coordinate the communication and outreach effort to integrate the social media and to be more time efficient.

MATERIALS AND METHODS

Goals and strategies should be tailored for each specific outlet. In that respect each social media outlet will be addressed separately in this section as well as in the results.

YOUTUBE

MBARI's YouTube channel is popular but attracts a disparate public. Since ITD's policy is to engage only in relevant discussion, comments are monitored for valuable questions that are answered by ITD or research staff and comments with profanity and spam are deleted. The strategy was to use our other social media outlets to foster more valuable discussion. First we decided to comment back and invite the YouTube viewers leaving valuable comments to our Facebook page (where links to MBARI's YouTube videos are also posted). Gathering all the people interested in valuable conversation about our

videos on Facebook is a more efficient strategy since comments are much less abundant and then much easier to manage on this media.

At the beginning of the internship, MBARI's channel was added to YouTube EDU but we realized that finding MBARI on EDU was not easy. YouTube EDU includes three sections; University & college, K-12 and Lifelong Learning. While MBARI channel is in the directory of Lifelong learning, it is not available on the two other sections. An email sent to YouTube early in the internship never received any reply. It does not seem relevant to advertise our EDU channel to teachers before understanding how YouTube EDU works. Moreover teachers reported that they were not using YouTube EDU in class since it is blocked by the school districts as well. MBARI cannot move forward before being in contact with YouTube EDU and until US schools recognize YouTube EDU as useful and unblock it. Another alternative would be to find a video sharing website that would be school friendly.

FACEBOOK

Facebook focuses on cultivating a social identity and fostering interactions with fans. The first step toward new strategies was to hear from MBARI's audience. We wanted to know who they are, what they expect from following us and how they think we could improve our Facebook page. We designed a short survey[3] and collected 36 replies from the fans.

Question 1: Why did you first decide to like the MBARI page?

About 40 percent of the respondents decided to follow MBARI on Facebook because they value science and MBARI's work and wanted to be updated about its work and/or discover the new exciting deep-sea animals or videos. About 30 percent wanted to keep in touch with MBARI via Facebook after working, studying or visiting MBARI as a student. Seventeen percent learned about MBARI via the Monterey Bay Aquarium and decided to follow us afterwards. Eight percent followed us on Facebook after visiting MBARI's open house and finally, six percent because they are local residents (Fig. 2).
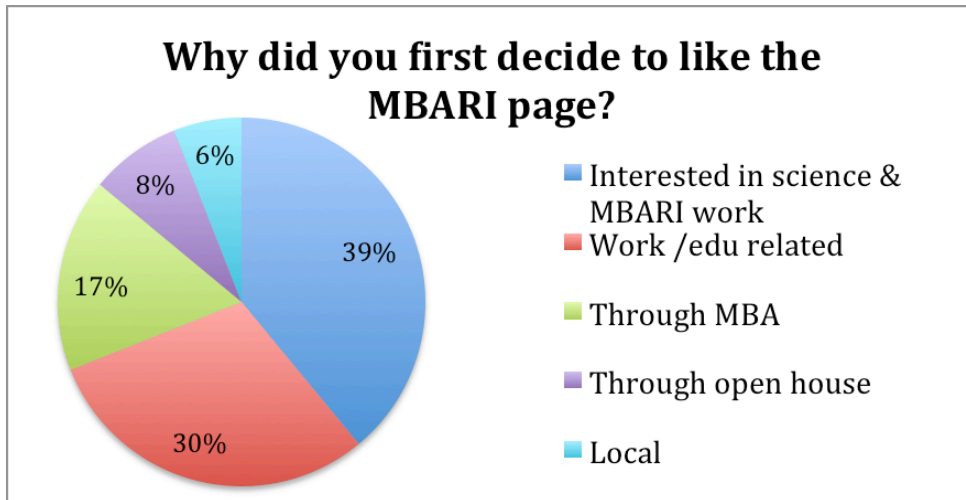
Figure 2. Plot of the percentage of survey respondents who mentioned the 5 different reasons for following MBARI page (n=36).

Question 2: What did you hope to see on the MBARI page?

Since people can be interested in more than one topic, we did not calculate a percentage for each topic but we counted how many times each topic was mentioned (Fig. 3). Here are the different topics mentioned in the 35 collected replies:

- Science and engineering at MBARI: 28 fans are interested in the final product of MBARI work (e.g. scientific publication, "cool" species, videos etc.)

- Behind the scenes: thirteen fans replied that they wanted to learn about the day-to-day work at MBARI featuring the people working here.

- General marine science news: 5 persons reported marine science outside of MBARI as something they were hoping to find on MBARI's Facebook page.

- Local news: 5 persons wanted news about local events or local marine news.

- Getting involved: 4 people were interested in job, internship or volunteering opportunities.

- Freebie: 1 person was hoping for freebies offered.

