Merging Reality and Virtuality with Microsoft HoloLens

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Table of contents

Abstract

In this thesis, I will investigate the discursive framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality, and its relation with the HoloLens' technological imaginary. I mean to answer the following research question using an adaptation of Fairclough's 'three-dimensional framework' for doing critical discourse analysis: "How is the HoloLens discursively framed as a technology that is able to deliver a symbiotic mergence between reality and virtuality?" This thesis includes a threefold analysis. First, on the level of 'text' I will analyse how Microsoft discursively frames the HoloLens on their official HoloLens webpage as a technology that is able to symbiotically merge reality and virtuality. Second, on the level of 'discursive practice' I will analyse how technology review websites subsequently interpret Microsoft's specific discursive framing of the HoloLens, and explain how both Microsoft and technology review websites together provide recourses that help to feed and frame the HoloLens' technological imaginary. And third, on the level of 'social practice', I will analyse how in a dialectical sense, the HoloLens' technological imaginary helps to constitute the discursive framing of the HoloLens, and how the HoloLens' technological imaginary is in turn partially constituted by the discursive framing of the HoloLens.

Introduction

> When you think about how you experience technology today, it's like behind this glass screen, and you're kind of stuck. It feels cold. We've unlocked the screen. […] Really what we're trying to do is break down the walls between technology and people. […] This is going to truly blend your digital life with your physical life, and it is so thrilling. This is truly about seeing the world in a whole different way (Microsoft 2015).

These promising statements allude to a technology that is supposed to facilitate a symbiotic merging between reality and virtuality. They have been transcribed from one of Microsoft's promotional videos for their recently announced technology, the "HoloLens", which can be found on Microsoft's official HoloLens webpage (Microsoft 2015). This technology was first introduced during Microsoft's "Windows 10 Event", which was held in January 2015. Alex Kipman, Microsoft executive and the inventor of the HoloLens (and Microsoft's Kinect before that) unveiled this technology during this event, dubbing it: "the first fully untethered holographic computer" (Kipman 2015 in Tam and Statt 2015). To know what exactly constitutes an "untethered holographic computer", and more importantly, how it is supposed to merge our physical life with our digital life, let us take a look at several other statements, also extracted from Microsoft's official HoloLens webpage. These statements might provide a more substantiated conception of this newly introduced 'holographic computer', and how it relates to a symbiotic merging between reality and virtuality:

> Microsoft HoloLens brings high-definition holograms to life in your world, where they integrate with your physical places, spaces, and things […] With the ability to design and shape holograms, you'll have a new medium to express your creativity, a more efficient way to teach and learn, and a more effective way to visualize your work and share ideas […] Microsoft HoloLens goes beyond augmented reality and virtual reality by enabling you to interact with three-dimensional holograms blended with your real world […] High-definition holograms integrated with your real world will unlock all-new ways to create, communicate, work, and play […] With Microsoft HoloLens, you can interact with holograms and everyday objects together (Microsoft 2015).

The previous statements made by Microsoft can be seen as being part of a particular 'discourse' that frames the HoloLens as being able to deliver a symbiotic merging between reality and virtuality. However, this process of framing is definitely not as straightforward as it might seem, as it showcases the power of discourse to actively construct meaning, in the case described above, the meaning associated with the ways in which people collectively think about the HoloLens as a technology that is able to symbiotically merge reality and virtuality, which is in turn reflected by the HoloLens' 'technological imaginary' (Lister et al. 2009). When we investigate the 'technological imaginary' of any technology, we draw attention to the way that a particular technology is socio-culturally framed as being able to deliver a potential realm of completeness, and

has hooked into it, or has projected onto it, a culture's wider social and psychological desires and fears (Ibid. 2009, 70).

When discursively framing the HoloLens, Microsoft draws upon discursive structures, i.e. systems of knowledge and belief, in the case described above, systems of knowledge and belief that concern the merging between reality and virtuality. These specific systems of knowledge and belief have a longer tradition that relate strongly to the conceptions of 'augmented reality' and 'virtual reality' (Milgram and Kishino 1994, Azuma 1997). While 'virtual reality' technologies totally immerse its users by placing them in completely virtual words, 'augmented reality' technologies are meant to 'augment' users physical world with virtual objects (hence the name). Especially the conception of augmented reality is interesting for Microsoft as a conception from which it can discursively draw when framing the HoloLens, since this conception deals with both the virtual and the real. Microsoft, as will be illustrated in this thesis' analysis chapter, means to move beyond this conception of 'augmentation', by framing the HoloLens as a technology that is able to provide a symbiotic mergence between the real and the virtual. Discourses in general are always based on established discursive structures. The general view is that the meanings people create through discourse are never objective reflections of a pre-existing reality, but contribute to the (discursive) construction of reality (Jorgensen and Philips 2002, 9). Discourse, therefore, can be seen as a practice, "not just of representing the world, but of signifying the world, constituting and constructing the world in meaning" (Fairclough 1992, 64).

It is important to realize that the 'meaning' produced by a discourse is never static, as it can change when other discourses come into play. We should therefore not think of Microsoft's discourse and its constitutive effects on the ways that people collectively think about the HoloLens as a top-down processes to which people outside the discourse are immune. We can witness one particular discourse that, together with Microsoft, plays an important role in the discursive framing of the HoloLens: technology review websites. Technology review websites function as important agents in discursive framing of new technologies, since they are often times the first to react to the initial framing of a new technology, by technology corporations such as Microsoft. Technology review websites are also the first to provide 'hands-on reviews' based on their experience with early prototypes of technologies provided to them by technology corporations at technology related events such as the Microsoft Windows 10 Event.

Various technology review websites, for example Wired and The Verge, have produced an abundance of texts that to varying degrees reinforce or undermine Microsoft's discursive framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality. This 'struggle' between discourses is interesting because it raises questions concerning the way that Microsoft and technology review websites together, with their produced discourses, provide resources that help feed and frame the HoloLens' technological imaginary. By focussing on such matters, I position myself in the academic debate concerning the discursive construction of new media, which in turn feeds, frames, and provides resources for the technological imaginary (Marvin 1988, Flichy 1999). Sociologist Patrice Flichy for example, in "The construction of new digital media" (1999), has illustrated how the technological

imaginary played an active role in the socio-technological construction of various new media technologies, such as digital television and the Internet. With my thesis, I would like to focus on how discourse, on a very concrete level, provides recourses and thereby helps to feed and frame the technological imaginary. While Flichy focuses on how the technological imaginary influences the socio-technological construction of new media technologies, I will focus on how the discursive framing of a new media technology, in this case the HoloLens, in turn helps to feed and frame the technological imaginary. In this sense, I will put more emphasis on the precise role of discourse in the socio-technological construction of new media-technologies. Besides my focus on the precise role of discourse in the socio-technological construction of new media-technologies, I mean to contribute to the general academic understanding of the HoloLens as a specific new media-technology from a humanities perspective. From this perspective, much has already been written in the past on specific 'augmented reality' and 'virtual reality' devices, for example by new media scholar Lev Manovic (2001) and communication scholar Howard Rheingold (1991). Precisely with my argument that the novelty associated with the HoloLens is its supposed capability to symbiotically merge reality and virtuality I hope to provide valuable knowledge for various academics that want to learn more about the HoloLens.

Let me now formulate a primary research question and a secondary sub question. The primary research question is: "How is the HoloLens discursively framed as a technology that is able to deliver a symbiotic mergence between reality and virtuality?" The secondary sub question focuses on the role of the hnological imaginary in the discursive framing of the HoloLens: "How does the discursive framing of the HoloLens, by both Microsoft and technology review websites, helps to feed and frame the HoloLens' technological imaginary?"

