Two Myths about Immersion in New Storytelling Media

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Abstract

This paper examines two widespread claims about immersion in new media for storytelling (such as interactive multimedia, hypertext, and computer games). Immersion here means to experience a story world while shutting out the real world. The two claims are 1) that an audience's experience will be more immersive the more sensory information the audience is exposed to and 2) an audience who is able to intervene—be active, participatory—in a medium will feel more immersed in the medium. I argue that these two claims are unsupported both theoretically and empirically and therefore should be considered myths. The origins of the myths are speculated to be a combination of uncritical application of concepts from other fields and general cultural values.

1. Introduction

In this paper, I will examine two myths about new media technology used for storytelling. They both deal with the phenomenon of *immersion.* By immersion, I mean to focus mentally on something other than the immediate surrounding reality. As I am concerned with storytelling, immersion here means to be captured by and experience a story and its world, shutting out the "real" world around you. Immersion is generally considered as something positive by people working with new media technology. The more immersive a media technology is, the better the experience will be for an audience. With "new media" I mean new technologies for storytelling such as interactive multimedia, hypertext, virtual reality (VR), multi user dungeons (MUDs), and computer games.

The first myth I shall consider is *the belief that an audience's experience will be more immersive the more sensory information the audience is exposed to*. An example of this belief is that a story presented in stereographic, three-

dimensional video and three-dimensional audio produces a more immersive experience than that of a story presented only as printed text. The second myth is *the belief that an audience who is able to intervene—be active, participatory—in a medium will feel more immersed in the medium*. For example, actively choosing the direction the story takes would lead to a more immersive experience compared to passively watching a story. The first myth can be summarised as the "more is better" myth. The second myth can be called the "participation is better" myth.

I am using the term "myth" because I think that these two beliefs are widespread but that there are no grounds for holding them as true. I will show that statements about immersion are frequently made on loose grounds. They are often supported by nothing more than mere speculation.

The structure of the argument in this paper is as follows:

(i) If a belief *B* is widespread and
(ii) there is no empirical or theoretical basis for *B*
(iii) then *B* is a myth

Below, I will show that (i) the two beliefs about immersion are widespread, and that (ii) researchers provide neither empirical nor theoretical support for the beliefs. Therefore, the two beliefs can not be said to be true (or probably true) but should be considered myths. So, myth here means not something that has been proven false, but rather something that is considered true although there are no reasons to believe in it.

The burden of proof is on the one who claims that a new feature increases immersion. Evidence should be given that these new features actually increase immersion. We surely cannot have the case where any new claim about immersion is considered true until proven false. Why? Consider an analogy in a medical context. If someone developed a new drug for headache and claimed that it was better than the previous ones, we would insist that this someone provide evidence that this actually is the case. We would be surprised if *we* instead were challenged to provide evidence that this new drug did *not* have a superior effect. The burden of proof is on the one who makes the extraordinary claim.

The reason for criticising the myths is an attempt to provide a firmer theoretical ground for the study of storytelling media. A *theoretical* ground is not to be confused with a *technological* ground. There is already a heavy emphasis on implementation details in the discussion about storytelling media. What is lacking are theoretical concepts and an empirical model of what is going on when a person is experiencing a story using storytelling media. This paper attempts to be a step towards such a model, focusing on the phenomenon of *immersion* when experiencing a story. This is important since, as will be discussed later, there are no

scientific models of storytelling immersion, so it is not certain what "immersion" means in this context.

Should the myths be considered harmful? Definitely. Any claim without support can mislead, confuse, and distract a more informed investigation of a phenomenon. And since we do not know beforehand which claims are true, all we can do is evaluate the claims in the light of the available evidence. This is what this paper attempts to do.

A note on terminology is in order. I will use the term "audience" to denote any user, viewer, listener, or reader of a medium.

2. What is immersion?

What is immersion? A look in the Oxford pocket dictionary reveals the definition "mental absorption". In the context of storytelling, I understand immersion to be the state of mind of an individual where he or she excludes the outside world and is totally focused on experiencing another world. This state can be more or less intense. For example, if you read a book that you find uninteresting you might still hear the noise of outside traffic. But it is also possible that you become so absorbed by a good book that you do not even notice that someone is talking to you.