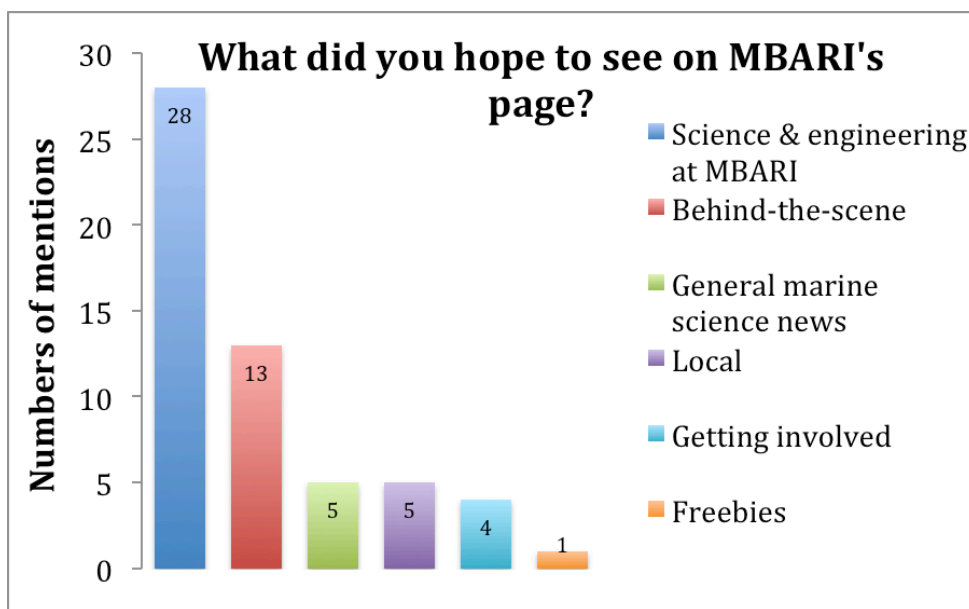[3] http://www.surveymonkey.com/s/RC9KCM5

Figure 3. Plot representing the number of mentions of the different topics survey respondents expected to see on the page (n=35).

It is interesting to see that several fans expressed their willingness to be educated by the MBARI page:

"Let me know what I need to know"

"was pleasantly surprise by how you have continued our education long after our trip to the aquarium"

"Also more links to the public educational material"

Question 3: Do you get what you expected by following us on Facebook?

58 % of the respondents are satisfied with the content we offer but 42 % are only partly getting what they expected.

Question 4: How could MBARI improve its Facebook page? What would you like to see more (or less) often on our page?

We wanted to hear what our fans suggest to improve our page. The different answers were sorted by topics out of 36 replies (Fig. 4):

• Behind the scenes: Twelve fans would like to learn more about the day-to-day work at MBARI, and MBARI's staff.

- Science and engineering at MBARI: Ten fans are eager to have more posts about the final product of MBARI work (e.g. scientific publication, cool species, videos etc.)

- General marine science news: Five fans would like to see general marine science news.

- Freebies and contests: Four fans want to win prizes and to participate in quizzes and contests.

- Local news: 1 person would like news about local events and local marine news.

- Ways to get involved: 1 person is hoping for more ways to be involved in MBARI's work.

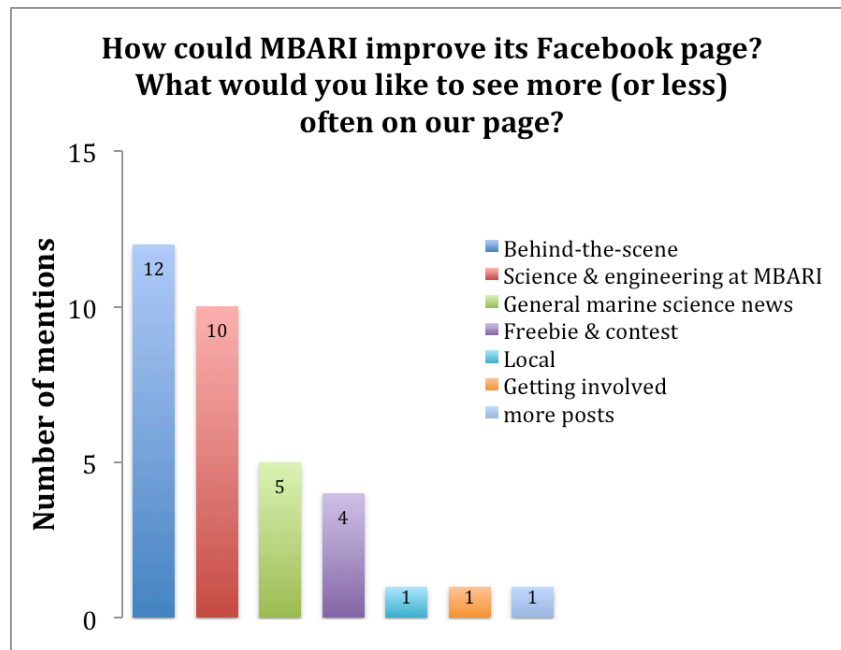- More posts: 1 fan suggested a more frequent posting on the MBARI page.

Figure 4. Number of times people mentioned the different categories concerning how to improve the MBARI page.

This survey shows that while MBARI's fans seem satisfied with the content provided, there is space for improvement, with the most requested topic being behind the scenes news.

After defining the type of information posted on Facebook, we still needed to know what was the most appropriate media and posting time. Zarella (2012) provides useful

information on the relative impact of different media used on Facebook. He analyzed 1.3 million Facebook stories posted by the 10,000 most popular Facebook pages in order to understand how the characteristics (media used, length of the text, posting time) of a post was correlated to its performance measures in terms of likes, comments and shares. Pictures appear to be much more efficient than the other media such as text, video and link; links are the least effective (Fig.5).
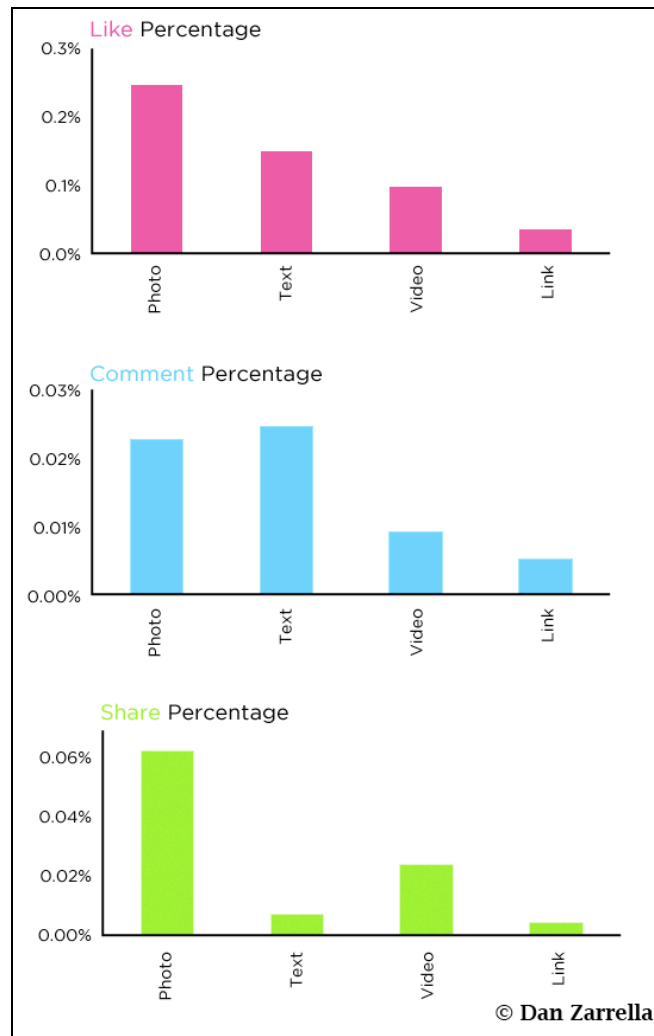