In order to be able to answer these questions, I turned towards a particular subset of 'discourse analysis' called 'critical discourse analysis'. Loosely explained, critical discourse analysis is a methodology, i.e. a combination of theories and methods, which allows relations between discourse and the social to be researched (Jorgensen and Philips 2002, 60). The label of critical discourse analysis is widely used in two different ways that are important to be distinguished. First, this label is used to describe the specific methodological approach developed by Fairclough (1989, 1992, 1995). The other way that this label is used is to describe a broader movement within discourse analysis in general, consisting of multiple 'critical' approaches (Jorgensen and Philips 2002, 60). This thesis adheres to the critical discourse analysis methodology as described by Fairclough, on the basis that his approach pays particular attention to the multiple 'dimensions' of discourse, which Fairclough tackles in his 'three-dimensional framework'. This layered attention to the different dimensions of discourse fits my goal to focus on discourse from the level of text (Microsoft's official HoloLens webpage), from the level of interpretation of this text (by technology review websites), as well as from the level of the technological imaginary.

This thesis will analyse the discursive framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality in accordance with the following three 'dimensions' that partly correspond with Fairclough's 'three-dimensional framework'. Fairclough views discourse in accordance with the following three dimensions: he sees a discourse as being, all

at once, a "piece of text", "an instance of discursive practice", and "an instance of social practice" (Fairclough 1992, 4). Shortly explained (a more elaborate explanation will follow in the methodological chapter), the text dimension concerns language oriented analysis of concrete texts, the discursive practice dimension concerns processes of text production and interpretation, and the social practice dimension concerns the social circumstances that shape the nature of the discourse (Ibid. 1992, 4). Fairclough dubs this multidimensional understanding of discourse as "social theory of discourse" (Ibid. 1992, 5). I will partly adopt these three dimensions in the following way in the analysis part of this thesis. First, on the level of 'texts', I will analyse formal linguistic aspects of Microsoft's official HoloLens webpage (Microsoft 2015), paying attention to the specific ways in which Microsoft discursively frames the HoloLens as a technology that is able to symbiotically merge reality and virtuality. Second, on the level of 'discursive practice', I will analyse how technology review websites interpret Microsoft's specific discursive framing of the HoloLens, and discuss how the interpretative discourse of technology review websites enters into a struggle with Microsoft's specific framing, and how they together in turn provide recourses that help to feed and frame the HoloLens' technological imaginary. Third, on the level of 'social practice', I will analyse how in a dialectical sense, the HoloLens' technological imaginary helps to constitute the discursive framing of the HoloLens by both Microsoft and technology review websites, and how the HoloLens' technological imaginary is in turn partially constituted by this discursive framing.

This thesis will be structured as follows: in a theoretical-framework chapter, I will elaborate on the specific system of knowledge and belief from which Microsoft draws discursively when framing the HoloLens as a technology that is able to symbiotically merge reality and virtuality. I will do this by focusing on various texts (e.g. Robins 1996, Manovich 2001, Azuma 1997 and Milgram and Kishino 1994), which are all part of various discourses that have a stake in the construction of a system of knowledge and belief that dictates thinking about the mergence between reality and virtuality. In addition, in accordance with Flichy (1999), I will discuss how technological imaginaries take part in the socio-technological construction of new media-technologies. Next, in a methodological chapter, I will discuss how I will partly adopt Fairclough's 'three-dimensional framework' (1992), and explain how I will conceptually link all three dimensions to this thesis' research question. After the methodological chapter comes the analysis part of this thesis, which consists of three chapters in accordance with the three dimensions of Fairclough's 'three-dimensional framework'. Finally, in a concluding and reflective chapter, I will conclude and reflect upon the analysis, and in turn discuss methodological considerations as well as possible ideas for future research.

Thinking About Reality and Virtuality

From the discursive examples in the introduction we have learned that Microsoft means to discursively frame the HoloLens as a technology that symbiotically merges reality and virtuality. The HoloLens will supposedly deliver us such an experience by allowing users to witness their world filled by holograms that act and seem "life-like" (Microsoft 2015). In this sense, the holographic virtual will

supposedly blend with the physical real in a manner of symbiosis. In this theoretical framework chapter I will elaborate on the systems of knowledge and belief concerning the mergence between reality and virtuality, from which Microsoft draws when discursively framing the HoloLens. I will first provide theoretical background on established connotations of the virtual as framed in academic new media discourses, and argue how these connotations might change with the HoloLens. I will then delve deeper into the systems of knowledge and belief associated with the mergence between reality and virtuality, and finally, at the end of this theoretical framework chapter, I mean to provide insights into the workings of the technological imaginary, by discussing, in accordance with Flichy (1999), how imaginaries influence the socio-technological construction of new media-technologies.

Connotations of the 'Virtual': Then and Now

Especially during the nineties, academic discourses that were concerned with new media were regularly elaborating on the 'virtual' and how it related to the 'real', predominantly in the context of virtual reality and augmented reality technologies. A salient example of a text that was part of this discourse from the nineties as described above is communication scholar Kevin Robins' *Into the Image* (1996). Robins argues about technologies capable of creating virtual spaces and objects (more specifically virtual reality and "new image and vision technologies"), that they are compelling because they provide "a certain security and protections against the frightful world", and that they "provide the means to distance and detach ourselves from what is feat-provoking in the world and in ourselves" (Ibid. 1996, 12). But what about the virtual was so attractive? Robins points us towards the force of the "techno-utopian vision", about which he claims: "What is invoked is an alternative reality of an 'intangible nature' – a reality that we cannot touch, and which, by the same token, cannot touch us" (Ibid. 1996, 14). Robins argues that these "alternative realities" are expressions of the "desire to escape the deficiencies and disorder of the 'physical stuff'" (Ibid. 1996, 14). What Robins emphasizes here is the "logic of transcendence" and the potential of technologies capable of creating virtual objects and spaces to 'realise' a "transcendental order" (Ibid. 1996, 14). However, due to the HoloLens' promise to present us with virtual objects that act and appear like ordinary physical stuff, 'life-like' objects, I argue that we must nuance this claim. Due to Microsoft's framing of the HoloLens, connotations of the virtual are arguably shifting from the 'intangible' and 'transcendental' to the 'real' and 'tangible'. With the HoloLens, the attraction towards the virtual might perhaps lie, in a paradoxical sense, in the fact that the virtual is precisely not 'virtual', but 'real'. I will return to the ontological distinction between the 'virtual' and the 'real' later on in this chapter.

Even after the nineties, examples from texts belonging to academic new media discourses can be found, which reinforce the argument that connotations of the 'virtual' and how they relate to the 'real' are arguably shifting from 'intangible' to 'real'. Consider for example how new media scholar Lev Manovich, in *The Language of New Media* (2001) argues about virtual reality technologies, that they "allow us to travel through non-existent three-dimensional spaces" (Ibis. 2001, 99). Here, the word "non-existent" ties in with connotations of the

virtual as something 'transcendental', something 'out there' that cannot be touched. With the HoloLens on the other hand, the virtual is supposedly right in front of us, precisely 'inside' our existing physical space, instead of 'out there' in "non-existing three-dimensional spaces". And even after the initial "retreat of 'VR'", which occurred due to disappointing technological failures, there remained a strong attraction towards the virtual in new media discourses, since virtual 'worlds', 'spaces', and 'environments' still remained ubiquitous in visual culture (Lister et al. 2009, 109). Think for example of the proliferation of video games, (IMAX) cinema, and mobile media over the past decennia.

Merging the Virtual and the Real

Microsoft's framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality has arguably always been a substantial part of the technological imaginaries of older technologies that were classified as 'augmented' or 'mixed' reality technologies. In both popular and academic discourses during the nineties, 'augmented reality' devices were predominantly explained as allowing users to witness the 'real world', which is either superimposed/augmented or composited/merged with 'virtual objects' (Azuma 1997). However, such explanations posit a certain ambiguity to the relationship between the virtual and the real in the context of augmented reality technologies, since these technologies can 'superimpose' reality with virtual objects, but also 'composite' reality with virtuality. For this reason, the term 'mixed reality' was introduced, signifying "technologies that involve the merging of real and virtual worlds somewhere along the "virtuality continuum" which connects completely real environments to completely virtual ones" (Milgram and Kishino 1994). Adhering to this definition of mixed reality, various augmented reality devices could be placed at specific points down the line of the 'virtuality continuum' (see Image 1 below).