I will now compare this notion of immersion in a storytelling context to some concepts that appear to be similar to it: *telepresence*, *virtual reality immersion*, and *flow*. But as we will see, the phenomenon of immersion cannot be captured by any of these.

2.1 Immersion and telepresence

Immersion has some similarities to the phenomenon of *telepresence*, as it is discussed within the areas of virtual reality research and computer-mediated work. Telepresence means to be present somewhere without actually being there bodily. An example of telepresence is a human operator who is remote-controlling a robot on the bottom of the sea. The operator "sees" through the robot's cameras and can affect the distant environment with the robot's tools. Immersion is similar to what Draper, Kaber, and Usher (1998) calls "experiental telepresence" in their survey of research on telepresence. However, immersion in the context of storytelling is different from telepresence in several ways. First, it is hard to see a *local environment* versus a *distant environment* which are fundamental concepts in respect to telepresence (for instance, it is hard to see what would be information from a distant environment when reading a book). Secondly, and most important, there is no *task* with related performance in the context of storytelling (telepresence is concerned with work-related contexts where task performance can be measured). So, although telepresence might appear similar to immersion,

it lacks several characteristics of the latter. Telepresence is a concept applied in a different domain.

A feature which immersion shares with telepresence is what Draper, Kaber, and Usher (1998) named "the measurement problem". There are no good measures of telepresence apart from questionnaires, which they largely consider undesirable. The same is true of immersion. Measures of immersion or degree of immersion in storytelling contexts have not been made, nor are there any measurements available. We only know that both traditional media and new media can be immersive. But we do not know whether one produces more immersion than the other. We do not even know what it means to say so, since we lack a theoretical explanation of immersion.

2.2 Immersion and virtual reality

Within the area of virtual reality (VR), "immersion" usually has a well-defined meaning. A common definition is Steuer's (1992) which defines immersion in terms of technological dimensions such as the number of sensory dimensions simultaneously presented and the resolution of these channels. In addition, "interactivity" also contributes to immersion. Interactivity in this context means that the user can modify the form and content of the mediated environment in real time. Thus, immersion in the VR sense is a technology-based characteristic.

Now, if one accepts this definition of immersion, then the beliefs "more is better" and "participation is better" become trivially true. Since the definition contains only technological elements, the only thing one has to do to obtain immersion (according to this definition) is to ensure that these elements are present. But what we are interested in in a storytelling context is the *feeling* of immersion, defined as a mental state, not as a technological characteristic. The VR definition of immersion says nothing about how these technological factors affect the feeling of immersion. Immersion as a mental phenomenon cannot a priori be determined by technological factors. So, we cannot say, by referring to purely technological terms, such as pixel resolution of a display, what effect this will have on the feeling of immersion. These are empirical questions.

2.3 Immersion and flow

When we do something we like and can exercise control over, such as when an athlete does a perfect high jump or when an artist is painting, we can experience a sense of *flow*. According to Csíkszentmihályi (1992), a flow experience has eight characteristics:

1. It is a challenge that one is capable of handling
2. It requires concentration
3. It has clearly defined goals
4. It provides immediate feedback
5. It is an escape from everyday reality
6. It involves a feeling of control

7. The self tends to disappear
8. Time is experienced subjectively, going either faster or slower than real time

Is experiencing a story a flow experience? It depends on how broadly one wants to interpret the eight conditions above. Some of the conditions are clearly met. Experiencing a story requires concentration (condition 2), it is an escape from everyday reality (condition 5), the self tends to disappear (condition 7), and time is experienced subjectively (condition 8). But is it really a challenge that requires special skill (condition 1)? In one sense, all activities require skills, as, for instance, distinguishing a chair from a table. But this is not the kind of skill involved in a flow experience. Reading a story does require special skills and is not mastered until years of practice. But what about listening to a story? Understanding a story appears to require skills mostly at an unconscious level. Even if these skills are learned, they are not learned consciously. Does experiencing a story have a clearly defined goal (condition 3), provide feedback (condition 4), and involve a feeling of control (condition 6)? I think none of these conditions are satisfied when it comes to stories. This is because experiencing a story is not a task at which one can consciously train and improve one's performance, as in golf or chess. Experiencing a story is not a challenge that requires special skills that one can improve in order to achieve control[1]. It is surely a rewarding experience but it is not a flow experience.

