Social Computing for Impact Assessment of Social Change Projects

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Abstract. One problem that both philanthropic foundations and scientific organizations have recently started to tackle more seriously is assessing the societal impact of the work they are funding by going beyond traditional methods and metrics. In collaboration with makers and funders of social justice information products, we have been leveraging social computing techniques for practical impact assessment. In this paper, we identify which of the main impact goals as defined in the social change domain can be assessed by using our computational solution, illustrate our approach with an empirical case study, and compare our findings to those that can be obtained with traditional methods. We find that our solution can complement and enhance the findings and interpretations that can be obtained with standard techniques used in the given application domain, especially when applying data mining techniques to natural language text data, such as representations of public awareness, dialogue and engagement around various issues in their cultural contexts.

Keywords: impact assessment, geo-cultural information, social justice, semantic networks, natural language processing

1 Introduction

Philanthropic foundations give out millions of dollars each year to "work with visionaries on the frontlines of social change worldwide" (Ford Foundation¹), create "informed and engaged communities" (Knight Foundation²), and "tackle critical problems" in a way that "emphasizes collaboration, innovation, risk-taking, and, most importantly, results" (Gates Foundation³). One common problem that foundations have been facing and recently started to address more seriously is how to measure if the above-mentioned results have been achieved [1, 2]. By results, foundations typically mean impact, i.e. change [3]. This change is often on a social level; requiring the consideration of relevant and meaningful indicators, collection and analysis of appropriate data, use of suitable methods and tools, and drawing of justified conclusions.

¹ http://www.fordfoundation.org/

² http://www.knightfoundation.org/

³ http://www.gatesfoundation.org/what-we-do

Prior work on impact assessment of social justice projects is limited by the comprehensiveness and scalability of theories, methods and tools [4, 5] (more on that in the background section). To address this challenge, previously and in close collaboration with the Ford Foundation, we have developed a theoretically grounded, empirical and computational methodology and pertinent technology⁴ to assess the impact of social justice information products; mainly documentary films [5, 6]. In this paper, we provide an additional evaluation of our solution by comparing it to the impact goals and assessment procedures and outcomes that are used by foundations and practitioners. For this purpose, we a) identify which of those goals can be measured by our solution and if so how (methods section), b) illustrate our approach with an empirical case study and c) compare our findings to those obtained by using common (state of the art is the same as cutting edge in this domain) assessment methods (results section). We find that our approach can a) complement and enhance common practice from the given application domain by leveraging social computing techniques and b) measure the types or dimensions of impact that funders in this domain care about.

2 Background

The philanthropic sector is not the only domain where impact assessment has recently become a real-world need and heavily debated topic as foundations have started to request impact assessments from their grantees. In science and bibliometrics, impact has been traditionally measured in terms of citation counts and metrics computed over these counts, such as the h-index and i-index [7]. In recent years, altmetrics has been emerging as an initiative to introduce alternative metrics for evaluating scholarly impact, such as the sharing of raw data (e.g. datasets and databases), the number of article views and downloads from online repositories, and references to scholarly work in traditional and social media [8, 9]. Like our approach [6], altmetrics is supposed to generalize to other information products beyond articles.

The historical evolution and ongoing efforts in the foundation's sector are comparable to the scientific domain: traditionally, impact of social justice information products and initiatives has been assessed in two ways [6]: first, in a quantitative and scalable fashion by counting the number of e.g. visitors, screenings, webpage visits, click throughs and downloads. Second, in a qualitative yet less scalable way by conducting focus group interviews; comparing the perception of a topic before and after users' exposure. Impact reports, which are typically a required deliverable for grantees at the end of their funding period, often combine both strategies. A set of representative, high-quality examples are reports provided by BritDoc⁵; a main funder of social justice documentaries in the UK. It is not unimaginable that scientific funding will become subject to broader impact assessment strategies in the future as well.

⁴ http://context.lis.illinois.edu/

⁵ http://britdoc.org/real_good/evaluation

3 Method

We are using the "Women, War & Peace" series (WWP) as a case study because their defined impact objectives and evaluation methods are representative for this domain. What is WWP? This five-part TV broadcast series was originally screened by PBS during October and November of 2011⁶. Since then, the Peace is Loud (PiL) organization has made WWP available for screenings as a media kit with accompanying educational material. The theme of the series is the impact of war on women and the role of women in peace-building processes in four different geo-cultural contexts: (1) "I Came to Testify": Bosnian women who became victims of sexual abuse and brought this case to court. (2) "Pray the Devil Back to Hell": Liberian women protesting the Charles Taylor dictatorship. (3) "Peace Unveiled": Afghan women participating in peace talks and negotiations with the Taliban. (4) "The War We Are Living" Colombian women defending their gold-rich lands and resisting to become displaced. The fifth film (War Redefined) is a series of interviews with high profile individuals, e.g. Madeleine Albright and Condoleezza Rice. We disregarded the last film for this study as it is not embedded in a geo-cultural context. PiL has given us access to their impact reports [10] and film material, e.g. transcripts.

