

Using Telepresence to Communicate Science in Giant Screen Cinema

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Regarding the content of giant screen cinema presentations of science, audiences are more likely to attend, pay attention, experience telepresence, develop interest and learn when the topic is intrinsically interesting and compelling, or made to appear so.

This presentation will focus on the phenomena, theories and corresponding research evidence regarding telepresence. It will explain how and why telepresence can be an important organizing framework for the effective communication of science and important scientific controversies to the public, in particular via giant screen cinema presentations.

Defining Telepresence

The concept of 'telepresence,' often shortened to 'presence,' emerged in an academic context beginning over a half century ago in film theory (Bazin, 1951), sociology (Goffman, 1959), telecommunications (Short, Williams and Christie, 1976), robotics and teleoperation (e.g., of equipment from a remote location) (Minsky, 1980), and communication (Steuer, 1992; Lombard & Ditton, 1997). In 1992 the first journal dedicated to the topic, *Presence: Teleoperators and Virtual Environments* (MIT Press), was founded. The International Society for Presence Research (ISPR) will host the 11th annual conference on the topic this fall.

While it is often loosely defined as the sense of 'being there' in a virtual or mediated environment and many competing definitions can be found (see Lombard & Jones, in press, for an overview), Lombard and Ditton (1997) identified six dimensions of telepresence from diverse literatures and defined the generalized concept as "the perceptual illusion of nonmediation "that occurs" when a person fails to perceive or acknowledge the existence of a [human-made] medium in his/her communication environment and responds as he/she would if the medium were not there."

During the spring of 2000 members of a growing interdisciplinary community of scholars developed a comprehensive explication of the concept through an electronic discussion on the presence-I listserv (ISPR, 2008). The lengthy explication, available on the ISPR web site (<http://ispr.info>), begins with this overview:

Presence (a shortened version of the term 'telepresence') is a psychological state or subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human-made technology, part or all of the individual's perception fails to accurately acknowledge the role of the technology in the experience. Except in the most extreme cases, the individual can indicate correctly that s/he is

using the technology, but at *some level* and to *some degree*, her/his perceptions overlook that knowledge and objects, events, entities, and environments are perceived as if the technology was not involved in the experience. Experience is defined as a person's observation of and/or interaction with objects, entities, and/or events in her/his environment; perception, the result of perceiving, is defined as a meaningful interpretation of experience." (The Concept of Presence: Explication Statement)

Since 2006, the term telepresence has entered the public sphere thanks to the high end videoconferencing systems of Cisco and other companies, technologies said to provide the illusion of a unified physical collaborative meeting space (see Lichtman, 2006).

In short, whether the result of using virtual reality, simulation rides, home theater, video conferencing, high definition television (HDTV), home or arcade video games, the World Wide Web (WWW), 3-D IMAX films or other technologies, a telepresence experience is one in which a media consumer has the sensation of being with and connecting to people, objects and events.

Aside from its inherent interest, telepresence is important to media theory and practice because it has been linked to physiological effects including arousal andvection (a sense of self-motion) and psychological effects including enjoyment, involvement, learning (including skills training), improved task performance, desensitization, persuasion, changes in social judgments (judgments about the nature of the world) and the development of parasocial interaction and relationships with mediated characters (see ISPR, 2008 and Lombard & Ditton, 1997 for more information).

Evoking Telepresence

A wide variety of characteristics of media form, media content, and media users are said to interact together to evoke telepresence in users. Media form characteristics include the number and consistency of sensory channels, image size and quality, proportion of visual field occupied by a medium's image, motion, color, dimensionality of image and sound, subjective camera techniques, interactivity, obtrusiveness of technology, live versus recorded or constructed experience, and the number of people who can simultaneously use the medium.

Content is obviously critical as well, especially the degree to which it is socially (not just perceptually) realistic, the use of media conventions which remind users of the artificial nature of the experience, and the topic and nature of the portrayal, task or activity. A key variable identified by some scholars (Green & Brock, 2000; Green, Strange, & Brock, 2002) is the use of compelling narrative or story. Media user characteristics that may be important include willingness to suspend disbelief, knowledge of and prior experience with the medium, gender, and others (see Lombard & Ditton, 1997).