Figure 5. Screenshot from Dan Zarrella's website. The first plot shows the percentage of people who clicked like for the four different media (photo, text, video and link). The second plot shows the percentage of people commenting on the four media. The third plot shows the percentage of people sharing the four different media.

The length of the post's text does not seem to be correlated to its success. The day of posting and the time influence the efficiency of the post but Zarrella suggests trying to figure out the best time and day for one's own audience.

With the results from the survey and the indications concerning the parameters influencing the efficiency of a post we designed a strategy to test the efficiency of seven types of posts:

- History (category 1): MBARI is celebrating its 25th anniversary. We are offering our fans a retrospective of our history in 25 posts.
- Species (category 2): deep-sea species observed during the MBARI ROV dives will be presented and described.
- Technology (category 3): equipment developed by MBARI will be presented.
- Behind-the-scenes (category 4): In these posts we will give information about ongoing projects and MBARI staff members in order to open the curtains of MBARI's world to our fans.
- Videos (category 5): as discussed in the YouTube section we will link to our YouTube videos to see how we could foster discussion on this outlet rather than on YouTube.
- General marine info (category 6): We will make sure to provide from time to time links to general marine information outside MBARI.
- Quiz: we will organize a "critter quiz".

We post one story per weekday. A better collaboration and coordination between the ITD staff was achieved by sharing an excel sheet presenting the post schedules for the coming weeks. If a staff member was aware of a story being published on a certain day, the schedule could then be easily modified accordingly to ensure that the latest news about MBARI are posted on Facebook as soon as available. This also helps to have consensus among ITD staff about the information and the media posted on Facebook.

The impact of the timing of posts (morning or afternoon) was also tested. This design leaves us with 3 tested variables with different levels (Table 1).

Variables	Levels						
Post category	History	Animal	Technology	Behind the scene	Video	Marine science	quiz
Post day	Monday		Tuesday	Wednesday		Thursday	Friday
Post timing	Morning				Afternoon		

Table 1. Table presenting the 3 variables to be tested with their different levels.

Apart from trying to reach as many people as possible (quantitative), one of our main goals is also to engage our fans in relevant discussion (qualitative). To encourage discussion, we replied to all comments and questions.

To evaluate the impact of the tested variables, we need to define what parameters to measure. Facebook is generous in providing metrics. First, we decided to record the number of MBARI fans and monitor how it evolves through time. Then for each post we follow several parameters:

- Amount of people reached: the number of unique people who saw your story. This can be split in two different types of reach:
  - The organic reach: the number of MBARI's fans reach by each of your stories. When MBARI posts a story, it will not be displayed on all fans' facebook pages. Facebook uses an algorithm (called edgerank) to decide which fans will be reached. The parameters influencing the edgerank seem to be (among other things) the timing of your post. If you post just when one of your fans logs in to Facebook it seems to increase the probability for Facebook to display your story on this user's newsfeed. Also, the level of engagement between MBARI and the fan is important. For example, a fan who likes or shares an MBARI post regularly will see MBARI's posts more often than someone who never visits MBARI's wall or interacts with us by commenting, liking, or sharing.

- o The viral reach: the number of Facebook users who saw your post because one of their friends interacted (e.g. liked, shared or commented) with MBARI's facebook page.
- Number of interactions: the total number of people who interacted with MBARI's facebook stories. There are different ways to interact with a story:
  - o Like: by clicking on the like button of a post
  - o Share: by clicking on the share button of a story, the user makes the story visible on his/her own wall and can add their own headline.
  - o Comment: by writing a comment to one of MBARI's stories
  - o Interaction with the media: This could be following a link, clicking on a picture to see it and the description on full screen display or clicking on the play button of a video player embedded in a story.

The data collected in this report runs from May 21st (a month prior to starting implementing the new strategy) until August 3rd. Since we only post once a day, we will need a longer period than the internship to collect enough data to test the effect of all the different variables.