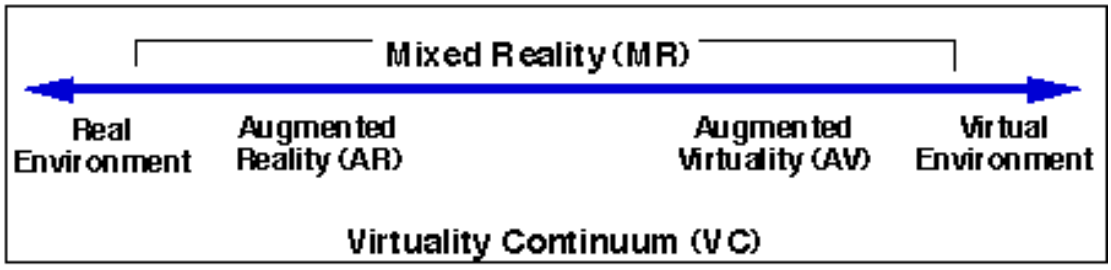


Image 1: Virtuality Continuum (VC) (Milgram and Kishino 1994)

In the academic discourse from the nineties that covered augmented and mixed reality technologies, several claims were made that fortify the argument I made above, that the merging between reality and virtuality is not merely a significant part of the HoloLens' technological imaginary, but has played a part in the technological imaginaries of augmented reality technology in the past. Computer scientist Ronald Azuma, in "A Survey of Augmented Reality" (1997), claims about augmented reality: "Ideally, it would appear to the user that the virtual and real objects coexisted in the same space, similar to the effects achieved in the film "Who Framed Roger Rabbit?"" (Ibid. 1997, 2). At the end of his survey, Azuma also claims about the future of augmented reality: "After the basic problems with

AR are solved, the ultimate goal will be to generate virtual objects that are so realistic that they are virtually indistinguishable from the real environment" (Ibid. 1997, 35). Now, almost twenty years later, Microsoft with its discursive framing of the HoloLens, supposes we have arrived at this ultimate goal. In another text called "Augmented reality: linking real and virtual worlds: a new paradigm for interacting with computers" (Mackay 1998), human-computer-interaction researcher Wendy Mackay claims about the broader objective of augmented reality and its future: "The most innovative aspect of augmented reality is not the technology: it is the objective. Instead of replacing physical objects with a computer, we create systems that allow people to interact with the real world in natural ways and at the same time, benefit from enhanced capabilities from the computer. The future we envision is not a strange world in which we are immersed in "virtual reality". Instead, we see our familiar world, enhanced in numerous, often invisible ways" (Ibid. 1998, 20). This claim also ties in with what I discussed above concerning the connotations of the virtual, which, with technologies such as the HoloLens, become more and more 'natural' instead of immersive. As a final example, consider what computer scientist Desney Tan argues in "The Best of Two Worlds: Merging Virtual and Real for Face to Face Collaboration" (Tan 2001). Tan explains the merging of the physical and virtual worlds in the context of mixed reality technologies as a "symbiosis, with desirable properties from each accentuated and complementing each other, rather than the enhancement of one with the other" (Ibid. 2001, 1).

Above I have argued that the thinking about the mergence between reality and virtuality is not exclusive to the HoloLens' technological imaginary, considering that it was already present in the imaginaries of older technologies. But how should we understand the relationship between these two spheres in the first place? From an ontological standpoint, it is arguable that the virtual is not the opposite of the real at all, but instead a kind of reality itself (Lister et al. 2009, 124). Virtualities, in the literal sense of the word, should not be seen as 'illusionary', as the opposite of reality, but more as 'almost' real. Consider for example how people often say that they are "virtually ready" with something, often times meaning that they are 'as good as' ready. In this sense, the virtual is not an illusion and there not exactly opposed to the 'real'. Rather, it could be argued that the virtual is different from the 'actual', but still 'real' in different ways (Ibid. 2009, 125). When we look at today's (digital) culture, virtualities have become increasingly ubiquitous over the past few decennia. Consider for example ATM machines through which people access their 'virtual' money. Examples such as these show that the virtual and the real are increasingly overlapping in our daily lives (Ibid. 2009, 125). The problem is that the 'virtual' where ATM machines connect us to (i.e. the world of virtual banking) is not concretely present to us. It is the place where people's real (but virtual) is (Ibid. 2009, 125). Here it stays 'virtual' until people exchange it for printed pieces of paper. Virtualities such as people's virtual money become 'real' when they become physically graspable. However, with the holograms produced by the HoloLens, perhaps we do not have to view the distinction between real and virtual in such a dichotomous manner. Holograms, while still not 'actually' physical, have more in common with most actual physical objects than most virtualities, such as virtual money from the ATM example above. The holograms produced by the HoloLens (as will be illustrated from the many examples in the

first analysis chapter) have many of the same properties as the many physical objects that people are dealing with on a daily basis. It would therefore be unjust to merely think of virtualities as 'out there', and impractical in another world. Tying this back to where I ended when discussing connotations of the virtual at the beginning of this chapter, it could therefore be argued that the holograms produced by the HoloLens are just as 'real' as they are 'virtual'.

The Socio-Technological Construction of New Media-Technologies

In this chapter, I have discussed the longer tradition associated with thinking about reality and virtuality, from which Microsoft has discursively drawn when framing the HoloLens. I have also illustrated that the symbiotic merging between reality and virtuality is not exclusive to the HoloLens' technological imaginary, but has already been a part of the technological imaginary of augmented reality technologies in the past. In addition, I have elaborated on ontological differences between the real and the virtual. Now I will explain how the technological imaginary can help to socio-technologically construct new media technologies, and for that we will turn towards Flichy's "The construction of new digital media" (1999). At the start of this article Flichy makes several apt claims that connect well to the specific way that Microsoft discursively frames the HoloLens. Firstly, the claim that new media have often times been announced as being able to "revolutionize our modes of acquiring knowledge and, more broadly, our ways of living and working" (Ibid. 1999, 33). The HoloLens being the catalyst that will supposedly symbiotically merge our physical and digital life and thereby "transform the ways you communicate, create, collaborate, and explore" (Microsoft 2015) can be seen a prime example of this kind of revolutionizing framing of new technologies. And secondly, the claim that "innovations are celebrated […] even before being launched" (Flichy 1999, 33), which is evidently the case with the HoloLens.

Using debates concerning the advent of digital television, Flichy argues how technological imaginaries play a substantial role in the way that new technology turn out: "the forms chosen for new media are not based on the technology; they correspond to the designers' representation of uses, and to the strategies they perceive to be most effective for marketing the product. In other words, these choices are social rather than technical" (Ibid. 1999, 34). Let us consider how Flichy distinguishes between three opposing conceptions of television: firstly, European engineers working on 'HDTV', who had a "distinctly cinematographic approach to television", secondly, a conception of digital television championed by Nicolas Negroponte, a 'guru' from MIT, who conceptions digital television being totally personalised; "a gigantic virtual video library", and thirdly, a conception from the first operators of digital television, which "in the tradition of developing cable and satellite", wanted television to have "an increased number of channels" (Ibid. 1999, 34). What is key to take away from these different conceptions of digital television is that, although they differ greatly from each other, "they nevertheless contribute towards an idea of digital television that takes shape in the 'collective imagination', (i.e. which is part of the technological imaginary) and participates in the socio-technological construction of a new medium" (Ibid. 1999, 34). In other words, these conceptions shaped collectively shared technological imaginaries, which in turn

helped to determine the actual outcome of digital television. Flichy leaves somewhat implicit, however, what the precise role of discourse is in the construction of these conceptions. Flichy merely denominates the actors in the networks of spokespersons associated with these conceptions, and does not explain how these actors have precisely discursively framed these very conceptions. Indeed, I want to argue that discourse plays a substantial powerful role, precisely in the construction of conceptions that in turn feed and frame the technological imaginary of a new technology and ultimately help to determine how this technology comes into existence. I therefore think that it is important to pay specific attention to the constitutive role of discourse, both for the technological imaginary, and the subsequent socio-technological construction of new media technologies.