Telepresence and Giant Screen Cinema

While arguably every medium including the telephone and standard television and film technologies can produce telepresence experiences for media users, giant screen cinema features several of the key media form factors identified by scholars as likely to evoke such reactions: extremely large, high resolution images, in some cases with 3D dimensional cues; powerful multi-channel dimensional audio; subjective 'you-are-there' camera views; motion; color; and more. The darkened theater also serves to focus attention on the mediated experience rather than the media technology, making telepresence more likely.

The industry rarely if ever uses the term telepresence of course, but its marketing materials make clear that it recognizes the potential of these characteristics to evoke telepresence. For example, IMAX describes the "IMAX Experience" this way: "IMAX is the ultimate movie experience. With crystal clear images and wraparound digital surround sound, IMAX lets you feel like you're really there." (IMAX, 2008). The marketing often describes actual activities that the movie-goer will 'do' such as "Climb the daunting heights of Everest. Experience the weightlessness of space. Dive into the undersea world to see incredible creatures. Get behind the wheel of a racing car going 200mph. Travel into exciting sci/fi worlds." (IMAX, 2008). Some preliminary research (Lombard & Ditton, 2007) confirms the power of IMAX 3D presentations to evoke various types of telepresence, and other studies (Lombard, Ditton, Grabe, & Reich, 1997; Lombard, Reich, Grabe, Bracken, & Ditton, 2000) show the power of even a relatively small increase in image size (e.g., from 12 to 46 inches) to evoke an enjoyable sense of movement, excitement and physiological arousal with the subjective forward point-of-view movement camera technique.

Telepresence, Giant Screen Cinema and Science

Clearly giant screen cinema is more capable than most media of evoking telepresence, which is likely a key reason for its appeal to the public. Because the goals of effective communication of science – changes in attitudes (e.g., increased interest in and positive perceptions of science topics) and changes in knowledge (i.e., learning about science topics) have also been identified as effects of telepresence experiences, it makes sense to look to telepresence theory and research for ways to enhance the effectiveness of the communication of science via giant screen cinema.

The various formal features of giant screen cinema discussed above (image size and quality, etc.) provide the potential for high levels of telepresence, but other features can enhance or limit telepresence. Presentations that incorporate 3D imagery and 3D or spatial audio are likely to increase the effect. Cinemas could also consider importing techniques used in simulator amusement rides that are often identified as elements of a 4D presentation: manipulations of the theater environment synchronized to the film such as changes in the room temperature, air jets, vibrating seats, artificial scents, etc. Less radical changes include reducing or segregating the inclusion of graphics, text (e.g., introductory credits) and other reminders of the artificiality of the mediated experience. Subjective camera techniques, e.g., through the 'eyes' of characters or even objects, can give audience members a feeling of participation in an experience rather than the

perception that they are only passive observers. The use of narrators, especially unseen, 'third person' narrators, should be avoided because it distances the viewer from the experience being portrayed.

Regarding the content of giant screen cinema presentations of science, audiences are more likely to attend, pay attention, experience telepresence, develop interest and learn when the topic is intrinsically interesting and compelling, or made to appear so. A key way to make a topic compelling is to present it as a story (the basis of human experience, cognition and memory according to Schank, 1991), one that 'transports' the audience on a journey (Bracken, 2005; Green & Brock, 2000; Green, Strange, & Brock, 2002). Research on parasocial interaction and relationships (Giles, 2002; Horton & Wohl, 1956) and social telepresence (see Biocca, Harms, & Burgoon, 2003) suggests the importance of presenting stories that involve compelling people with whom audiences are likely to connect. All of this requires realism, not just in how the environment, objects and people look and sound but in their correspondence to their real world counterparts: the events, dialogue and acting have to seem possible, plausible and 'real' to the audience. Nunez and his colleagues (Nunez, 2007; Nunez, & Blake, 2003; 2006) have also demonstrated that telepresence is enhanced by the audience having at least some previous familiarity with a topic and by bringing that familiarity to the forefront prior to a mediated presentation via what they call thematic inertia or cognitive priming – for example the use of sounds, images, and other stimuli related to the presentation topic while audience members wait for the experience itself to begin.

