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NEGLECTED SPACES IN SCIENCE COMMUNICATION

Community engagement and co-creation of strategic health and environmental communication: collaborative storytelling and game-building

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Abstract

From a strategic communication perspective, for any communication to be effective, it must be audience-centered, with content and delivery channels that are relevant to its intended target. When trying to reach culturally specific communities or other groups that are not otherwise connected with science research, it is crucial to partner with community members to co-create content through media that is appealing and culturally competent. This commentary considers some examples including storytelling through *fotonovelas* and radio stories, community drama and serious games.

Keywords

Community action; Informal learning; Public engagement with science and technology

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Context

My entry into science communication stemmed from my experiences with community-based research and advocacy around health and social issues, which identifies opportunities for communication beyond a broadcast model. Like author and podcaster Illingworth [2020, p. 2333], I believe that "science communication initiatives need to move away from this one-way discourse aimed at an unrealistically homogeneous public". In strategic communication, there is no such thing as a single audience for any message. Messages need to be tailored so that they are relevant to people's life experiences, and translatable into information that can be recalled when it's time to make decisions or act. This is especially true in the context of marginalized groups who are not easily reached by campaigns aimed at the wider public. The format of the communications and the cultural representations of the intended audience may determine whether the conversation even begins.

To increase community engagement with science communication, it is useful to take a community-based participatory research (CBPR) approach. CBPR has been used successfully in public health to bring together researchers and communities as equitable partners in addressing health disparities [Chandanabhumma et al., 2020]. I have been part of multiple projects that applied principles of CBPR to create messages and engagement tools that would resonate with specific communities, primarily low-wealth immigrants in Miami, Florida (U.S.A.). We have used CBPR to create, validate and evaluate communication content and interventions on health and social justice, and we are starting to use the same strategies to reach community residents on topics related to climate change, sea level rise, and vaccination. Through the action research that takes place in these projects, communities find local strategies that make sense for them. There is great potential to do the same in all aspects of science communication for and with minoritized communities.

In this commentary I share my experiences on projects where community residents and academics or other subject matter experts co-created communication materials to make critical information relevant and applicable to their target audiences. I will describe how the partnership between "subject matter experts" and "community experts" was invaluable in the development of the final communication. I believe this model of content-cocreation is the key to community engagement with science.

Beyond the deficit model

The deficit model [Seethaler et al., 2019; Simis et al., 2016] refers to the belief that people don't act in the scientifically recommended way because they do not possess knowledge, and that once they gain said knowledge, they will comply. This disregards community knowledge, lack of trust in institutions, and the pre-existing attitudes and beliefs that may trump scientific information when it is time to make decisions. It is important to value all that community members are able to do without formal technical training. They possess a technical knowledge about their life and their communities, which experts may lack. Scientists and academics are traditionally not trained to value "community expertise". Many graduate education programmes in science, technology, engineering, and math (STEM) fields lack formal training in public communication or other social sciences that could facilitate community engagement, and this helps perpetuate the knowledge deficit model of science communication [Simis et al., 2016] amongst many scientific communities.

To overcome the deficit model, it is necessary to build relationships between scientists and communities, and foster trust and communication [Delemos, 2006; Chen et al., 2012]. Community-based and participatory approaches lead to more culture-centric expressions of problems, solutions, and needed structural transformations related to scientific issues [Chandanabhumma et al., 2020]. In our work with immigrant communities around mental illness and substance abuse, our CBPR approach helped academics and clinicians understand the hesitations that the community had around psychotropic medications and clinical diagnoses [Villar, 2015]. Together, the teams co-created materials that addressed these reservations and provided communities and service providers with a common language to communicate more effectively. Besides the content that needed to be communicated, the community provided insight into the formats that would be best received. Generally, people trust information from a person they know, and prefer to consume information in the form of stories, preferably video in the case of

our programs. Since most community-based programs lacked the funding for video production, we developed creative ways to discuss complex content, often embedded in cultural beliefs and attitudes formed through lived experiences. Co-creation was the key to success of these efforts.

Co-creation for health and environmental communication

There are myriad examples of scientists and communities partnering to co-create content for specific communities. The beneficiaries are not only the community members, but also the scientists and officials working on these issues from their own governmental or organizational perspective. In a project about complementary and alternative medicine for mental health, our team worked with community members to understand how they deal with mental health issues outside the formal clinical context. This was a validating experience for participants who may not have thought of their strategies as addressing mental health. It was also crucial for service providers to understand the communities' perspectives [Pessin and Villar, 2014].

Particularly in remote, marginalized or minoritized groups, co-creation of content is critical since members may hold beliefs that are not shared by the majority. For example, indigenous populations often have a unique relationship with and reliance on local environments for their culture, health, and well-being. Boyd and Furgal [2018] found that in order to best communicate about environmental risks, messages must be congruent with the populations' cultural beliefs and understanding of the environment; and delivered by credible and trustworthy spokespeople. In order to achieve this it is necessary to include indigenous populations in message design and delivery.