2.4 What is immersion, then?

In conclusion, the concepts of telepresence, technologically defined immersion, and flow can not explain the phenomenon of immersion when experiencing a story. These concepts apply do different domains and cannot be transferred to a storytelling domain without modification.

A tentative characterisation of immersion in a story context would include the following elements:

- *Attention* is directed at the storytelling source (text, voice, images, etc.) (This creates the flow conditions 5, 7, and 8 above as side effects)
- *Mental construction* of a story world, a plot (temporal and causal connections between events) and possibly other story elements, such as genre
- An *emotional state*, as a response to elements in the story

A possible way to measure immersion would be to measure people's ability to detect vague stimuli while experiencing a story. One could put people in various immersive situations and measure how faint a stimulus (visual or auditory) they react to. But without a better theoretical explanation of story immersion, such

[1] It is possible however to turn reading into such a challenge. Some postmodern literary works challenge the reader's traditional understanding of, e.g., temporality and causality. This can force the reader to make conscious efforts in order to make sense of the story. Also, detective stories may invite the reader to guess who the murderer is. These elements of conscious reasoning may be present when experiencing some stories, but they are not central to the story experience, as the majority of stories show.

tests will only be preliminary. In the meantime, we have to rely on an intuitive understanding of the concept. This should be sufficient for the point of this paper, which is to examine the validity of two claims about immersion.

3. What the myths claim about immersion

I will now clarify what the myths "more is better" and "participation is better" are claiming about storytelling immersion. In what follows I will sketch the image I will later attack.

In the myths, immersion is considered a quantitative concept. Why? If the myths say that participation (or using more sense modalities) increases immersion generally, it must be possible to state that one storytelling situation is generally less immersive than another. Further, using the words "increases" and "more" demands a quantitative dimension in which to compare degrees of immersion. So it follows that, according to the myths, immersion can be quantified and is of the same kind in different storytelling media so that it can be compared across them.

Table 1 is a simplified comparison of various media for storytelling and the immersion they produce according to the myths "more is better" and "participation is better". A storytelling medium can be considered a way of communicating a story using the senses. Further, a storytelling medium can be classified as participatory when the audience changes the story as it progresses.

Storytelling media	Sense modality			Participatory	Degree of immersion according to myth (numerical score in parentheses)
	Visual iconic	Visual symbolic	Auditory		
Written text: e.g. a novel	No	Yes	No	No	Low (1)
Oral storytelling: e.g. a bedtime story	No	No	3-D	No	Medium (2)
Text adventure game: e.g. Deadline	No	Yes	No	Yes	Medium (2)
Film: e.g. Casablanca	2-D	Yes	2-D	No	Medium (3)
Play: e.g. Hamlet	3-D	No	3-D	No	Medium (4)
IMAX Theater film	3-D	Yes	3-D	No	High (5)
Multimedia, VR: e.g. Myst	3-D	Yes	3-D	Yes	High (6)

(Score is calculated according to the following rules: "No" = 0 points, "Yes/2-D" = 1 point, "3-D" = 2 points)

Table 1. Examples of storytelling media. Shown are which sense modalities the media utilise, whether they are participatory or not, and what degree of immersion they should produce according to the myths "more is better" and "participation is better".

Some of the most common storytelling media is included in Table 1. Oral storytelling is exemplified with a parent telling a bedtime story to a child. An example of a story in written text is a novel such as *War and Peace* by Tolstoy. A play is a story performed on a stage in front of an audience, such as Shakespeare's *Hamlet*. A film, such as *Casablanca*, is an audio-visual projection on a flat screen. An IMAX film extends traditional film with three-dimensional video and audio (see Murray, 1997). A text adventure game is a computerised version of a role playing game where a user reads and inputs text on a computer. An example of this is Infocom's *Deadline* (see Aarseth, 1997 and Murray, 1997). A multimedia or VR story is capable of three-dimensional projected video and audio (see Laurel, 1993 and Murray, 1997). The example, *Myst*, does not utilise real 3-D video or 3-D audio, but includes other elements of this type of media. The criteria for selection of these examples are not so important here. As long as some of the most common storytelling media are included, both old and new, the point can be made.