How has WWP's impact been assessed? Table 1 lists the impact goals as defined by PiL, who also measured the achievement of these goals using state of the art methods:

- Quantitative techniques and metrics: aggregated statistics, e.g., 12.57 million viewers of the series and 1,461 hostings of screenings [10].
- Qualitative techniques: (1) Surveys at screenings, which capture self-reported information on media coverage and audience demographics, engagement with the given topic and intent to further discuss the topic. (2) Listing of feedback from testimonials, press quotes, website comments and social media comments.

The quantitative indicators are easy to calculate if one has access to these data and also easy to interpret – basically, the more the better. The qualitative indicators, which in this case were thoroughly gathered and reported by PiL, are not only tedious to collect, but also require further data analysis in order to arrive at valid, meaningful and comparative conclusions and interpretations. This is where our approach to social impact assessment starts being useful and complementary to traditional techniques: in a nutshell (for methodological and technical details see [6]), we collect publicly available information from media (through LexisNexis Academic) and social media sources (Facebook, Twitter, YouTube, Amazon reviews) in a semi-automated fashion. From these data, we build a baseline model, which represents the public discourse on the main theme(s) addressed in a film (as defined by film maker) prior to film release. This model comprises semantic networks of the main issues addressed in a documentary and social networks of stakeholders (individuals and organizations) associated with these issues. Building these networks combines techniques from natural language processing (NLP) and network analysis. We also build a ground truth model (semantic network, NLP results) of information contained in the actual documentary,

⁶ http://www.pbs.org/wnet/women-war-and-peace/

book etc.. This model represents the information a film can convey. We then track the a) evolution of the baseline model from before to after release and onwards and b) (social) media coverage of the film. We compare a) to b); looking for correlations and differences, and test if parts from the ground truth model occur in a) and/or b).

Which of the common social justice impact goals (as defined by practitioners and funders) can we assess with our given solution? Table 1 lists PiL's goals and specifies how we approach their measurement – if we do. The results section provides an example of the actual outcomes from brining our solution to this problem and series.

Table 1: Feasibility of measurement of goals with existing computational solution

Goal	Can we measure achievement?	How?
Build awareness for WWP	Yes	Over-time, semantic
2. Spark dialogue	Yes	and social networks
3. Reach and engage key constituencies	Yes	from media and so-
4. Continued utilization of series	Yes	cial media data, plus
5. Introduce series to new, varied audience	Yes	natural language
6. Increase public engagement with topic	partially (words yes,	processing techniques
	actions not)	(details in [6])
7. Inform stakeholders, serve as resource	not yet	
for stakeholders		
8. Highlight immediacy, proximity of topic	not yet	

3.1 Data Collection and Network Construction

To collect media data, we consult with the filmmakers to identify the main themes of a production. We translate their input into key-word-based Boolean queries. This step is crucial as it generated the raw data for analysis. Table 2 lists the queries and amount of retrieved articles for the baseline model before and after film release (three years of data in each direction), and press on films. The amount of coverage of the topics does not correlate with coverage of the films; indicating that different factors affect the importance of each subject.

Table 2: Queries and amount of retrieved data

Country	Keywords (baseline: woman, women, war, wartime, peace*, <country name="">)</country>	Before	After	Press on film
Afghanistan	peace talks, Taliban	450	1,069	4
Liberia	protest*, Charles Taylor 493		605	85
Colombia	gold*, displace* (not Olympic)	80	109	3
Serbia	rape, sexual violence	54	66	22

We herein focus on semantic networks as they allow us to gain a structural look at the development of the public awareness and dialogue around an issue as well as engagement with this topic (these represent defined impact goals). The data cleaning,

preprocessing, management and analysis were done in ConText. We construct two types of semantic networks based on different types of information from the articles: meta-data networks link index terms that co-occur with at least a certain threshold value per article (from the "subject" category). Such networks provide a high-level summarization of the main themes covered in an article [11]. We also extract semantic network from the text bodies of the articles, which provide a more in-depth and culturally sensitive view [11]. In these networks, nodes represent the most salient pieces of information (based on cumulative (weighted) frequencies and tf*idf scores of terms including proper N-grams). Edges are based on term co-occurrences within a user-defined distance (we used seven words for the given corpora). The media data networks were visualized in Gephi, where node colors indicate cluster affiliation (based on modularity), node size is scaled by degree (number of direct neighbors), and tie width represents frequency. For social media data collection, analysis and visualization, we used NodeXL (http://nodexl.codeplex.com/). Since most of the films don't have their own social media presence (which is typical for umbrella campaigns), we used the WWP fanpage. To be in sync with the methods for network construction from articles, we linked salient terms (as per tf*idf) that co-occur at least twice (posts) or thrice (comments) per page. The parametric choices are based on the actual data, and similar to those from other impact assessments we have done.