TWITTER

Online literature indicates that five to ten tweets a day is the optimal number to engage people and become influential on Twitter. One should also make sure to space the tweets throughout the day for a maximum impact (Pohlman, 2011; Wildrich, 2011). Prior to the internship, the average was about 3 tweets per day. We decided to follow this advice and started tweeting more throughout the day. We also decided to interact more with other Twitter users (also called tweeps) by thanking them when they mention us or by retweeting their tweets. Moreover, we followed influential tweeps in the fields of marine science, deep-sea science and exploration, climate change and ocean acidification. We also increased our use of hashtags. A hashtag is a word preceded by "#" (e.g. #climatechange). Adding a hashtag to your post will make your post visible not only by your followers but also by anyone searching this particular term. We also had discussion about starting to follow politicians, however, the question if it is appropriate for MBARI to follow certain politician is still under discussion. Since we decided to tweet more, it

was important to find a way to make it as time efficient as possible. After investigation, we decided to use the application Hootsuite[4]. Hootsuite is a social media management application that lets you organize your screen in different columns, displaying a selection of tweets by key words or by users (Fig. 6).
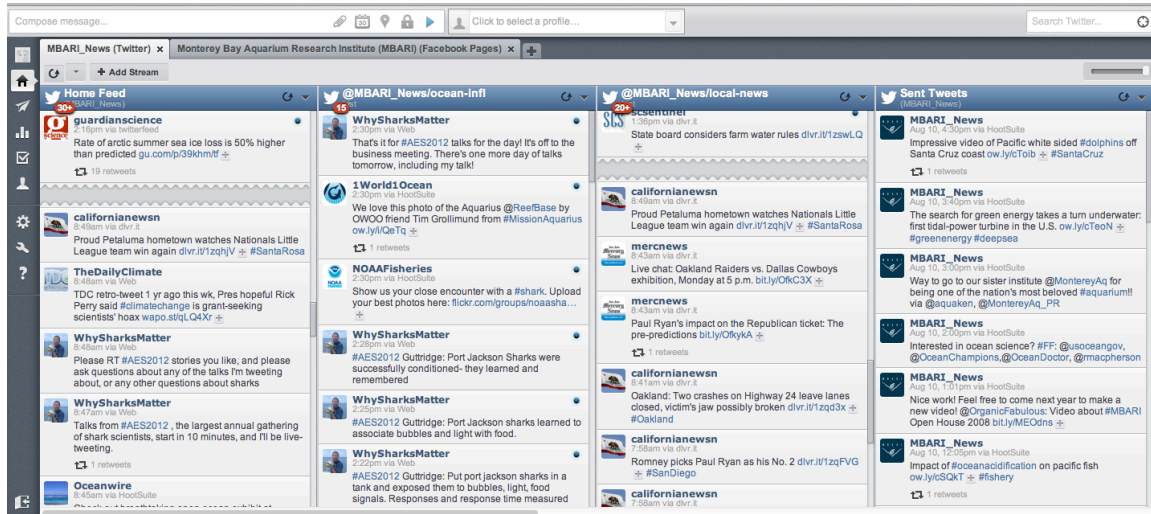

Figure 6. Screenshot of Hootsuite application.

The user can schedule its tweets to be posted later during the day. Thanks to this schedule feature one does not need to come back regularly to Hootsuite during the day to post, Hootsuite does it automatically. Moreover, the tweets scheduled are visible to anyone who logs in on Hootsuite with the MBARI login so that different staff members can add tweet what they think is interesting or check what is planned for the day. This could help to improve the coordination within the ITD regarding Twitter.

After using this new method for about three weeks we received some negative feedback about the fact that we were tweeting too much and we decided to try to focus more and avoid tweeting broadly about marine science but to limit ourselves to deep-sea science and exploration, climate change related news and local marine news.

In order to measure the impact of our new strategy we decided to monitor the evolution of number of followers, as well as numbers of retweets and mentions. Unfortunately, collecting these data was more challenging than expected. First, Twitter does not provide

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[4] http://hootsuite.com

a record of your metrics. So you have to either record the number of followers on a daily basis or to count manually the number of retweets and mentions per day which is time consuming and not sustainable. There is a wide range of tools online for Twitter measurement purposes but they often request access to your account and authorization to post tweets on your account or they collect your data and digest them and provide you only with a obscure global score of your influence on Twitter or across your different social media. Twittercounter was tested. Twittercounter charges the user a small fee for data collection. It starts the accurate collections of metrics when you start paying but they don't have any possibilities to retrieve accurate previous data. They actually track over 24 million twitter accounts but since it represents a tremendous amount of data, they track them occasionally and extrapolate the missing data based on the tendency observed. The implication of their tracking system on our data analysis will be described in the results section. Twittercounter only tracks in real time the account from the Twitter users paying the Twittercounter fee.

OPEN HOUSE

On July 21st MBARI opened its doors to the public for its annual Open House. This year for the first time, a booth was dedicated to social media. The objective was to let people know about MBARI's presence on social media and tell them what type of information is provided on each media. A Facebook raffle was also organized. We took pictures of our Facebook fans in front of a deep-sea background and uploaded all the images to a photo album on MBARI's page. People entered the raffle by tagging themselves in the photo album. A total of 136 photos were uploaded on Facebook and about 40 people tagged themselves.

RESULTS

FACEBOOK

Quantitative analysis. MBARI's Open House on July 21 had an effect on the number of fans. As shown on the figure 7, the number of followers increased linearly ($R^2=0.98$,