The examples in the table use either the visual or auditory sense modalities or both (it would be possible to include other modalities, such as touch, but for simplicity, these limitations have been made). The visual modality has been divided into *visual iconic* and *visual symbolic*. Visual iconic means that the visual stimuli contain non-arbitrary elements, such as gesture or images of objects (elements that are "natural" to human communication). Visual symbolic means that the visual stimuli contain conventional, arbitrary symbols, such as letters making up a text. The iconic part of the visual modality is divided into "No" meaning that no iconic visuals occur, "2-D" meaning that the medium uses a flat surface, and "3-D" meaning that the medium uses stereoscopic viewing. The auditory modality is categorised into "No", meaning no sound at all, "2-D" meaning a monophonic or stereophonic reproduction, and "3-D" meaning a presentation that captures the three-dimensional arrangement of sound sources in the medium.

According to the myths, media that use more sense modalities and participation should be more immersive. We can reflect this by giving each medium in Table 1 a score according to the number of modalities it uses and if the medium is participatory or not. A medium should get more points the more sense modalities it uses, and a higher score if it is participatory rather than non-participatory. A "No" in the table is given 0 points, "Yes" or "2-D" is given 1 point, while 2 points are given for "3-D" (these scores are somewhat arbitrary). If we now calculate the total score for each medium, we will get its degree of immersion according to the myths (shown in the rightmost column in Table 1). Note that this is not a measure of immersion, only a scale that makes it possible to present the media in an ordered list roughly according to the myths' claims.

Now, this analysis captures some of the details of what the two myths claim. IMAX Theater film and Multimedia/VR stories generate the highest degree of immersion while written text generates the lowest degree of immersion. The other media types fall in between these two.

A few things are worth noticing about Table 1. It can be seen that written text as a storytelling medium utilises the fewest number of sense modalities and is not participatory. With written text, the stimuli contain as few "natural" elements as possible. All that are available to tell the story are purely conventional symbols. There are no images, gestures, or speech. If written text is highly immersive, then it is so without the use of multiple sense modalities and without the use of participation.

We will now in turn look at the two myths in more detail.

4. First myth: More sensory information, more immersion

4.1 The myth

There is a widespread belief that the more sensory information you provide an audience with, the richer a storytelling experience the audience will have. It could be more information in one sensory modality (e.g., vision, and hearing) or the use of more sensory modalities at once. More is better. It is easy to slip into this thinking which appears common sense. The myth can be exemplified with the following statements:

- "Still images are better than text"
- "Video is better than still images"
- "Sound is better than no sound"
- "Three dimensions are better than two dimensions" (for both audio and video)
- "The larger the screen, the better"

Now, let us turn to how the myth has shown itself in the research literature.

4.2 The myth in the literature

Janet Murray, a well-known scholar studying narrative in new media technology, discusses in her book *Hamlet on the Holodeck - The Future of Narrative in Cyberspace* the question of whether more sensory information leads to more immersion. She arrives at conflicting conclusions regarding whether more information means more immersion. Generally, however, I conclude that the book expresses the "more is better" myth.

She appears to subscribe to a belief that "more is better", especially when she marvels on the technologically advanced Sony IMAX Theater:

> "the BIGGEST movie screen on earth." How big is it? . . . The 3-D screen is eight stories high and 100 feet wide, the size of seven elephants; the special film is ten times the size of 35mm film, is stored in a canister that is 7.5 feet in diameter, and runs in a projector that weighs 500 pounds and uses 18,000 watts of electricity. . . . The size of the film means an increase in information, offering a richer and there-

> fore more persuasive visual illusion. It is not merely a larger image but a more present reality. (Murray, 1997, pp. 44-45, capitalisation Murray's).

She says, however, nothing about what the size of the screen adds to the story. What about the millions of people in the audiences that have watched plays or read books throughout history and missed such a wonderful, and supposedly necessary, technological experience? Perhaps the human race's experience of narrative in the past has been marginal and horribly dull? Or it might just be that perhaps such technological feats as the IMAX Theater is not really vital for an immersive story experience? What makes Murray adhere to a myth is that she does not provide any grounds for her conclusions, but merely states them as established truths.

