Scientific Discourse and Lifelong Learning on Social Media: The Case of Non-Ionizing Radiation (Short paper)

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Abstract

Over the last decade, the internet has become a major force influencing many aspects of our learning life. Within this platform, Social media play an increasing part in learning and lifelong learning of many issues and especially science related. This paper looks systematically at the public science discourse that took place on a FB page of a prime time investigative TV program following the airing of the episode about Non-Ionizing Radiation (NIR). Our study characterizes the different types of interactions that took place on this FB page before, during and after the airing of the program. We look at the issue of risk from NIR as a Socio-Scientific issue (SSI). In the context of our research, social media discussions on SSIs can demonstrate how adults use their argumentation skills and evaluate data in a "natural" social setting. This social setting is a main feature of our digital era: online social network platforms. In our research we have found that interactions on NIR took different forms: sometimes the interactions were questions and answers, and at times the interactions took the form of a diatribe – criticizing the program for their lack of research and the viewers for their lack of sense. The discourse also includes many pieces of scientific information – either as links to other resources or as written comments by participants. Overall, we have found that people engage with the frame on NIR provided by the TV program but bring their own unique perspective and positions.

Keywords: social networks, non-ionizing radiation, socio-scientific issues.

Introduction

Social media play an increasing role in learning and lifelong learning as they provide "easy, fast and efficient ways to access a great diversity of information" (Redecker et al., 2010, p. 8). Investigating how online social communities engage with socio-scientific issues (SSIs) is becoming increasigly relevant. The objective of this study was learning how people discuss SSIs in a non-scientific setting using social media as a platform. This study is part of a larger project funded by the Ministry of Science and Technology.

On Thursday, July 20st, 2017, an Israeli prime-time TV show, "Osot Heshbon" (OH), aired an episode on the dangers of NIR from home appliances. This is an investigative program dedicated to consumer issues, such as the nutritional values and flavors of ice-creams and the safety of water dispensers. Target audience is general and not specifically people who are interested in science. Our study is focused on the program's Facebook page with 58,152 followers (4/12/2017), and lively discussions of viewers.

Theoretical Framework

SSIs are controversial scientific issues that involve engagement "in dialogue, discussion, and debate. They… have the added element of requiring a degree of moral reasoning or the evaluation

of ethical concerns" (Zeidler & Nichols, 2009, p. 49). In the context of this research, social media discussion on SSIs can demonstrate how adults use their argumentation skills and evaluate data in a "natural" social setting, make sense of conflicting messages and data.

Media outlets set frames for the public, choosing what information should be promoted and emphasized. Entman (1993) identifies media frames as selecting "some aspects of a perceived reality and making them more salient in a communication text, in such a way as to promote a particular problem definition causal interpretation moral evaluation…" (P. 52). Thus, media frames are a basic reference points with which the audience engage.

Despite the existence of apparent and clear frames, Nisbet (2009) found that often a part "…of the public either ignores the coverage or reinterprets competing claims based on partisanship or self-interest, a tendency confirmed across several decades by public opinion research" (p.14). Viewer engagement with media messages is selective and based on considerations relevant to their daily lives.

Methodology and Analysis

The OH Facebook page published twelve posts related to the NIR program: 8 before the airing, 2 during the airing and 2 afterwards. In total, 458 comments were made on these posts, including 226 comments merely tagging other people. The remaining 232 comments were included in our analysis. Posts and comments were extracted using WhoLikesUs (https://wholikes.us/).

Our analysis is based on Nisbet (2009) and Laslo et al. (2011). First, we looked at the program's framing of NIR and how commenters make sense of this frame. The editors of the program framed the issue as a neglected health hazard, e.g figure 1.

We then looked at how the commenters expressed their agreement or disagreement with this frame (Table 1). From the table we can learn that twice as many comments rejected the proposed frame, then those who agreed with it. Moreover, there were even comments that chastised the program anchors for their lack of research and scientific rigor.

In addition, we looked at the different links and external resources participants shared. Similar numbers of comments contained links to scientific sources about NIR (17) and to sources explaining why NIR is dangerous (15). However, 9 of the latter links were provided by known anti-NIR activists.

Finally, we observed two distinct patterns from the comment interchanges: Firstly, although people engaged in Q&A discussions, often people want to express their opinion or ask a question, but many new comments are completely unrelated (e.g., Figure 2). Secondly, anti-NIR activists distributed messages, but faced skepticism and demands for scientific sources, e.g., Nature magazine (Figure 3).

**Table 1. Attitudes presented on Facebook Comments
following posts and videos on NIR from home appliances (N=232)**

		# of comments	% of total comments	Example quotes
Position regarding the frame advocated by the program:	**Opposing**: NIR from home appliances is not dangerous	57	24.5%	"How much nonsense in one program!!!!" "I suggest you sleep soundly, this program is off the point".
	Accepting: NIR is dangerous	25	10.7%	"wow this is scary" "we need to use (the appliances) wisely – stay away as far as needed, and some of the appliances need to go – for example microwave and cordless phones"
	Position not stated clearly	150	64.8%	
Shared external links	to scientific source/s	17	7%	
	to nonscientific source/s	15	6%	
Asking for advice or information about NIR and how to measure it.		44	18.9%	"I noticed there was no reference to air conditioners. Do you have any information about them?" "Where can I get the instrument that measures radiation?"