While form and content characteristics of giant screen cinema are primarily under the control of producers, the characteristics of the audience are in most cases not. Given the expense of producing films in specialized giant screen formats, designing experiences for narrow audiences is impractical. But knowing more about the diverse demographics, motivations, attitudes, and knowledge levels (about both the presentation topic and the technology) of their audiences can help producers enhance telepresence and its desirable effects. Producers can select topics with which the audience will already have some general familiarity, and bring that familiarity to their focused awareness immediately before the presentation via cognitive priming as mentioned above. They may be able to avoid hindering audience members' willingness to suspend disbelief by providing minimal or no information about the technology behind the presentation (at least prior to the experience).

Perhaps most important, producers need to account for an overall orientation of their audience toward entertainment rather than education. While some giant screen cinema audience members, especially at venues in science and other museums, may attend primarily to learn, most likely come to be entertained. A pioneer in the field of communication, Wilbur Schramm (1971), argued that there is an unspoken cultural contract between producers and audience members that varies with the goals of the relationship. If the goal is transmitting information, "the communicator is expected to be knowledgeable, accurate, and fair in his interpretations. The receiver is expected to pay attention. If either one fails to live up to these expectations, then the relationship results in disappointment or

indignation." If the goal is entertainment, "[a]n actor is expected to give a skilled performance; in return, the audience is expected for the time to suspend disbelief - not to apply reality tests to the drama, but to live for a while in its world of imagination, and use its ambiguities to stimulate their own imaginations." He goes on:

The entertainer is expected to have more concern with form than is the informational communicator. The way he writes or speaks or moves is itself expected to give pleasure. He is expected to be imaginative rather than utilitarian, to write richly rather than clearly, to tell a good story, to do an expert job of turning a phrase or building a scene. In other words, whereas informational communication asks for the skill of the reporter, entertainment asks for the skill of the artist. ... The receiver, on his part, is expected to be willing to identify with one or more of the characters, to put himself in their places, to feel with them (ibid).

If producers seek to transmit information while audience members seek to be entertained, the contract likely will be broken and either one or both goals will be unfulfilled. But if producers use the audience's goal of entertainment to evoke telepresence with a vivid and impactful experience that along the way provides the information necessary to affect their attitudes about and knowledge of a science topic, both parties' goals may be accomplished. This is the basis for theoretical and applied work in what has been labeled "entertainment-education" (Singhal, Cody, Rogers, & Sabido, 2003; Singhal & Rogers, 1999):

This approach to communication is the process of designing and implementing a media message to both entertain and educate to increase audience members' knowledge about an educational issue, create favorable attitudes, and change overt behavior. It uses the universal appeal of entertainment to show individuals how they can live safer, healthier, and happier lives. Entertainment formats such as soap operas, rock music, feature films, talk shows, cartoons, comics, and theater are utilized in various countries to promote messages about educational issues. (Singhal, Cody, Rogers, & Sabido, 2003)

If producers can generate enjoyable telepresence experiences that take advantage of the audience members' expectations based on Schramm's entertainment contract, and incorporate the key elements of information about a science topic at the same time, they can more effectively educate them as well.

Summary

Theory and research on telepresence, the psychological state or perception in which a media consumer has the sensation of being with and connecting to people, objects and events, provides a potentially valuable framework for increasing the effectiveness of giant screen cinema presentations of science. By taking advantage of, and making small adjustments to, the immersive form of these presentations and by creating compelling, story-based content that encourages audience members to identify and engage with believable characters, producers can create

experiences that satisfy the audience's primary goal of entertainment while increasing their interest and knowledge regarding important scientific topics.

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