p<0.01) between the 21st May and 20th of July with 2.98 new fans per day. Similarly, a linear increase of 3.17 new fans was observed after the 24th July (R^2=0.98, p<0.01). A shift between the two linear relationships was observed as a consequence of the open house leading to an increase of 60 additional fans.
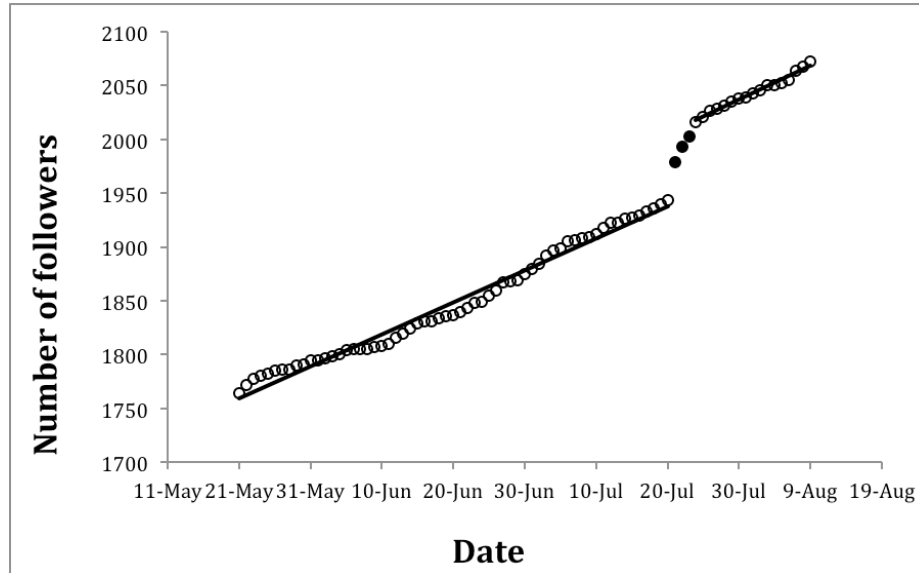

Figure 7. Graph presenting the evolution of number of followers through time. Note the sudden increase around the Open House (July 21, 2012).

Four parameters were tested for their effects on fan interactions on Facebook. Due to the limited number of data available, it is not possible to study their interactions and each parameter will be considered individually.

1. **Day of the week**

The total number of interactions is lower (33) on Monday compared to other days of the week (52). However, this is probably an artifact due to the fact that less data were available for Mondays, leading to bias the data from days with fewer followers and less reach (Table 2). When standardized to remove the total reach effect (Std(total inter)=log(total inter)/total reach), the difference between day of the week is not significant. In that respect there is no effect of the day on the efficiency of our posts.

Level	n	Total reach	Total inter	Std(total inter)
Monday	5	750±122	32.8±18.1	0.0018±0.0001
Tuesday	9	852±95	52.1±20.3	0.0017±0.0002
Wednesday	10	833±102	52.8±15.4	0.0018±0.0001
Thursday	9	903±100	51.9±10.4	0.0019±0.0001

Friday	9	884±101	53.6±16.9	0.0017±0.0001

Table 2. Interactions and reach observed by day of week (Mean ± standard error of mean)

2. Time of the day

There is no effect of the time of the day on the total interactions of a post (Table 3).

Level	n	Total reach	Total inter
AM	27	853±55	52.4±8.7
PM	15	860±81	51.3±13.2

Table 3. Interactions and reach observed by post timing (morning or afternoon) (Mean ± standard error of mean)

3. Post category

When looking at the different categories of the posts, we see there is not enough data to evaluate categories 1 and 7. We observe that categories 2, 3 and 4 have a higher number of reach and total interactions (TR>1000 and TI>80) compared to category 5 and category 6 (the lowest) (Table 4).

Level	n	Total reach	Total inter
Cat 1	2	1152±48	53.5±1.5
Cat 2	6	1094±135	91±26.8
Cat 3	4	1073±82	82.4±13.2
Cat 4	9	1005±75	82.5±27.4
Cat 5	3	822±113	30.3±11.7
Cat 6	17	615±40	17.4±3.2
Cat 7	1	1152	75

Table 4. Total reach and total interactions observed by category. Cat 1, history; Cat 2, animal; Cat 3, technology; Cat 4, behind the scene; Cat 5, video; Cat 6, link; Cat 7, quiz. (Average ± standard error of mean)

4. Before and after implementing the new strategy

We observed an increase in total reach and in the different types of action as well as the total interaction after the implementation of the new strategy (Table 5).

Level	n	Total reach	Interaction	Like	Share	Comment	Total interactions
Before	18	615±41.4	11.4±2.6	11.1±2.6	3.1±0.6	1.1±0.4	26.6±5.4
After	24	1050.2±43.4	29.3±5.1	32.3±4.7	4.9±1.2	4.6±1.2	71.1±10.5

Table 5. Engagement triggered by our posts before and after the implementation of the new strategies.

(Mean ± standard error of mean)

Qualitative analysis. The analysis of the comments' content posted on MBARI's stories revealed some meaningful discussions where people asked questions or shared information with other fans, allowed us to further study our contributions to marine science literacy of the public on Facebook. This kind of discussion has been observed in posts from different categories such as MBARI's technology with a post about the Deep-ESP (Fig. 8), a behind-the-scenes story about the deployment of the power buoy (Fig. 9) and the deep-sea species *Beroe* (Fig. 10).
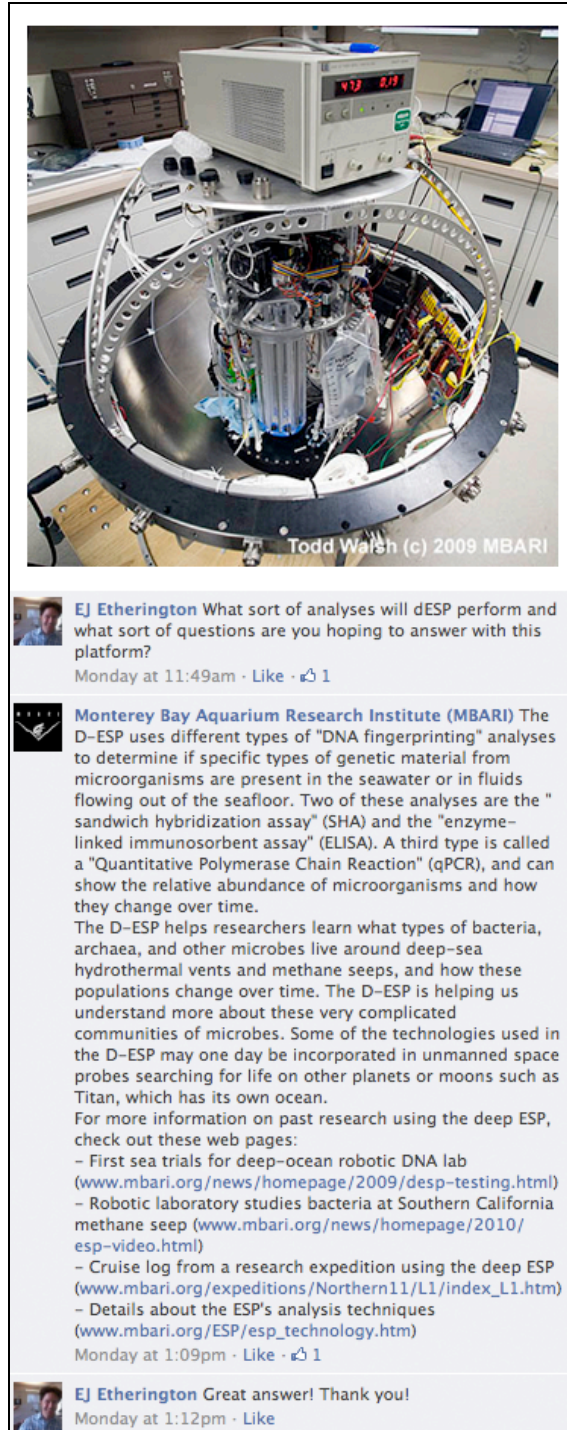
Figure 8. Screenshot from the post on August 2nd about the Deep-ESP with comments.