Discussion: Implications for lifelong learning in the digital era

We want to start our discussion with thinking broadly about how the public engage with SSIs through social media. But who is this public? Weeth Feinstein (2015) offers an interesting perspective by examining Habermas's term "public sphere": "Habermas was particularly concerned with a stage of public discourse that often precedes the formation of defined interest groups – the stage in which private citizens with diverse interests meet to debate those interests in an unrestricted manner" (p. 147). In many aspects, Facebook discussions, such as the ones we analyzed, represent concerned individuals with diverse backgrounds and goals debating an SSI in an unmonitored manner. However, these discussions are hardly a knowledgeable debate or dialogue.

This finding fits nicely with Kirschner's (2015) claim that we need to acknowledge that Facebook is "a poor environment for fruitful argumentation and discussion" because of the "linear structure of a discussion board" (p. 622). In addition, we noticed that for the most part people are holding on to their convictions – Most interaction can be classified as "knowledge sharing" where people

"share information and personal ideas" without elaborating or advancing knowledge (Fu et al. 2016, p. 455).

Recently McClain (2017) argued that "[i]n social media, the role of scientists to make others aware of information and filter this information could potentially be as valuable as generating new content" (p. 6). Perhaps by enhancing the role of scientists in this discourse we can have a more fruitful scientific online discourse; there was some discussion on the credentials and credibility of both the people appearing on the program itself and the people commenting in the Facebook page.

Adults and teenagers use social media as a major source and resource for information in general and for science information in particular. In many situations we observe that engagement with specific scientific issues is instigated by personal concerns and needs. This is demonstrated by the questions people ask on Facebook, questions that aim to alleviate their anxiety and perception of risk. Even though there are many who volunteer relevant but general scientific information, people want an answer to their specific question. This finding echoes Weeth Feinstein (2014).

It is important to learn more about these two groups who operate in the digital public sphere – specific information seekers and general information providers. Both are involved in a learning process vis-à-vis media, and this learning process is a key characteristic of our digital age. Further research should look at how this learning process is different for different issues and what are its implications for developing scientific literacy in adults.

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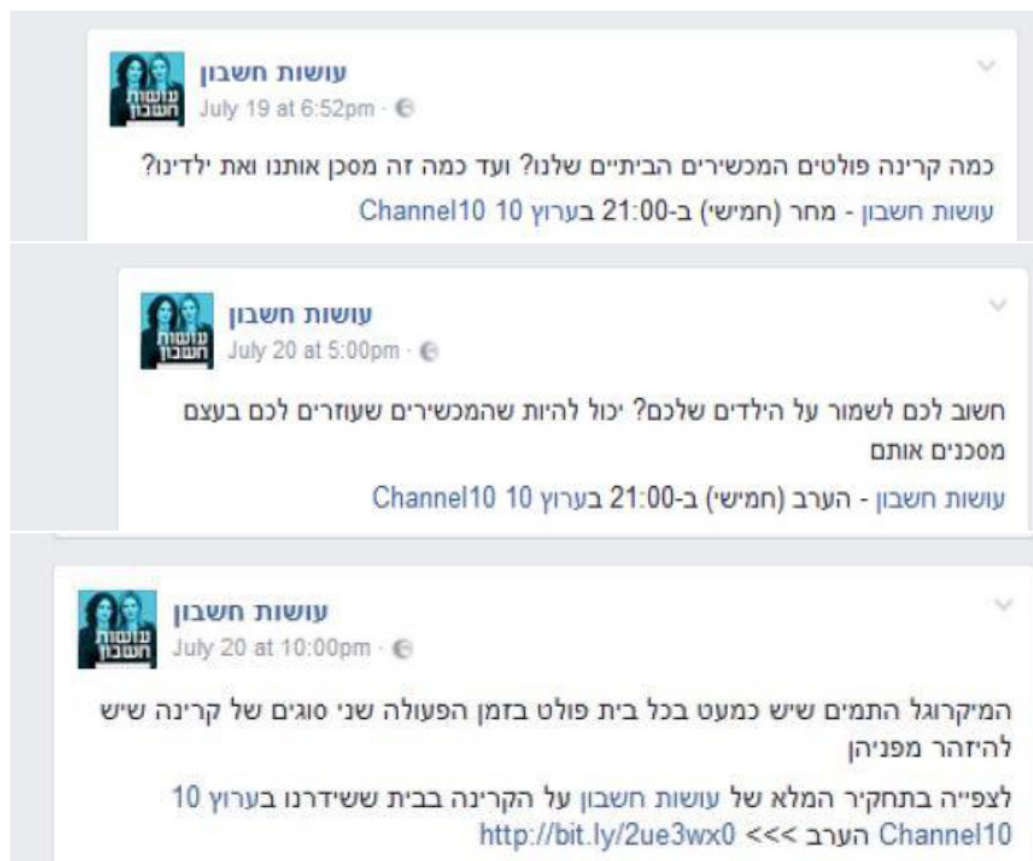
**Figure 1. Post promoting the program on NIR from home appliances
on Osot Heshbon's Facebook Page**

עדי מורן קיבא

מה עם מכוניות היברידיות?