Tackling the Three Dimensions of Discourse

In this methodological chapter, I will first provide some theoretical background information concerning critical discourse analysis in general and Fairclough's approach specifically, and I will then explain in detail how I will adapt Fairclough's 'three-dimensional framework' for doing critical discourse analysis. Flichy's focus on the role of the technological imaginary in the socio-technological construction of new media technology illustrates that various social processes can determine the outcome of new media-technologies. The notion that social processes determine the outcome of these technologies stands opposite the philosophical heading of 'technological determinism' (Lister et al. 2009, 78), which views the advent of new media-technologies as something that is purely determined by technological factors. Flichy, in this sense, has a lot in common with critical discourse analysists including Fairclough, who can be placed under the philosophical heading of 'social constructionism'. Social constructionists understand our world and aspects of it as created and maintained by social processes (Jorgensen and Phillips 2002, 5). This ties in with the notion that technological imaginaries are framed by social processes (i.e. partially by discourse), and in turn Flichy's argument that they play an important role in the socio-technological construction of new media-technologies. Jorgensen and Phillips therefore (2002) state that critical discourse analysis should not be regarded as a straightforward method for data analysis. Instead, it should be regarded as a "theoretical and methodological whole" containing basic philosophical premises based on social constructionism, which concern the precise role of discourse in the social construction of the world (Ibid. 2002, 4).

Fairclough criticizes ordinary linguistic approaches on the basis that they often concentrate exclusively on textual analysis and showcase a superficial understanding of the relationship between texts and societal and cultural processes (Ibid. 2002, 66). Instead, Fairclough's critical discourse analysis can be seen as an interdisciplinary approach, one that combines textual analysis and social analysis. Fairclough's understanding of discourse, and the specific approach to critical discourse analysis that he proposes, are therefore dictated by his objective to "bring together linguistically-oriented discourse analysis and social and political thought relevant to discourse and language" (Ibid. 1992, 62). Fairclough adheres to the meaning of the word discourse as it has been used in social theory, predominantly the work of Michel Foucault, in which it refers to

the "different ways of structuring areas of knowledge and social practice" (Fairclough 1992, 3). In this sense of the word, discourse can be manifested in various ways using language and various other symbolic forms such as images (Ibid. 1992, 3). Central to this understanding of discourse lies the claim that discourses "not just reflect or represent", but can also "construct or constitute" (Ibid. 1992, 3). Fairclough therefore proposes to see language use as a form of social practice instead of an individual activity, which has two implications that are central to his 'social theory of discourse'. First seeing language as a form of social practice implies that discourse is "a mode of action", "a form in which people may act upon the world", as well as "a mode of representation", "a view of language use which has been made familiar […] by linguistic philosophy (Ibid. 1992, 63). Secondly, seeing language use as a form of social practice implies that there is a dialectical relationship between discourse and social structure in that discourse, on the one hand, is "shaped and constrained" by social structure, and on the other hand, that discourse "contributes to the constitution of […] social structure", which leads to the view of discourse as a practice "not just of representing the world, but of signifying the world, constituting and constructing the world in meaning (Ibid. 1992, 64).

There are multiple constructive effects of discourse, namely the construction of "social identities" and "subject positions", the construction of social relationships, as well as the construction of systems of knowledge and belief (Ibid. 1992, 64). The constructive effect linked to the construction of systems of knowledge and belief, which Fairclough dubs the "'ideational' function of language" (Ibid. 1992, 64), is the constructive effect of discourse that this research will focus on, specifically the system of knowledge and belief associated with the HoloLens' supposed capability to symbiotically merge reality and virtuality, which subsequently influences how people collectively think about the HoloLens, which is in turn reflected by the HoloLens' technological imaginary.

Discourse, as a social practice, can have varying orientations, for example economical or cultural. However, it is discourse as 'ideological' practice that especially concerns Fairclough. Discourse as an ideological practice "constitutes, naturalizes, sustains, and changes significations of the world from diverse positions in power relations" (Ibid. 1992, 67). Focusing on power is part of what makes Fairclough's approach 'political'. Fairclough's 'political' approach shows how discourse is "shaped by relations of power and ideologies, and the constructive effects discourse has upon […] systems of knowledge and belief" (Ibid. 1992, 12). While I will not use Fairclough's methodology in the manner by focusing on how discourse is specifically shaped by power structures, I will however illustrate how discourse is both shaped by and helps to shape the technological imaginary, which does have certain "constructive effects", as it plays a role in the socio-technological construction of new media-technologies.

Besides discourse as social practice, there are two other dimensions according to Fairclough through which discourse needs to be understood. We arrive at the next dimension by answering the question what makes discursive practices particularly 'discursive', which is evidently language. As Fairclough rightfully states, "discursive practice is manifested in linguistic form, in the form of what I shall refer to as 'texts'" (Ibid. 1992, 71). However, this dimension is mediated by another dimension, one that understands discourse as a

"specifically discursive practice" (Ibid. 1992, 71). Discursive practice is a particular form of social practice, in the sense that the social practice may be constituted by the discursive practice, while the social practice may also involve a particular mix of discursive and non-discursive practices (Ibid. 1992, 71). When analyzing discourse as a form of discursive practice, we focus on "processes of text production, distribution and consumption" (i.e. interpretation) (Ibid. 1992, 71).

The way Fairclough visually represented this three-dimensional conceptualization of discourse can be seen in Figure 2 below:

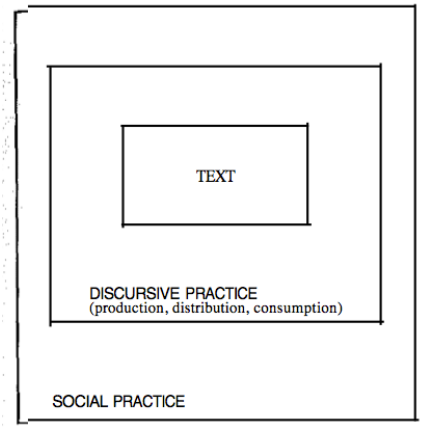


Figure 2: Three-dimensional conceptualization of discourse (Fairclough 1992)

According to Fairclough, "It is an attempt to bring together three analytical traditions, each of which is indispensable for discourse analysis. These are the tradition of close textual and linguistic analysis […], the macrosociological tradition of analyzing social practice in relation to social structures, and the interpretivist or microsociological tradition of seeing social practice as something which people actively produce and make sense of on the basis of shared commonsense procedures" (Ibid. 1992, 72). In the paragraphs below, I will explain how I will adapt Fairclough's three dimensions for the purpose of answering this thesis' specific research question.

The text that will be investigated is Microsoft's official HoloLens webpage. This webpage consists of a rich combination of text, combined with images and several videos, which together provide an elaborate description of the HoloLens and all its features and capabilities, predominantly its ability to provide a symbiotic merging between reality and virtuality. I will focusing on two of Fairclough's "main headings" of "text analysis" when textually analyzing how, on Microsoft's official HoloLens webpage, the HoloLens is discursively framed as a technology that is able to symbiotically merge reality and virtuality. These are 'vocabulary' and 'grammar' (Fairclough 1992, 75). When focusing on vocabulary, I will analyze individual words and their ideational significance for the framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality, such as Microsoft's continual usage of the "come to life" metaphor (Microsoft 2015). When focusing on grammar, I will analyze 'clauses', which consist of groups of words or phrases, such as: "When you change the way you see the world, you can change the world you see" (Microsoft 2015).