Opportunities for creative formats

Besides content, co-creation between scientists and communities often leads to creative formats to reach target audiences. This may necessitate involving designers in the co-creation team. Visual narratives, such as comics and animations, are becoming increasingly popular as a tool for science education and communication [Farinella, 2018]. Comics and other visual creative storytelling mediums combine the benefits of visualization with powerful metaphors and character-driven narratives. These formats have the potential to make scientific subjects more accessible and engaging for a wider audience [Farinella, 2018]. *Fotonovelas* are a sort of graphic novel incorporating photos with text balloons. They started as photographic stills of popular films popular in Mexico in the 1950's and 1970's, and spread north to the U.S. Hispanic population centers where it found new audiences. The *fotonovela* works well as a culturally informed health tool because it combines visual elements and short, simple text which reflect common social experiences [Cabassa, Molina and Baron, 2012].

In my work with Latin@/Hispanic communities in Miami, we have created several *fotonovelas* as a way to encourage conversation about stigmatized issues that are difficult to talk about, such as drug abuse, domestic violence, and sexual abuse. Beyond explaining what they look like and the possible courses of prevention and action, the co-created fotonovelas incorporated social perspectives that "experts" would have likely overlooked. Examples include contradicting advice from health care workers, police and family members, gossip and misinformation among

friends and neighbors, and religious and spiritual factors that come into play [Villar and Bauduy, 2014]. These cultural insights, are fundamental to the topic in these communities and would not have emerged without the community's active participation.

When engaging in similar work with the Haitian community in Miami, there was an assumption that radio would be a preferred medium since Haitian Creole is traditionally a spoken rather than written language. We worked with community members on a radio story that not only explained technical issues around teenage depression, but also gave parents talking points to ask questions and help them make decisions. The story was recorded by community volunteers, played on a local radio station and uploaded to YouTube. Community radio can play a significant role in increasing and promoting participation and opinion sharing, improving and diversifying knowledge and skills [Bhatt and Kashyap, 2015]. Feedback from the audience was positive and it was perceived to accurately represent Haitian culture and concerns. However, an interesting insight arose after the radio story was completed. The community informed us that the assumption about radio being preferred to text and images was not correct, and audio alone was perceived as less engaging. We then worked with an illustrator and community members to illustrate the radio story and printed it as a booklet and put it online.

Davis and Jansen [2020] found that a culturally competent fotonovela about the dangers of Crystal meth in an ethnic minority community in South Africa outperformed the traditional brochure on intention toward starting conversations about crystal meth. Readers with relatively low literacy preferred the fotonovela over the traditional brochure. This mirrors the results of our own experiences with fotonovelas where the impact on knowledge was equivalent to that of a traditional presentation, but the impact on self-disclosure, questions and further conversations about the topics were much greater with the fotonovela that reflected their own experiences [Villar, Rubio-Rivera et al., 2012]. Participants had reactions such as "that happened to me (or someone I know)", "that's exactly how it is" or even talking back at the story characters, as people speak to characters on TV. Participants demonstrated empathy and identification with scenarios such as explaining mental illness to the police or having to make decisions about medicating school children for behavioral issues. Without representatives of the target audience participating in the creation of the story, the impact would not have been the same.

In the digital age, there are expanded possibilities for visual, audio and interactive content, which can be easily shared through SMS and social media. For example, Prayaga and Prayaga [2020] developed a mobile communication approach to present health messages in English and Spanish with links to easy to understand *fotonovelas*. They showed the benefits of SMS text messaging combined with visual stories to influence health behaviors, build knowledge and self-efficacy. In communities where most people have smartphones, using community outreach through text and social media to link with co-created materials online expands the reach of these communication strategies without additional resource demands (e.g. printing and delivery).

Community drama

Community drama is another creative medium in which to partner with communities to create content and deliver it to larger audiences through performances. A project in rural China explored the novel use of interactive drama to engage a local community in cross-cultural co-creation to determine the core characteristics of a better local community [Wang, Bryan-Kinns and Ji, 2016]. This process resulted not only in the generation of more suitable ideas, but also community engagement and knowledge sharing beyond the design process itself. In rural Homestead Florida, we used community drama to foster discussion about unhealthy relationships. Community members met for several months discussing the topic and learning about Theater of the Oppressed (TO) [Boal, 2000], which invites audience members to stop a performance and suggest different actions for the actors, who then carry out the audience's suggestions. This resulted in rich discussion among creators and community members. The project was accompanied by a social media campaign where community members shared their reactions to the performances, and also linked to a national campaign. This helped participants feel connected to larger effort beyond their immediate community.