Designers of VR technology also tend to have a technology-oriented view of what creates the feeling of immersion. Here is an example quote taken from the web page of Fraunhofer Institute for Computer Graphics, Department for Visualization & Virtual Reality ("presence" can be understood as "immersion" in this context):

> One part of the VR Technology Lab is covered by a CAVE, one of the most exciting VR output devices available today. Consisting of 5 stereo projection screens (3 walls, floor and ceiling with a dimension of 2.4 m by 2.4 m each), a CAVE extends the definition of immersion of traditional VR output devices by the sensation of "presence".
> (From the web page http://www.igd.fhg.de/www/igd-a4/news/cave_ws1.html)

The technological details are impressive, but what is their relation to the feeling of immersion?

Returning to Murray, she has the same view when discussing immersion as an essential property of new storytelling media. She describes it as "the sensation of being surrounded by a completely other reality . . . that takes over all of our attention, our whole perceptual apparatus." (Murray, 1997, p. 98). Thus, Murray attaches importance to being able to experience the fictional world using as many senses as possible. But she does not say how or why this should be so.

Also, when discussing the historical timeline of computer adventure games, Murray expresses the belief that "Images are better than text". She says that when going from text-based interfaces to graphics-based ones, the interfaces have "progressed" (Murray, 1997, p. 190). Apparently, she views the latter more positive than the former.

Then, surprisingly, she makes a statement about computer text adventure games that appears contradictory to the rest of her book. When discussing text adventure games (such as Infocom's *Planetfall*), Murray notes that multisensory interaction is not apparently necessary to obtain a successful experience in an interactive narrative, as the successes of these narratives show. "It demonstrates that the potential for compelling stories does not depend on high-tech animation and expen-

sively produced video footage but on the shaping of such dramatic moments" (Murray, 1997, p. 53). This fact casts doubt on the myth that "more is better". Computer text adventure games were very popular, a commercial success, and are still created and surrounded by a faithful crowd of fans on the Internet. These games produce nothing but text but still manage to immerse audiences in rewarding experiences. This suggests that immersion might depend on factors other than the amount of sensory stimuli presented.

The myth can also be found in the writings of Brenda Laurel. In her book *Computers as Theatre* she emphasises the importance of multiple sensory modalities:

> Tight linkage between visual, kinesthetic, and auditory modalities is the key to the sense of immersion that is created by many computer games, simulations, and virtual-reality systems. (Laurel, 1993, p. 161)

Thus, she suggests that presentation of stimuli in multiple sensory modalities is central to the feeling of immersion. Why, for instance, the visual modality is not enough she does not say, nor does she provide any empirical evidence for her statement.

4.3 Other arguments in support of the myth

I will now consider other arguments, beside those found in the literature, in defence of the myth. Perhaps the myth is reasonable after all?

It is possible to argue for the belief that "more is better" in the following way (I do not know if anyone does, but it would be a reasonable argument all the same): Because the everyday world of humans has both three-dimensional video and audio this would be the most "natural" and "real". And since it is the most "natural" and "real", it would be the most immersive because real life is immersive. Even if this argument appears convincing, it is easy to find counter examples. Consider books. Books contain nothing more than printed words which are actually something very unnatural and conventionalised. Despite this, books have during history managed to, and still do, immerse millions of readers in rewarding experiences. Another counter example is oral storytelling. By just using sound, it is easily possible to capture audiences in a state of high immersion. It is a mystery, then, why people have not abandoned books long ago if they provide such poor and dull presentation of sensory data. Perhaps story immersion does not depend on superficial features of presentation, but on something other beyond this. The "as real as possible" hypothesis is suspect because a story is *not* like real life. So, in trying to approximate real life, we are not approximating a real story situation. A prototypical story situation would be listening to a story in words only, rather that having the story happen in front of you in real life.

4.4 Why the myth?

Where has this myth come from and why has it spread? I will provide some answers here, but I want to point out that they are only speculations (and possibly myths themselves). I do not want to be accused of the same crime that I am op-

posing. These speculations are only included here in order to suggest a few possible explanations for why the myth is widespread.

Part of the answer to why the belief of "more is better" exists might be that it has migrated from the field of VR research into research of technology for storytelling. The trouble is that this migration has taken place unnoticed. Researchers of storytelling have uncritically imported terms from VR research without carefully inspecting them first. As was discussed above, the term "immersion" is often used in a technological sense in research on VR. The problem is that VR immersion is not about storytelling immersion, but a technical term referring to, for instance, information bandwidth. This view of immersion cannot be brought into the context of storytelling, where immersion refers to a mental phenomenon. This becomes clear when considering traditional media for storytelling, such as books or speech, where immersion occurs with a very small bandwidth (if that concept can even be applied here). However, one should note that even in the fields of VR and teleoperator research, there is not a consensus whether the optimal design solution is a true-to-life sensory information exposure (Draper, Kaber, & Usher, 1998).