As has been mentioned before, discursive practices involve various processes of text production, distribution, and interpretation. These processes vary greatly within each discourse due to differing social contexts (Ibid. 1992,

78). In the second chapter of the analysis part of this thesis, I will focus on the discursive practice of interpretation, more specifically how technology review websites interpret Microsoft's discursive framing of the HoloLens. I mean to explain how technology review websites, in their texts covering the HoloLens, interpret Microsoft's specific framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality, and how they in turn, together with Microsoft, provide recourses that help to feed and frame the HoloLens' technological imaginary. I will conduct a small study that departs from a linguistic starting point in a corpus of texts in which technology review websites cover the HoloLens. I will analyse the extent that these technology review websites, in their texts covering the HoloLens, use a vocabulary and grammar that is similar to Microsoft's when framing the HoloLens. I will do this by searching for, and subsequently highlighting, two things in the texts in which technology websites cover the HoloLens: the textual segments (i.e. individual words and clauses) that concern the HoloLens supposed ability to symbiotically merge reality and virtuality, and the segments in which these texts classify the HoloLens as a specific technology (i.e. augmented reality, virtual reality, or holographic related technology). I will place these highlighted segments as data in two respective tables that can be found in the "attachments" chapter at the end of this thesis (i.e. one for each of Microsoft's two big events upon which these texts have reacted). I will subsequently colour label the textual segments that comply with Microsoft's specific framing of the HoloLens. I will subsequently discuss the collected data and subsequently use examples from the two respective tables. Thus, with this small empirical study, I mean to make insightful how technology review websites interpret Microsoft's specific framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality, and subsequently explain how they, together with Microsoft, provide recourses that help to feed and frame the HoloLens' technological imaginary.

When analysing the third dimension of social practice, I mean to discuss how the HoloLens' technological imaginary, in a dialectical sense, constitutes the discursive framing of the HoloLens by both Microsoft and technology review websites, and in turn discuss how the HoloLens' technological imaginary is partially constituted by this same discursive framing. As has been stated before, discourses are able to partially constitute various social practices and at the same time are also constituted by these same social practices. Thus, in this last part of the analysis, I will use a heuristic lens, Fairclough's theories in order to explain this dialectical relationship.

Discourse as Text

In this first chapter of the analysis part of this thesis, I will linguistically analyse various parts of Microsoft's official HoloLens webpage, in order to investigate how Microsoft uses discourse in order to frame the HoloLens as a technology that is able to symbiotically merge reality and virtuality. Microsoft's official HoloLens website went live shortly after Microsoft's Windows 10 Event which was held in January 2015. At that time the site merely had two pages. The first page was a promotional page consisting out of an audio-visual blend of images and links to video's including segments of text that served to promote the HoloLens' features and capabilities. The other page was a "Frequently Asked

Questions" page, which included answers to questions such as "How is this different from existing AR and VR technologies?" (Microsoft 2015). After Microsoft's Build Developer Conference, which was held from April 29 until the first of May 2015, the site got a major boost in content, and at this time of writing, Microsoft's official HoloLens webpage still remains in that phase. The current site consists out of the following six pages:

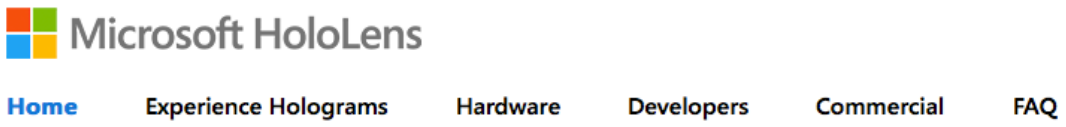
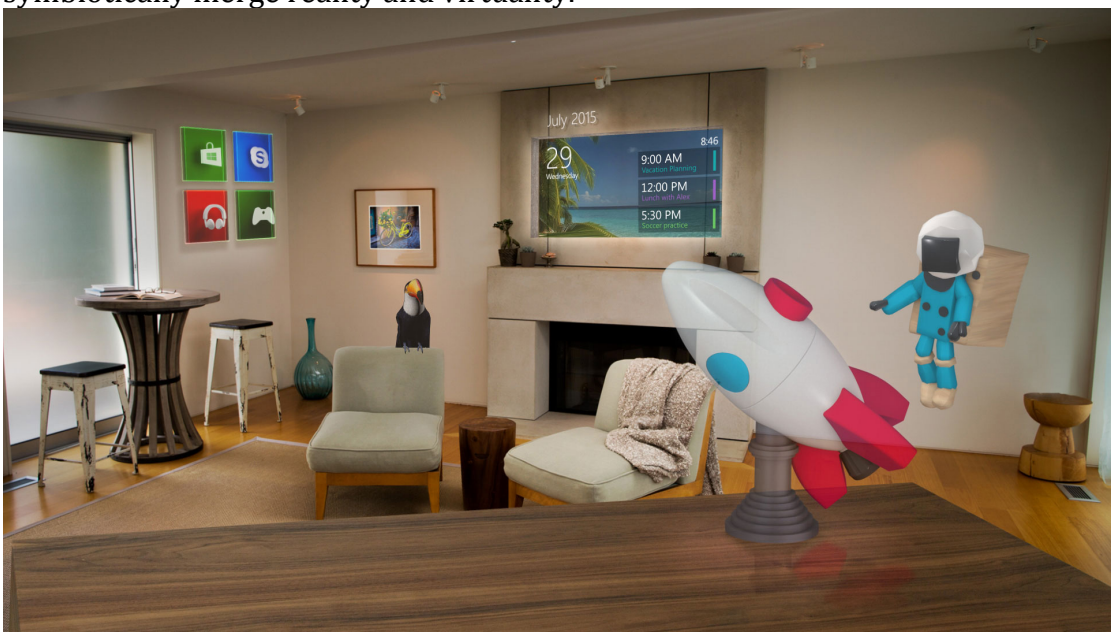


Figure 3: Microsoft HoloLens web links (Figure 3 until Figure 12 were accessed on June 26 2015)

I will highlight various discursive aspects (i.e. vocabulary and grammar) from these six links seen above. Due to the sheer size of this website, I will not be able to highlight and discuss every individual word, clause, or image on this entire site. Instead, I will first discuss the most salient aspects from the "Home" ,"Experience Holograms", and "FAQ" page, i.e. those discursive aspects that contribute most to the framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality.



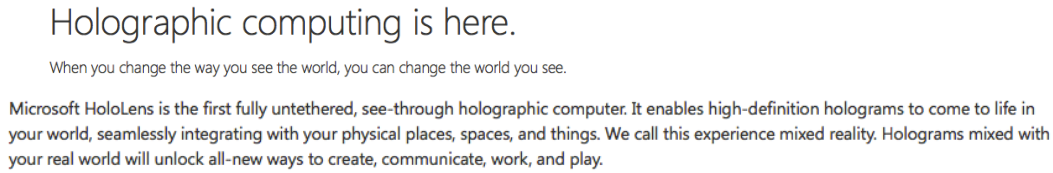


Figure 4: HoloLens title page

Above we can see a visual extract from the "Home" page. It includes two clauses, an image, and a basic description of the HoloLens. The first clause can be interpreted as a somewhat 'celebrational' way of introducing a new supposed computational era dubbed "the era of holographic computing". This clause is celebrational in the sense that it is the very first thing presented to us in this text, only preceded by the image above, and formulated as an absolute truth, since the

clause “is here” leaves no room for other possibilities than the arrival of this new “era”. In terms of vocabulary, as I have stated before, it is plausible that Microsoft strategically uses the term “holographic computing” instead of the term ‘augmented reality’, because the latter term does not fit in a promotional story that attempts to signify a technology that is able to symbiotically merge reality and virtuality. Most people are all to familiar with the lifelike sci-fi-esque three-dimensional hologram of Princess Leia in Star Wars (1977), in the scene where she states: “Help me Obi-Wan Kenobi, You’re my only hope.” Such conceptions of holograms indeed connote to a world where the real and the virtual live in a symbiotic relationship. Augmented reality, on the other hand, connotes to augmentation, and therefore functions for Microsoft as a less fruitful term for the discursive framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality.