Matt Powers Any more details on the power generation profile – I read "400 watts", – is that peak during the best kind of wave? what do typical profiles look like over periods of time? Could these be conceivably linked to feed some type of marine powerline running to shore?
June 27 at 11:38am · Like

Monterey Bay Aquarium Research Institute (MBARI) Matt, 400 Watts is an estimate of average power across all expected wave conditions in Monterey Bay. Sometimes it's much higher, and sometimes it's zero in the case of flat calm seas. There is an industry dedicated to wave energy conversion dedicated to bring power ashore for utility scale use. This project is much different in that it aims to provide much smaller amounts of power for oceanographic instrumentation use.
June 27 at 2:48pm · Like

Matt Powers Thanks, was just wondering if your custom design and control software for optimizing the resistance to wave input gives top–tier efficiency and how that compares to utility wave power solutions.
June 27 at 4:19pm · Like

Ed Blake In your reply to Matt Powers, you stated, "This project is much different in that it aims to provide much smaller amounts of power for oceanographic instrumentation use." For the buoy shown in the posted picture, just what exactly is being powered and what measurements/data is being collected if any?
June 27 at 4:34pm · Like

PhilipJames Jarosz Time and Tide Energy. One of the lowest upfront cost. Instead of oil platforms in the ocean we could have Tide Energy platforms with turbines. The deeper you go. The ocean currents reverse direction.
June 27 at 4:59pm · Like · 👍 1

PhilipJames Jarosz ABC Television in Australia did a report on this. Scotland has some offshore tide turbines. No more oil leaks that hurt environment. Siemens is working on a paddle type submersible turbine that won't hurt marine life.
June 27 at 5:01pm · Like · 👍 1

Eric Nelson Looks good Andy!
June 28 at 5:09am · Like

Eric Nelson Doesn't look like the fastest ride for the http://singlehandedtranspac.com/ though

> **Singlehanded Transpac | 34 years of racing history!**
> singlehandedtranspac.com
> .... Sp...
> See More

June 28 at 5:23am · Like · Remove Preview

Monterey Bay Aquarium Research Institute (MBARI) Matt, you can't really calculate the efficiency because it depends largely on how much waves energy is extractable. And that's very difficult to estimate.What we know is the efficiency of the electro–mechanical system that transforms linear mechanical energy to electrical energy and that around 50%
June 28 at 9:15am · Like

Monterey Bay Aquarium Research Institute (MBARI) Ed, this propotype only powers the buoy's control and communication systems. It doesn't have any scientific instruments. When the batteries are fully charged, the excess energy is dissipated in large resistors.
June 28 at 9:16am · Like · 👍 1

Figure 9. Screenshot from the story post on June 27th about the deployment of Hamilton's power buoy with comments.

Figure 10. Screenshot from the story posted on August 6th about *Beroe abyssicola* and the comments.

TWITTER

Quantitative analysis. It is very difficult to get any significant tendencies in the data since many factors interact to decrease the validity of the data. The data collected are accurate only from July 20th. Before that as described above our account was tracked occasionally and the rest of the data are just an extrapolation from this very limited data set. Our new strategy started around July 5th but there is a gap between July 13th and July 16th since we were at sea with very limited Internet access. Between the 20th and 25th July our twitter activity was especially high due to our Open House, MBARI's anniversary and an article