Immersive interactive games are a variation of community drama in that they involve community members in a real-life interaction in dramatized scenarios. For example, Downpour! is a street game created in the U.K. that casts players as flood risk advisers in a fictional flooding scenario. Players work in teams to respond to an immediate crisis and make longer-term decisions about mitigation through a series of challenges and encounters with actors [Wendler and Shuttleworth, 2019].

Serious games

Serious games provide a medium through which scientists can engage nonscientists in meaningful dialogue, "helping to address a scientist's social responsibility and diversify science in the process" [Illingworth, 2020]. The co-creation of serious games between community members and scientists has been used to advance climate change communication [Ouariachi, Olvera-Lobo and Gutiérrez-Pérez, 2017; Kwok, 2019]. This medium also lends itself nicely to co-creation of content.

The beauty of games to communicate complex issues is the ability to place players in scenarios that require analysis from various perspectives. Games offer people the agency to experiment with decisions in a safe space. When players identify with characters and scenarios in a game, it helps them create an emotional connection with the issues, which has the potential for triggering active involvement in the issue. [Wendler and Shuttleworth, 2019].

The key for social change games is creating scenarios that resonate with the target audience, and allow them to experience simulations that resemble their lives and are relevant to their worldview. This is where co-creation is essential. In the traditional approach of creative engagement with science, researchers provide information and designers develop a creative output. Co-creation brings together the scientists, designers and intended audience to develop content whose main objective is to be relevant and relatable (besides creatively appealing and scientifically correct). The creators of the game Downpour! presented a tabletop prototype of the game at a museum, which included the opportunity to provide feedback and ask questions to a scientist. This interaction helped the development of the game mechanics and narrative [Wendler and Shuttleworth, 2019].

I have been part of two game co-creation projects that used CBPR to co-create content to appeal to its target audience. In a game to raise awareness of commercial sexual exploitation of children and adolescents in Colombia [Wendorf Muhamad and Harrison, 2017], we worked with community members, child advocates, tourism workers, police officers and a game designer to share perspectives on the issue, understand barriers to reporting, stigma, cultural beliefs, and economic incentives. We co-wrote scenarios and game play options and tested them together until we reached consensus. Community members' participation was critical to establish the right balance between scenarios that were realistic but not so shocking or unpleasant as to trigger cognitive dissonance. Building on this experience, we worked with young people in southern Miami-Dade County Florida to develop a board game to promote bystander involvement in cases of sexual assault. We met over several months with young people who conducted their own community research and learned about game design [Fetterman, 2020]. In a pilot test, participants reported increased knowledge and awareness of bystander intervention options, and found the realism of the scenarios to be key to its efficacy. Although these two examples are not specifically about science communication, they deal with issues that are complex, uncertain, and require multiple systems to address. In this sense they are a valuable example of co-creation of content with community members that could be used for science communication.

Co-creation and social justice in science communication

Science communication is embedded in the many inequities that plague our societies. Dawson [2018] conducted research about involvement in science communication from the perspective of people from low-income, minority ethnic backgrounds, and found that participation in science communication is marked by structural inequalities. Community members had limited access and exposure to science communication and much less participation in its creation. Their main exposure was through mass media, which itself exhibits cultural imperialism and misrepresentation or 'othering' of the powerless. Dawson [2018] concluded that science communication "reflects the shape, values and practices of dominant groups, at the expense of the marginalized". Co-creation of science communication content is a promising approach to begin addressing these challenges.

Participatory design and co-creation are common approaches to collecting indigenous wisdom and crafting solutions that are inclusive and empathetic. However, the involvement of local participant is often unequal to that of the "experts" and leads to problems in the suitability and sustainability of solutions [Wang, Bryan-Kinns and Ji, 2016]. While there is often enthusiasm for community outreach, scientists frequently lack the time, training or opportunity to develop communication and engagement projects [Ecklund, James and Lincoln, 2012]. In partnership with designers and community members, scientist can take an active part in creative outreach.

We need to move toward more effective science communication efforts, which include training scientists in communication methods grounded in social science research and using approaches that engage community members around scientific issues. [Simis et al., 2016]. Science communicators need to learn how best to engage multiple audiences in a two-way communication that can both inform research and lead to the cocreation of new ways to communicate research with the public [Illingworth, 2020].

I am inspired by the conviction that traditional one-way science communication methods based on the information deficit model aren't particularly effective to generate the level of involvement required for behavioral change. While most of my experience has been around health and social issues, I am motivated to use these participatory co-creation methods to address contemporary science issues that are impacting communities, such as vaccine hesitancy, climate change and sea level rise, and in the post-COVID world, understanding the cause and spread of infectious diseases. I would argue that most science issues are also social issues, thereby requiring content co-creation to effectively reach communities and meet them where they are.

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