The image above the two clauses shows us a living room setting viewed from the perspective of somebody wearing the HoloLens. The living room in the image is filled with a symbiotic mixture of virtual and physical objects. We see a physical table with a virtual toy spacecraft on top, a virtual tropical bird resting on a physical lounge chair, and a virtual calendar projected on a physical fireplace. The image tells us that the HoloLens supposedly does not just allow for the coexistence of virtual and physical objects in a single space, but lets them merge symbiotically as objects that complement each other. This complementation ties in with, as I have explained before in the theoretical framework chapter, how Tan explains that a desirable property of mixed reality technologies is for them to provide a “symbiosis, with desirable properties from each accentuated and complementing each other, rather than the enhancement of one with the other” (Tan 2001, 1). It is important to note however, since I will be discussing multiple images in this chapter, that the images on Microsoft’s official HoloLens webpage are not actual first-person images of people wearing the HoloLens, but instead are merely constructed to seem as if they are (i.e. ‘artist’s impressions’). Various people who were able to try the HoloLens at Microsoft’s Build Developer Conference reported that the HoloLens has peripheral projection problems due to its small field of view: “HoloLens only feels natural when you're not handling anything much bigger than a basketball. It produces a magic square the size of a large TV screen, and the moment something slips outside, it disappears […] It shatters the illusion, and it looks very little like the amazing whole-world illusions of Microsoft's videos” (Robertson 2015). I will return to this disappointingly small field of view in the next chapter, since this was a key point made by technology reviewers that downplays Microsoft’s framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality.

Moving on to the device description seen in Figure 4, notice Microsoft’s usage of the “come to life” metaphor. This metaphor, which is ubiquitously used by Microsoft in all their promotional material (i.e. not just on the website itself), connotes to the virtual stepping into the ‘actual’ living world of people and psychical things, which is a prerequisite for virtual holograms “seamlessly integrating with […] physical places, spaces, and things”. This ties in with what I have argued in the theoretical framework chapter, namely that in a paradoxical sense, with the HoloLens, the virtual is framed as the ‘real’. In addition, notice the modality of Microsoft’s claim: “We call this experience mixed reality”.

Modality concerns the degree of affinity expressed with propositions (Fairclough 1992, 236). According to Fairclough, assessing modalities can say something about "social relations in the discourse", and "controlling representations of reality" (Ibid. 1992, 236). In terms of modality, why is the previous statement so interesting? Because "we call this experience" is an expression with a very high degree of affinity, as it leaves no room for doubt. And when this clause is linked to the existing term "mixed reality", the reader might interpret it as if Microsoft is the one who invented this term, while this is in fact not the case. Microsoft merely uses the term mixed reality because it is beneficial for the discursive framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality.

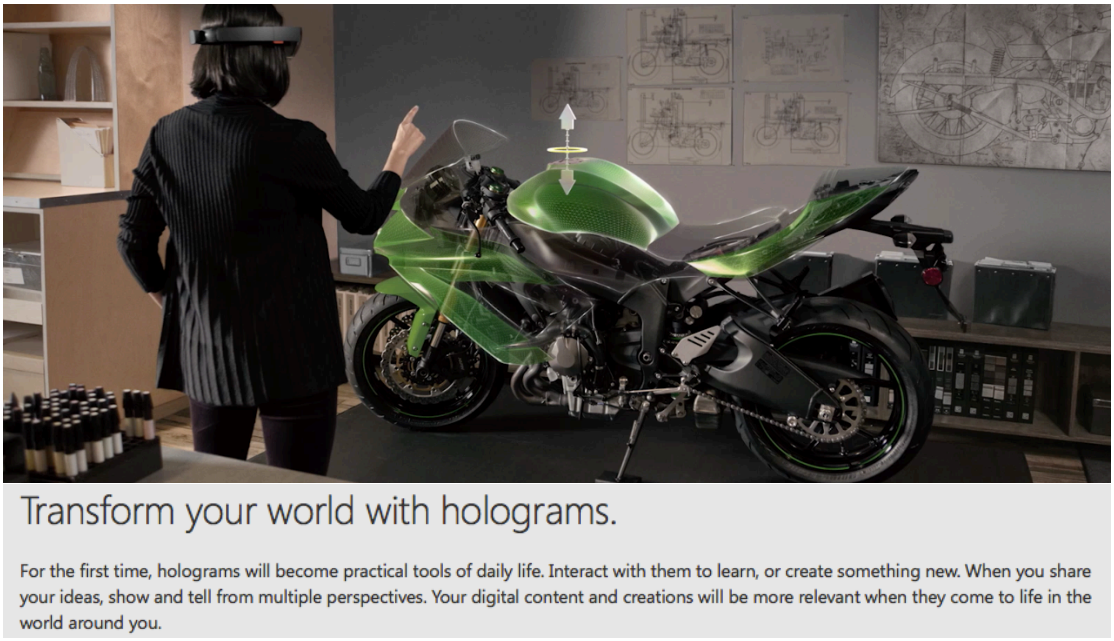


Figure 5: Transform your world with holograms

Figure 5 can be seen at the "Home" page and is clickable on the website as a link to the "Experience Holograms" page. The image shows someone wearing the HoloLens from the back. This person is making design adjustments to a physical motorcycle using holograms created by the HoloLens. This image is also a testimony for the supposed interactive nature of the holograms produced by the HoloLens, which allows them to be used as practical objects. The practical nature of these virtual holograms again reinforces the theoretical notion that, with the HoloLens, connotations of the virtual are shifting from the 'intangible' to the 'tangible'. The slogan and text underneath this image tie in with all this perfectly. The clause "For the first time, holograms will become practical tools of daily life", tells us that holograms will function practically in our daily lives, just like kitchen knives, hammers, and pencils. This notion of practical use is subsequently reinforced by the recurring presence of the "come to life" metaphor. As a result, people looking at this motorcycle that has been complemented by holograms, might not be able to visually distinguish the real parts from the virtual ones. This ties in with, as I have stated before in the theoretical framework chapter, Azuma's claim that the ultimate goal of augmented reality is to "generate virtual objects that are so realistic that they are virtually indistinguishable from the real environment" (Azuma 1997, 35)

Go beyond the screen.

Shape holograms to fine-tune a design. Interact with them to learn something new. When you share ideas, show and tell from multiple perspectives. Microsoft HoloLens enables you to make decisions more confidently, work more effectively, and bring ideas to life before your eyes.

Figure 5: Go beyond the screen

When we move towards the "Experience Holograms" link, we arrive at a page where multiple hypothetical HoloLens experiences are illustrated through the combination of an image with a slogan and several elaborative clauses underneath. These hypothetical experiences again serve to frame the HoloLens as a technology that is able to symbiotically merge reality and virtuality. The image of the first experience shows us a male HoloLens wearer (again from the third-person perspective), who is standing in his kitchen, which is filled with holograms. We see a holographic television screen playing a football match on the wall next to the oven, a virtual recipe book pinned to a cupboard, a virtual "Vacation To-Do List" pinned to the fridge, as well as an interactive weather forecast of Maui, which is probably this person's vacation destination. The slogan "Go beyond the screen" is a familiar metaphor, which in this case means to express the redundancy of the physical screen. Again here we can witness the presence of the "bring to life" metaphor.

Your world as a canvas.

Microsoft HoloLens intelligently maps your room, mixing holograms with the environment around you. Pin holograms in physical locations as easily as you would place a physical object in a room. Interact with holograms and everyday objects together.

