

# 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 Foundation<sup>1</sup>), create “informed and engaged communities” (Knight Foundation<sup>2</sup>), and “tackle critical problems” in a way that “emphasizes collaboration, innovation, risk-taking, and, most importantly, results” (Gates Foundation<sup>3</sup>). 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.

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<sup>1</sup> <http://www.fordfoundation.org/>

<sup>2</sup> <http://www.knightfoundation.org/>

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

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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 technology<sup>4</sup> 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 BritDoc<sup>5</sup>; 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.

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<sup>4</sup> <http://context.lis.illinois.edu/>

<sup>5</sup> [http://britdoc.org/real\\_good/evaluation](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 2011<sup>6</sup>. 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,

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<sup>6</sup> <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 bringing our solution to this problem and series.

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

Goal	Can we measure achievement?	How?
1. 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, actions not)	processing techniques (details in [6])
7. Inform stakeholders, serve as resource for stakeholders	not yet	
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>)	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

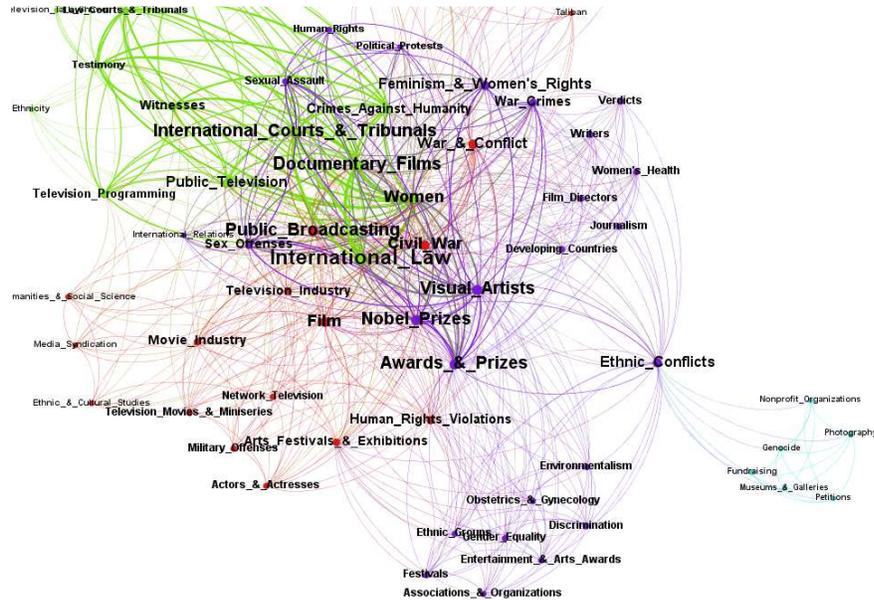
Even though the queries for all retrieved corpora weighted women as strongly as the main issue(s) per film, the networks for most films and points in time are dominated by representations of the given substantive issues, while women are positioned marginally and hardly ever tied into the main issues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

**Table 3:** Main findings from semantic network analysis per dataset

Film	Press on theme before release		Press on theme after release		Transcript (country name excluded)
	Main cluster(s) and key nodes	Women	Main cluster(s) and key nodes	Women	
<b>Afghanistan (Peace unveiled)</b>	(1) war & conflict, Taliban, muslims, peace process	2nd yet smaller cluster with human rights	(1) like before, (2) peace process, talks & meetings	marginal, separated from main clusters	women, Taliban, support, war, peace, conference
<b>Liberia (Pray the devil back to hell”)</b>	(1) war & conf., civil war, rebellion & insurg. (2) elections	very marginal, no cluster	(1) like before (2) war crimes	3rd cluster with protests & demonstrations, nobel peace prize	Leymah Gbowee, women, peace, Charles Taylor
<b>(Colombia (War we are living)</b>	(1) war & conflict, human rights	marginal cluster with international relations	(1) rebellion & insurgencies, war & conflicts	2nd main cluster with human rights and displaced people	war, family, land, community, government
<b>Serbia (I came to testify)</b>	(1) war & conflict, ethnic conflict, religion (2) international legal issues	marginal cluster with sex offenses and human rights	(1) war & conflict, ethnic conflict, human rights (2) war crimes	marginal, no cluster	rape, women, witness, war, crime, tribunal







**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 semi-structured (key words) and unstructured (content of articles) text-based data (or cherry



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.

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