There might also be a more culturally oriented answer to why the myth is widespread. To me this appears to be an American or Western cultural phenomenon, that "bigger is better". In a consumer culture "new" means "more", which in turn means "better". My suspicion is that especially certain groups of people feel immersive with new technology. These groups are technologically interested persons, and persons who have a positive attitude towards new technology in general—for instance, developers of new technology. Perhaps the only immersive power of new, shiny technology is that which it exercises over its amazed worshippers. Until empirical studies are conducted, this is at least a possibility.

5. Second myth: More participation, more immersion

5.1 The myth

The second widespread belief about immersion concerns participation. It is the myth that if the audience is given the possibility to participate in a story, they will experience greater immersion than if they are not allowed to do so.

What is meant by "participation"? There are several kinds of participation. One example is that the audience is able to change the outcome of the story. Another example is that the audience can change the point of view—from what perspective the story is told. Let us just say that the myth states that the more possibilities for participation, the more immersive the experience.

A common term used in this context is "interactivity". There are "interactive computing", "interactive stories", and even "interactive games". It is a problematic term since it appears to mean nothing when it stands on its own. For in-

stance, it would be difficult to understand what is meant by the statement: "All our company's products are interactive." The term should be used as an *adjective* together with something that one wants to describe as "interactive", for instance, "interactive story". Unfortunately, its meaning is usually unclear anyway. In the following, I will try to clarify it in each context it is used.

Let us see how the "participation is better" myth surfaces in the research literature.

5.2 The myth in the literature

While discussing the future of narrative media, Peter Gärdenfors states that: "A computer representation of a story and the user's possibility to interact with what is happening offers a much stronger feeling of presence in the story than has been possible in earlier narrative media" (Gärdenfors, 1998, my translation). This is a clear statement about immersion, but is it true? No basis is given for the statement; it rests purely on intuition. One could just as easily imagine things to be the other way around. The possibility to interact might disturb the feeling of presence. Not having to participate might lead to a strong feeling of presence, such as when we are captured by a good novel.

Murray has the underlying belief that the power of immersion has not been utilised to its full potential during human history. She states that "The age-old desire to live out a fantasy aroused by a fictional world has been intensified by a participatory, immersive medium that promises to satisfy it more completely than has ever before been possible" (Murray, 1997, p. 98). With this statement, Murray expresses an optimistic view of the future, but she does not give any support to the fact that participation actually does create a more immersive experience.

The role of participation is stated clearly by Marie-Laure Ryan, one of the leading figures in narrative and new media. She states that "[t]he more interactive a virtual world, the more immersive the experience" (Ryan, 1994, paragraph 37). No evidence is presented in support of this. On the relation between immersion and interactivity, Ryan believes that they do not counteract each other: "There is nothing intrinsically incompatible between immersion and interactivity" (Ryan, 1994, paragraph 37). This is of course a logical possibility. But for something to be probable, one has to give it more support than just showing that it is logically possible. It is still as likely that interactivity is unrelated to or even hinders immersion when it comes to a real storytelling situation. Ryan provides something that looks like an argument. She supports her statements that interactivity leads to immersion with a parallel to real life: "[I]n real life also, the greater our freedom to act, the deeper our bond to the environment" (Ryan, 1994, paragraph 37). But no support for this statement is offered, it is just stated. The statement does not appeal to scientific evidence but to our informal experience. Does this parallel even hold? Consider people with disabilities who can only move very limited parts of their bodies, perhaps only their fingers or their eyes. Do these people

have a more superficial bond to the environment than non-disabled people do? I think not. In what other real life situations is the freedom to act limited? As it is hard to imagine any, it becomes difficult to determine the resulting "depth" of the bond (in Ryan's words). The argument appears uncompelling even when it comes to arguing that a greater freedom to act leads to a deeper bond to the environment, and it is even less applicable to freedom to act *in a story*.