Figure 6: Your world as a canvas

The next image, of the experience with the slogan "Your world as a canvas", shows us another male HoloLens wearer from the third perspective who is looking at a specific part of what seems to be his living room, which is now filled,

in a metaphorical sense like a canvas, with Holograms comprised of small Minecraft-like building blocks. These building blocks mean to represent various things: on the small table in front of the couch we can see a farmhouse including a grass field with fertilized crops. On the couch we can see a medieval castle, and on the wall behind we can see a digital hole with small flying digital bats in front of it. The hole seems to lead to some sort of fantasy-esque dungeon. All in all, what this image tells us is that, with the HoloLens, the physical world around us can turn into a 'canvas', which we can fill with our own creations. In the text beneath the slogan we can see three clauses that all connote to the supposed symbiotic merging between reality and virtuality. The first clause tells us that we can "mix" holograms with the actual environment around us. The second clause tells us that we can "pin" holograms as "easily" as placing a "physical object" and the third clause tells us that we can "interact with holograms and everyday objects together." In addition, this hypothetical HoloLens experience again tells us that with the HoloLens, the virtual will complement the real, and thereby become more like the real.

Below I will highlight and discuss several recurring words and clauses used by Microsoft on their "FAQ" page, which contribute to the framing of the HoloLens as a technology that is able to provide a symbiotic mergence between reality and virtuality. I will first show an image of a specific frequently asked question and answer to it (i.e. not all present on the "FAQ" page), and then highlight specific words or clauses from that specific question that particularly contribute to the discursive framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality.

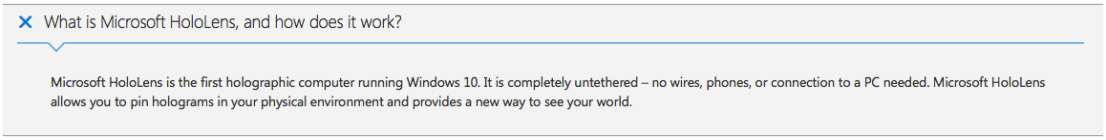


Figure 8: HoloLens FAQ 1

From the question and answer above, we can see that Microsoft classifies the HoloLens as a "holographic computer" (i.e. according them the "first" of its kind). In the next chapter, I will investigate whether technology review websites comply with this classification of the HoloLens, or reject this term and instead classify the HoloLens as either an augmented reality or virtual reality device. From the question above, the clause "provides a new way to see the world" again frames the HoloLens as a revolutionary technology.

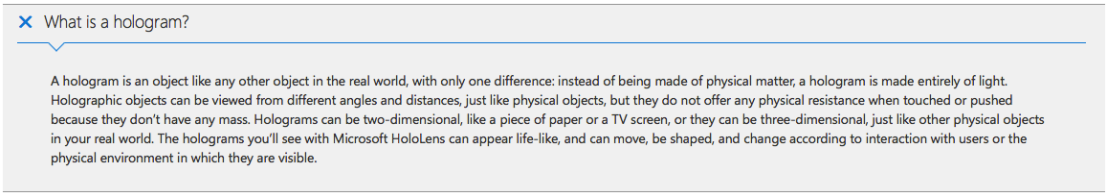


Figure 9: HoloLens FAQ 2

What is noticeable from the answer to the question above is that Microsoft puts a lot on emphasis on the framing of holograms as "any object in the real world". Microsoft claims that there is "only one difference" between holograms and real

world objects. This again ties is with what I have stated in the theoretical framework chapter, where I argued that with the HoloLens, connotations of the virtual are shifting from the 'transcendental' to the 'real'.

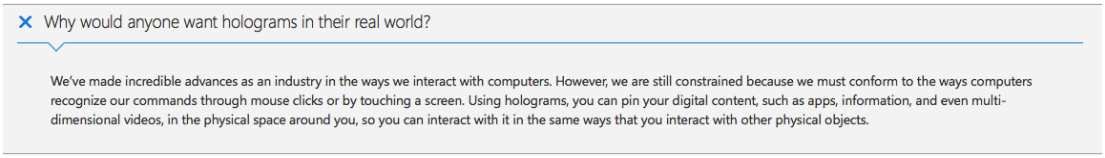


Figure 10: HoloLens FAQ 3

In the answer to the question above, Microsoft makes another attempt to emphasise the supposed revolutionary capabilities of the HoloLens. Microsoft supposes that we can interact with holograms "in the same ways that you interact with other physical objects", which helps them argue that the HoloLens moves beyond established computer interaction paradigms, and which again ties in with what I have stated above concerning shifting connotations of the virtual.

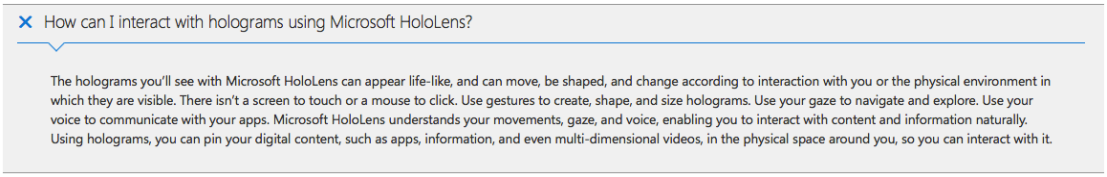


Figure 11: HoloLens FAQ 4

In the answer to the question above, which is also about interacting with holograms, the clauses "The holograms you'll see with Microsoft HoloLens can appear life-like" and "enabling you to interact with content and information naturally" are similarly important to consider, since they again reinforce the notion that the holograms produces by the HoloLens are similar to 'natural' physical objects.

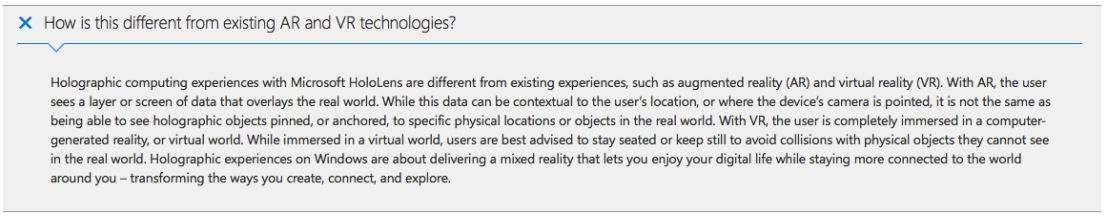


Figure 12: HoloLens FAQ 5

In the question and answer above, notice how Microsoft refutes the labels of augmented and virtual reality, precisely because instead of adding a "layer" that "overlays the real world" as is done with augmented reality technologies, the HoloLens means to provide a symbiotic mergence between the real and the virtual. In addition, here we can again witness how Microsoft has hijacked the established term of 'mixed reality' as a suitable term for the framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality.

As a closing remark, it is important to consider that all of Microsoft's examples of hypothetical HoloLens experiences, as well as the vocabulary and grammar used to describe them, are not objective reflections of pre-existing realities, but have been discursively framed. And in order to frame them,

Microsoft has drawn from existing systems of knowledge and belief (i.e. those discussed in the theoretical framework chapter). This ties in with what I have described in the introduction about discourse, namely that the meanings people create through discourse are never objective reflections of a pre-existing reality, but contribute to the (discursive) construction of reality (Jorgensen and Philips 2002, 9), and that discourse, therefore, can be seen as a practice, "not just of representing the world, but of signifying the world, constituting and constructing the world in meaning" (Fairclough 1992, 64).

Discourse as Discursive Practice

From the previous chapter, in which Microsoft's official HoloLens webpage stood central as a text in which the HoloLens is discursively framed as a technology that is able to facilitate a symbiotic merging between reality and virtuality, we now move towards the interpretation of this discursive framing by technology review websites. Microsoft has held two events that have resulted in two respective corpuses of texts covering the HoloLens, which were written by technology reviewers for various technology related websites and news sites. These were the previously mentioned Microsoft's Windows 10 Event, which was held on January the 21st, and Microsoft's Developer Build Conference, which was held from April 29 until the 1st of May. I have traced down a great amount of these texts using Google Search, and subsequently analyzed them in the specific manner described in the methodological chapter. In this chapter, using data from the "Post Windows 10 Event" and "Post Developer Build Conference" table that can be found in the "attachments" chapter at the end of this thesis, I will discuss how technology review websites, in their texts covering the HoloLens, interpret Microsoft's discursive framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality. In addition, I will discuss how technology review websites, with their interpretive discourse, subsequently enter into a struggle with Microsoft's discourse, and explain how both Microsoft and technology review websites thereby provide recourses that help to feed and frame the HoloLens' technological imaginary.