about MBARI in the San Jose Mercury news[5]. These three topics were often mentioned and retweeted. Then from July 31st we decided to modify the strategy and to narrow down our topics. Therefore, we do not have a period long and stable enough to analyze the data. However, the data from Twittercounter reveals an increase in number of retweets during the Open House period (Fig. 11)
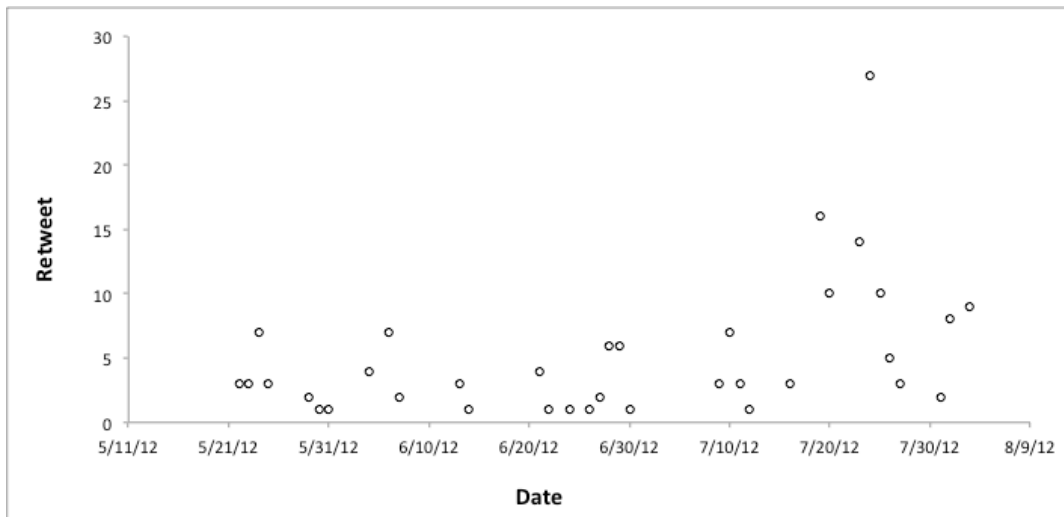

Figure 11. Plot presenting the number of retweets through time.

The evolution of number of followers shows an increase right after the Open House (Fig. 12). We do not know what is the cause of this increase. It might be due to the promotion of our Twitter account at the Open House or the fact that MBARI was more frequently mentioned during that period on Twitter.

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[5] http://www.mercurynews.com/science/ci_21107843/monterey-bay-aquarium-research-institute-turns-25-at
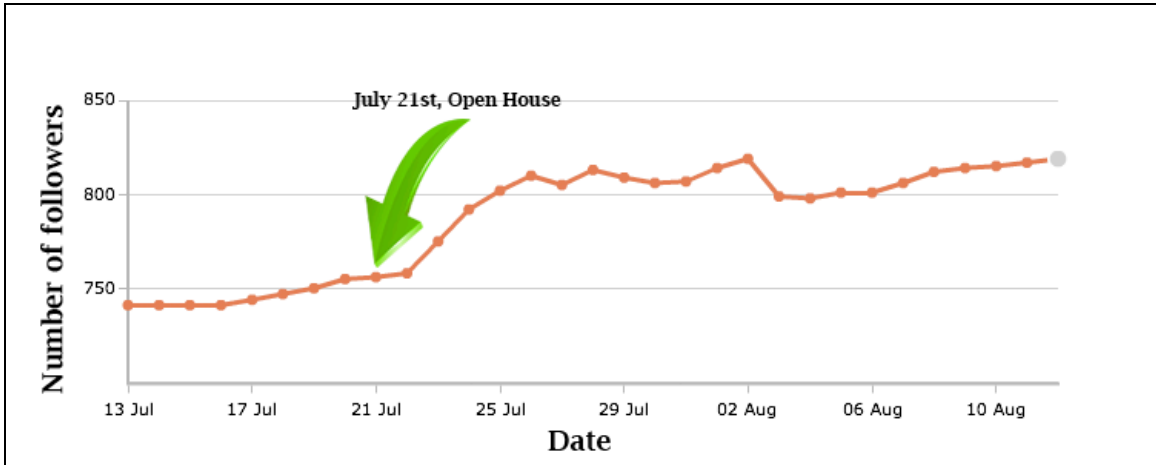
Figure 12. Graph showing the number of followers through time.

Qualitative analysis. We can report some events that seem to indicate that we are moving in the right direction to become more influential on Twitter. Around the time of Open House and the Mercury article, policy-makers such as Karen Bass, Sam Farr and Loretta Sanchez began following MBARI on Twitter (Fig. 13).

Figure 13. Screenshot of the Twitter profiles of three Californian politicians who started to follow us very recently.

Representative Sam Farr, who represents the district that MBARI resides in tweeted about us for MBARI's anniversary and invited his followers to visit our Open House. The

same phenomenon has been observed with journalists who recently started to follow us (Fig. 14).
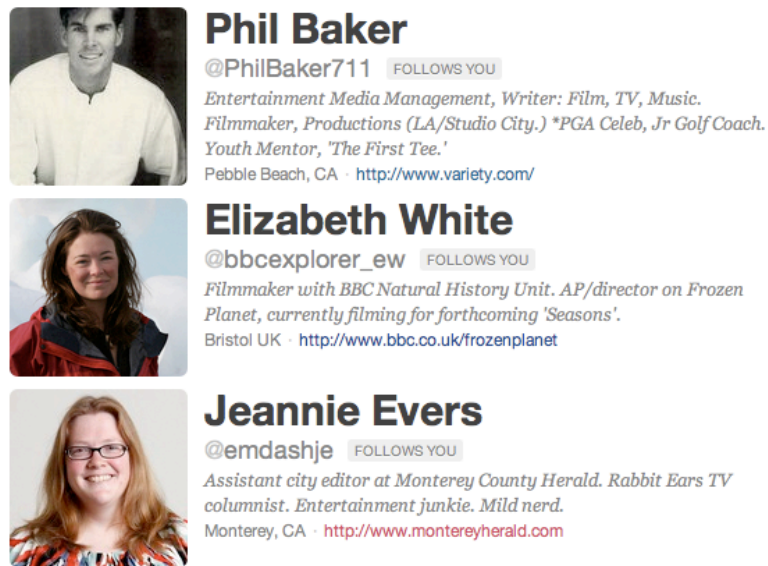
Figure 14. Screenshot of the Twitter profiles of three journalists who started to follow us very recently.