4 Results

Even though the queries for all retrieved corpora weighted women as strongly as the main issue(s) per film, the networks for most films and points in time are dominated by representations of the given substantive issues, while women are positioned marginally and hardly ever tied into the main issues and respective clusters (Table 3).

Table 3: Main findings from semantic network analysis per dataset

Film	Press on theme before release		Press on ther	Press on theme after release	
	Main cluster(s)	Women	Main cluster(s)	Women	(country name
	and key nodes		and key nodes		excluded)
Afghanistan	(1) war & con-	2nd yet small-	like before,	marginal, separat-	women, Tali-
(Peace un-	flict, Taliban,	er cluster with	(2) peace pro-	ed from main	ban, support,
veiled)	muslims, peace	human rights	cess, talks &	clusters	war, peace,
	process		meetings		conference
Liberia (Pray	(1) war & conf.,	very marginal,	like before	3rd cluster with	Leymah
the devil	civil war,	no cluster	(2) war crimes	protests &	Gbowee,
back to hell")	rebellion &			demonstrations,	women, peace,
	insurg. (2)			nobel peace prize	Charles Taylor
	elections				
(Colombia	(1) war &	marginal clus-	(1) rebellion &	2nd main cluster	war, family,
(War we are	conflict, human	ter with inter-	insurgencies,	with human rights	land, commu-
living)	rights	national rela-	war & conflicts	and displaced	nity, govern-
	-	tions		people	ment
Serbia (I	(1) war &	marginal clus-	(1) war & con-	marginal, no	rape, women,
came to	conflict, ethnic	ter with sex	flict, ethnic	cluster	witness, war,
testify)	conflict, reli-	offenses and	conflict, human		crime, tribunal
	gion (2) inter-	human rights	rights (2) war		
	national legal		crimes		

issues

A notable exception is the coverage of the Liberia issue after film release (Figure 1 before, Figure 2 after), where Leymah Gbowee won a shared Nobel Peace Prize; drawing attention to the role of women in this conflict and moving this theme closer to the center of the debate. Overall, for two of the four films, women became more marginalized and disjoint from the core in the networks since film release, while in the other two, they got more connected to the main issues. The observed effects are correlational. The semantic networks also reveal additional central themes that are closely tied to the query concepts (Table 3).

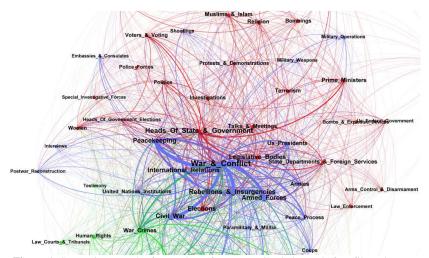


Figure 1: Semantic network of meta-data of press on Liberia issues before film release

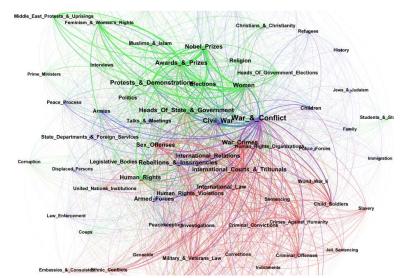


Figure 2: Semantic network of meta-data of press on Liberia issues after film release

The ground truth model (semantic network based on film transcript) for all films feature women as a key node, followed by references to the geo-political region, main issues addressed in the film, as well as war and peace (last column in Table 3). How does this compare to the press coverage of the films? In general, in press articles about social justice documentaries, we often see a strong focus on artistic features and embedding the film in the wider context of film making, festivals, awards and screenings. While aligned with the quality standards of film making, this (journalistic) deci-

sion does not contribute much to increasing the film's impact on a given issue and is a missed opportunity for drawing attention to the film's content or problem domain. We have discussed this issue in meetings with journalists who cover this domain. For WWP, we observe mixed results: First, for all films, women are more central in the press coverage on the film than press on the topic. In "Pray the devil back to hell" (Figure 3) (Liberia, most film press), the main theme is film (making) and related festivals and awards, followed by a smaller cluster about religious issues; with the latter being more central to the content of the film. We see the opposite for "I came to testify" (Figure 4) (Serbia, 2nd most film press), where the core of the semantic networks is on international legal matters as they relate to women and violence, which is right at the heart of the film. Most articles about these films also mention the series; leading to a moderate overlap in nodes and edges of the networks for all films.