See Translation
Like · Reply · 2 · July 21 at 11:24am

Oren Pisha Donald J. Trump
Fake news at it's finest
Like · Reply · 1 · July 21 at 12:40pm

Tzufit Boaron

היתה חסרה התייחסות למטענים שונים למיני מכשירים בבית וכן לשימוש בטלפונים
סלולריים עם וללא טעינה

See Translation
Like · Reply · 1 · July 21 at 1:33pm

Katya Tevkin

האם אפשר לקנות מודדי קרינה כאלה?

See Translation
Like · Reply · 1 · July 21 at 2:27pm

Meron Shoshana Moskovich-goldman

ומתכנני הדירות/קבלנים?

See Translation
Like · Reply · 1 · July 21 at 1:34pm

Eve Becker

ואם זה מסוכן מידי לא נכבס יותר??

See Translation

Like · Reply · July 21 at 12:38pm

Ohad Rovshitz

היכן ניתן לרכוש את המכשיר שמודד קרינה?

See Translation
Like · Reply · July 21 at 10:11am

**Figure 2. Dialogue from Facebook page
demonstrating unrelated Q&A discussions**

Gal Chimovich

עושות חשבון

הכתבה הכי חובבנית שנפגשתי בה מזה הרבה זמן!

שמדברים על קרינה באופן כל כך כללי אתן חוטאים לתפקידכם ומטעים את הציבור.

ערכי מילי גאוס?

אתן מודעים לכן שמיליגאוס אלו יחידות של שדה מגנטי ולא של קרינה?

יותר מכך אם נניח שאתן צודקות, האם מצאתם לנכון לציין שהשדה המגנטי של כדור הארץ בישראל הוא 340 מיליגאוס? (גם אם אנחנו לא ציפורים נודדות אני לא רואה סיבה למה זה אמור להזיז יותר מדיי).

עכשיו נדבר על סוגי הקרינה, קרינה מייננת ובלתי מייננת, האם נגעתם בסיפור?

הקרינה המסוכנת היא קרינה מייננת, לא ציינתן איזה סוג קרינה מופץ?

See Translation

Like · Reply · 🅾 10 · July 20 at 10:19pm

⌃ Hide 14 Replies

Amir Borenstein

שלום Gal Chimovich

א. גם שדה מגנטי בתדר נמוך נחשב קרינה בלתי מייננת.

ב. השדה של כדור הארץ הוא שדה מגנטי קבוע, DC אינו משתנה, בעוד שהשדה שמדדו הוא בתדר של 50HZ ומכאן נובע השוני במסוכנות בניהם.

ג. זה שקרינה מייננת מסוכנת יותר לא אומר שלא צריך להתעלם מהסיכון של קרינה בלתי מייננת (למרות שזה מה שעושים הרבה מאוד אנשים).

See Translation

Like · Reply · July 20 at 10:27pm

Gal Chimovich Amir Borenstein

http://www.sviva.gov.il/.../radiation%20exposure%20levels...

הקרינה המסוכנת היא זו בתדרים הגבוהים.

See Translation

Like · Reply · 🅾 2 · July 20 at 10:37pm

Amir Borenstein

שלום גל Gal Chimovich

אני שמח לראות שאתה מודע לסיכון בקרינת רדיו-מיקרוגל , אבל גם חשיפה לקרינה בתדר נמוך אינה בריאה. למעשה המודעות לגבי הסיכון שלה גבוהה יותר והחל מ2001 היא נחשבת מסרטן אפשרי בבני אדם.

למעשה ההמלצות לחשיפה לקרינה בתדר נמוך בארץ לוקחות בחשבון כבר היום נזקים ביולוגים במידה מסוימת. בעוד שההמלצות של המשרד להגנת הסביבה בקשר לחשיפה לקרינת רדיו עדיין מבוססות על חום בלבד. זאת כאשר השפעות בריאותיות לקרינת רדיו מתקיימות בכמה סדרי גודל מתחת לתקן הלא מגן.

See Translation

Like · Reply · July 20 at 10:41pm · Edited

Gal Chimovich

שנייה מביא לך כתבה מnature שמראה שאין קשר בין קרינה לא מייננת לתחלואה.

Figure 3. Dialogue from Facebook page demonstrating discussions between anti-NIR activists and the public