DISCUSSION

While MBARI's social media goals and strategies are still under discussion and testing, we can use the MBARI education strategic plan[6] as a ground to start the reflection. The two main goals of MBARI's education strategic plan are:

1. Becoming a trusted and well-utilized ocean information source for resource managers and policy makers.

Social media offers an efficient way to keep in contact with these audiences on a daily basis. Twitter seems to be the best outlet for accessing these audiences. MBARI's twitter account should not only share MBARI science, but more about marine science in general since Twitter is a place to spread news, not to only speak about yourself (which you can do on Facebook). Through our researcher's expertise in climate change, deep-sea exploration and the Monterey bay marine ecosystem in general, MBARI could become influential in these topics and reach politicians and journalists on Twitter. This influence

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[6] http://www.mbari.org/about/sp/MBARIEducationPlan.pdf

can provide a new outlet to disseminate MBARI science when relevant. We could also leverage Twitter to facilitate contact with the media and redirecting them to MBARI's public information specialist Kim Fulton-Bennett for further discussions or information. Due to the lack of valid data previous to the beginning of the new strategies it is very difficult to prove any significant improvement in MBARI's influence on Twitter. However, the metrics will be followed in the future to determine how they evolve through time since the strategies has been implemented very recently.

2. Stimulate interest in science, engineering, technology, and ocean literacy by showcasing MBARI's cutting-edge technology and research.

As described above, Facebook is one of the best social media to disseminate information about MBARI and to build relationships with people. Facebook seems a very appropriate outlet to show case MBARI's work and thus stimulate interest by fostering discussion with our audience. Moreover, Facebook is a good way to present the human face behind the institute, which would help people become more connected with MBARI, helping MBARI research and development to reach a wider audience. The most efficient way to post a story per day would be to use stories already available on the MBARI website. For example, the featured images with a short description are a perfect post for Facebook.

Since people are interested in what happens at MBARI on an everyday basis, we would need help from MBARI staff to contact the social media team when their group is doing something that would be of interest to the public (e.g. deployment of tools, starting a new experiment). This will not take much of their time since the stories are always very short on Facebook. This will be the best way to make MBARI's fans feel they get real insight into what is happening at MBARI.

The preliminary results indicate that the video and the general marine information reach fewer fans than the other categories. These two categories are the only ones using links as media rather than photos. It would be interesting to compare the reach of the same video posted in two different ways; first as link to the video on YouTube and secondly the actually video uploaded on Facebook.

It is encouraging to see that the strategy has increase the total reach and interaction of MBARI's fans in a very short period of time. This should encourage MBARI's staff to continue in this direction. An important factor to consider when evaluating the efficiency of a tool is the time dedicated to it. Six hours a week can allow maintaining a frequency of 5-10 tweets per day and one Facebook post per day. Of course, coordination between the ITD members is essential to facilitate the implementation of MBARI's latest news in the Facebook schedule. Moreover, the help of the MBARI staff at large is the only way to provide behind-the-scenes news. As specified in one of MBARI's principles in the Education strategic plan; "Education is a part of our mission and should permeate the entire organization; i.e., education is not the responsibility of a small subset of the staff". Providing short stories for Facebook could be a win-win for the staff members required to contribute to the education effort of MBARI and for ITD staff.

I had the opportunity to meet Geoff Drake working at Monterey Bay aquarium (MBA) as their social media expert. He is dealing with the same tools but with a much bigger audience and more expertise. Interestingly, MBARI seems to take the same reflection path as MBA. They had the same question about when to post and decided to post once in the morning and one in the afternoon, as currently tested and described above. They struggled while trying to make the MBA staff share their stories to be posted on Facebook. They struggled with the same questions about what kind of content to post and the importance to foster discussion with the audience. Finally, since MBARI and MBA are sister institutes and a significant amount of people in our survey mentioned following MBARI only after a visit at MBA, it is important to investigate how to promote MBARI social media presence at MBA. For example, at the end of the Mysteries of the Deep show, when a full auditorium is excited about MBARI exploration stories, why not adding a last slide inviting the audience to follow us on Facebook to follow our adventure all year round? It would be very interesting to monitor the evolution of followers each day and see if we can link any increase to the Mysteries of the Deep show! Moreover a poster about our social media would be also very useful in the MBARI exhibit.

As my internship ends, I will continue tracking and analyzing MBARI strategy on Facebook during the coming semester. The data will be used to write my master thesis in education, communication and information technologies at the University of Gothenburg,

Sweden and publish the results in a peer-reviewed journal. I will stay in close contact with ITD to agree upon the type of stories posted as well as the timing to make sure I gather the data I need.

CONCLUSIONS/RECOMMENDATIONS

The fact that this internship had a strong focus on Twitter and Facebook does not imply by any mean that those outlets are the only ones that should be used. YouTube is extremely valuable for MBARI and a very good way to reach many people with the videos produced by the members of the video lab. While it would be too time consuming to moderate the large number of comments on this outlet, it is very important for MBARI's visibility to keep creating and making the videos available on MBARI YouTube channel. While we hope that the YouTube EDU will allow MBARI to reach k-12 education more easily in the near future, another option would be to investigate the potential of dissemination of TeacherTube[7] (another video sharing website allowed in U.S. schools) with the same video that will then be accessible from schools. Facebook and Twitter offered a perfect sandbox for developing strategies built upon the existing MBARI expertise in these networks. During this internship, serious progress has been made in the understanding of how to use social media. So far MBARI on Tumblr is still missing this expertise that would make the testing of new strategies more relevant. It would be interesting in the future to apply the same kind of strategy testing to Tumblr and to make sure to maximize the success we should start to collect metrics from Tumblr right now. It is also important to remember that we should not try to compare one social media to another in terms of efficiency since they all have a very different audience, way of working and goals linked to it. We should see the different social media as complementary in our goal to reach as many people as possible rather than in competition with each other.

ITD staff should now try to come to an agreement concerning the goals to reach for each social media outlet in order to let the goals drive the strategies and the effort dedicated.

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[7] http://www.teachertube.com/

The staff should also be sensitized to the key role they could play in the Facebook presence of MBARI.

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