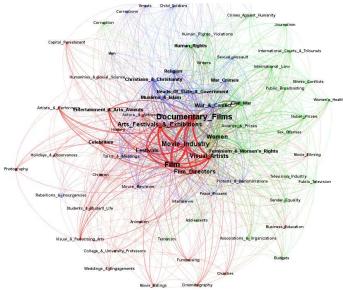


Figure 3: Semantic network of press on film "Pray the devil back to hell"

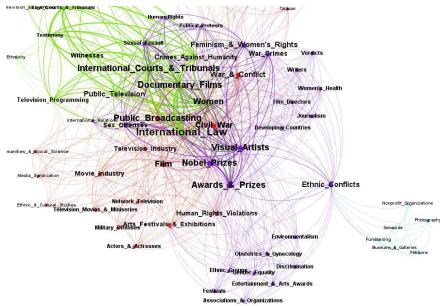


Figure 4: Semantic network of press on film "I came to testify"

How do public awareness, dialogue and engagement unfold on social media? While we have analyzed multiple platforms, we focus on Facebook here. The posts on the WWP fanpage, which are often authored by a staff member involved with the production and can be considered as a stimulus, center on three themes (Figure 5): the winning of a shared Nobel Peace Prize by one of the women in "Pray the devil back to hell", sexual violence, and empowering women and girls. This differs from the heavy focus on screening announcements that we typically see in posts and might indicate actual user contributions. How do the users react to these inputs (Figure 6)? The commenters focus on the sexual violence issue and add additional concepts to the debate (men, children), but the overall user reaction seems less diverse, thematically involved and active as we have previously observed for other productions.

5 Discussion and Conclusion

We have shown how our assessment approach can a) measure the achievement of a large portion of the common impact goals defined by funders and evaluators in the social impact domain, and b) complement and enhance the findings and interpretations that can be obtained with standard techniques used in that field. Our solution brings social computing techniques, particularly network analysis and natural language processing to application this domain; enabling the systematic and efficient analysis of small to large amounts of data across time and productions.

Practitioners and analysts in this domain typically collect and often only list semistructured (key words) and unstructured (content of articles) text-based data (or cherry

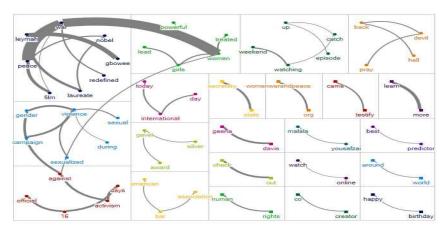


Figure 5: Semantic network of posts on WWP Facebook fan page

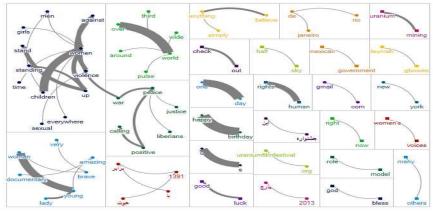


Figure 6: Semantic network of comments on WWP Facebook fan page

picked excerpts thereof if too much data), such as press coverage and social media data, in their reports. For these data, summarization and content analysis techniques – including semantic network analysis - can help to gain a more concise picture systematically and efficiently. These techniques are readily applicable to the kind of data that practical evaluators already gather, including the content of interviews with focus groups, which otherwise are aggregated into statistics that disregard the content of user statements. As academics might not have access to these data and practitioners lack the skills for analyzing them, we have been engaging in a series of collaborations with film makers and funders to realize the potential of these data and methods.

Currently, we are synthesizing the results from about a dozen social justice impact assessment studies that we have conducted into a framework for impact trajectories depending on a set of features. This work aims to lead to a theory of impact evolution

as well as generalizable and practically useful guidelines for designing for impact. In future work, we plan to refine our methodology by considering prior work on causal inference in observational data and quasi-experimental research designs.

As part of this project, we are generating and continuously expanding a) a dictionary of terms, concepts and associated entity types relevant for the social impact domain, and b) a valence (aka sentiment) dictionary and classifier for this field. These resources are being made publicly available in ConText.

Acknowledgements.

This work is supported by the FORD Foundation, grants 0125-6162 and 0145-0558. We thank Angie Wang from Peace is Loud for information access and sharing, Dr. Susie Pak from St. John's University for her feedback on this work, and graduate student Aseel Addawod, Informatics/ UIUC, for her help with social media analysis.

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