5.3 Other arguments in support of the myth

What other arguments are there in favour of the myth? One intuitive belief is that the feedback loop that interactivity introduces must somehow increase immersion. The objections to this are at least three. First, it is not at all clear why a feedback loop should increase immersion while *experiencing a story*, even if it does so in real life tasks. Second, even if a plausible description is given of how such a feedback loop might increase immersion, empirical evidence is still needed to make the point. No such evidence exists. Third, for every such example it is also possible to find a non-participatory example that is just as (if not more) immersive. For instance, a participatory computer adventure game that uses only text is immersive, but so is a non-participatory (traditional) novel.

The only published empirical data concerning interactivity and immersion that I know of suggest the opposite state of affairs. Lydia Plowman has made extensive studies of actual use of interactive narrative multimedia in real classroom settings. The results obtained in her studies show that interactivity interrupts the narrative flow in educational multimedia programs (Plowman, 1998).

5.4 Why the myth?

I will now speculate on where this myth has come from and why it has spread.

This myth is particularly strong among people working with new media technology, probably because this area has as its core *the computer*, which has a great potential for "interactivity" (that is, you put something into the computer and it gives a response). Culturally, the computer is a symbol of progress. Since progress is something desirable, the act of computerising is associated with making things better. Nowadays, everything should be "interactive" (there is even the neoplasm "interactive games").

The myth has also fed from VR and teleoperator research, but even there it is questionable if interactivity enhances the sense of presence. Draper, Kaber, and Usher (1998) refer to a study by Taylor and Rushton where no relationship between the degree interactivity and sense of presence was found.

6. Conclusions

The claims about immersion discussed in this paper were that

- more sensory information, and
- more participation

creates more immersive, and therefore better, experiences for the storytelling audience.

6.1 Claims are myths

The writings of some prominent researchers in the area of storytelling and new media were examined. Although these claims are widespread throughout the research literature, not a single piece of convincing evidence was found to support them. The statements and beliefs expressed were all seen to be without empirical support. The few arguments offered were shown not to hold. The survey has been selective, but it nonetheless shows that there are widespread myths about immersion in new media for storytelling.

The proponents of the myths provide neither a mechanism that explains why immersion should increase nor empirical evidence for increased immersion. For this reason, I consider the case for the myths to be weak. I encourage more research in the area. It could very well be the case that when a model of immersion is tested, the claims of the myths turn out to be true. Regardless, there is still at this time no evidence in favour of the myths.

6.2 Origin of myths

I suggest that one source of the myths are when concepts from one domain are incorrectly applied to another domain. A medium that is defined as "immersive" only by virtue of its technological features does not guarantee that it will produce an immersive storytelling experience.

Another source of these myths might be cultural. The design of new technology is a process associated with hopes and dreams. It is a technology-driven world where "new" is equal to "better". A new computer is better than any old one. Higher resolution, more colours, and faster refresh rates rule the game. Certainly higher fidelity graphics and sound and increased interactivity must be *better*, even for storytelling media? Well, we do not know.

6.3 The value of new media

The conclusion suggested by the present discussion is that neither old media nor new media are superior to the other—in terms of immersion—but rather that they are *different*. When discussing traditional media, it would be strange to generally conclude that, for instance, cinema is superior to books. Along the same line of reasoning, one could say that interactive and technologically complex media are different sorts of beasts from traditional media. But there are no grounds for saying that one is better—more immersive—than the other.

However, one should note that the present paper does not argue against the position that new media for storytelling are better than old media. New storytelling

media might be better than old storytelling media for a number of reasons. New media might be more flexible, cheaper, and be better at raising the public's interest. But the conclusion here is that there are no grounds for arguing that new media are better because they create a greater sense of immersion.

6.4 So what?

What are the consequences if the myths are false? Does it matter?

There is a risk that designers of new media for storytelling focus on the wrong things. There is an over-emphasising on developing ever more advanced technology to solve the problem of how to create immersive experiences. The answer might be simpler and lie elsewhere.

Both researchers and developers should benefit from moving the focus from ever more advanced technology. Whether you are a designer with dreams of creating that perfectly immersive, rewarding experience or a scientist studying what people do when using new media, you do not want to base your work on myths. Instead, we should find out what really is behind interesting, rewarding, immersive experiences.

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