There is a key difference between these two events that needs to be mentioned first, since it had a great effect on the way technology reviewers reacted to the discursive framing of the HoloLens as a technology able to symbiotically merge reality and virtuality. While Microsoft's Windows 10 Event only offered a first glimpse at this technology, the Developer Build Conference offered a more in-depth look. Microsoft's Windows 10 Event was held at a time when only preliminary prototypes were usable by a handful of people who were attending the event, during demo's that were strictly scripted by Microsoft, and thereby greatly restricted attendees in their abilities to experiment with these prototypes. At Microsoft's Developer Build Conference, on the other hand, attendees were allowed to play around more freely with hundreds of HoloLens prototypes, which in terms of hardware were very close to the one's showed in Microsoft's promotional material. The data found showcases this difference. According to this data, the texts that were written shortly after the Windows 10 Event were substantially more positive towards the symbiotic merging between reality and virtuality associated with the HoloLens, which can be seen in the compliance between the technology reviewers' discourse and that of Microsoft.

My data shows that the texts written post Microsoft's Developer Build Conference did not share this same degree of enthusiasm. What was detrimental for the framing of the supposed symbiotic mergence was the small holographic field of vision of the prototypes usable at Microsoft's Developer Build Conference. Metz (2015) from Wired for example states:

> At the conference, Microsoft also gave personal demos, letting select coders, press, and analysts try the HoloLens. It even let them build simple holographic applications for the device. These demos were also impressive. But the experience didn't quite match the impression you get from Darren's apartment. When you wear the device—as opposed to viewing the holograms via a movie camera equipped with very different hardware—your "field of view" is significantly smaller. You only see holograms in a slim area in front of your eyes—an area that spans about 35 to 40 degrees horizontally (Ibid. 2015).

Darren is a fictional character used by Microsoft in their promotional material who lives in a apartment ubiquitously filled with holograms. When you look at this promotional material, in the same way as is illustrated in the previous chapter, you look at the holograms produced the HoloLens from a third-person perspective (as an 'artist's impression'). As a result, there is not the problem of peripheral vision. We see the whole apartment and all the holograms in them with the same clarity. In this sense, this promotional material does not represent the 'field of view' of the actual HoloLens' hardware, which is particularly smaller as is exemplified in the quote above. Almost all technology reviewers who were able to try the HoloLens at the Developer Build Conference described this disappointing field of view, and textual accounts of this disappointment arguably function to nuance connotations concerning the HoloLens' supposed ability to symbiotically merge reality and virtuality. A rejection of Microsoft's framing due to the critical discourse of technology review websites can in turn affect the way people collectively think about the HoloLens in terms of its supposed capabilities to symbiotically merge reality and virtuality.

The data found showcase that the classification of the HoloLens in terms of augmented reality, virtual reality, or holographic related technologies greatly determines how these texts respectively speak about the HoloLens' capability to mix the virtual and the real. The data from both tables shows that texts that classify the HoloLens purely as an augmented reality technology (seven out of eleven in the "Post Windows 10 Event" table, and eight out of fourteen in the "Post Developer Build Conference" table) use a vocabulary in order to talk about the relationship between the virtual and the real, which includes combinations of words such as: "superimposes", "atop of", and "overlays over", which is a vocabulary that does not comply with Microsoft's. This is a vocabulary that belongs to discourses associated with augmented reality technologies. Rosoff (2015) from Business Insider for example states that the "HoloLens is augmented reality", and subsequently continues: "which means it projects images on top of the real world" (Ibid. 2015). On the other hand, the texts that classify the HoloLens as purely a holographic technology, use a vocabulary consisting of combinations of words such as "seamlessly blend", "integrated within", and "merged seamlessly", which is a vocabulary that does comply with

Microsoft's. Limer (2015) from Popular Mechanics for example classifies the HoloLens as "an effective hologram machine", and continues to talk about the relationship between the virtual and the real as: "HoloLens puts its floating windows and holographic dogs into the real world. Into your living room" (Ibid. 2015).

How are we to understand the discursive practice associated with the interpretation of technology review websites in terms of its constitutive effect on the HoloLens' technological imaginary? The interpretative discourse from technology review websites, as I have already argued in the introduction, plays a substantial role in the discursive framing of new technologies. Since technology review websites are the first to react to Microsoft's framing, for the masses that have had no access to the HoloLens, their texts covering the HoloLens can greatly determine the way people collectively think about this technology, precisely at a time where a consumer version of the HoloLens has not yet been released. It is at this 'pre-release' phase of the HoloLens where Microsoft and their promotional discourse, as well as technology reviewers and their discourse covering the HoloLens, together provide recourses that help to feed and frame the HoloLens' technological imaginary. Technology review websites can either comply or collide with Microsoft's discourse used in order to frame the HoloLens as a technology that symbiotically merges reality and virtuality. In the end, it comes down to a struggle between texts that discursively comply with Microsoft's specific framing of the HoloLens, and texts that thumb down or reject this framing. Until the HoloLens will be released as a consumer product, this struggle will spike at moments when Microsoft enriches its discourse by providing new promotional material, upon which technology review websites will subsequently respond either by complying or colliding with this framing in texts of their own.

Discourse as Social Practice

In the previous two chapters I analysed how Microsoft uses discourse in their official HoloLens webpage in order to frame the HoloLens as a technology that is able to provide a symbiotic mergence between reality and virtuality. I then analysed how technology review websites interpret this specific framing of the HoloLens by either complying or rejecting Microsoft's framing. I also discussed how technology review websites enter in a struggle with Microsoft's framing, and how they together in turn provide recourses that help to feed and frame the HoloLens' technological imaginary. In this final chapter of the analysis part of this thesis, I will zoom in on the workings of the HoloLens' specific technological imaginary, by explaining how it, in a dialectical sense, helps to constitute the discourse connected to the previous two analysed dimensions, and in turn, is partially constituted by this discourse.

In the methodological chapter, I have already explained in accordance with Fairclough (1992) that discourses, in a dialectical sense, are able to constitute social processes, and at the same time are also constituted by various social practices that revolve around power, ideology, and the construction of systems of knowledge and belief (Ibid. 1992, 86). I have also explained that technological imaginaries, similar to ideologies, help to construct reality, as they play a significant role in the socio-technological construction of new media-technologies. How can we best explain the dialectical relationship between the

discursive framing of the HoloLens and framing of the HoloLens' technological imaginary?

Starting off, it was at Microsoft's Windows 10 Event where the HoloLens was first announced. So in this sense, Microsoft 'took the first shot' at discursively framing this technology for the public, thereby providing recourses that helped to feed and frame the HoloLens' technological imaginary. The technological imaginary, in a general sense, takes shape through discourse and is in turn reflected in discourse. To repeat what I have said in the introduction, technological imaginaries of any new technology have hooked into it, or have projected onto it, wider social and psychological desires and fears (Ibid. 2009, 70). These desires and fears can in turn be reflected in the discursive framing of these new technologies. So in this sense, Microsoft, at the Windows 10 Event, provided the recourses that helped to feed and frame the HoloLens' technological imaginary. These recourses, as has been argued before in this thesis' theoretical framework chapter, were discursively drawn from earlier established systems of knowledge and belief associated with the mergence between reality and virtuality.

The first phase of the official HoloLens webpage was put online shortly after Microsoft's Windows 10 Event, and by the same time, the first wave of technology reviewers had responded with texts in which they interpreted the HoloLens on the basis of how it was framed by Microsoft. These texts either complied with Microsoft's framing or rejected it, thereby adding additional recourses that helped to feed and frame the HoloLens' technological imaginary. Some of these recourses provided by discursive framing of the HoloLens by technology review websites naturally did not comply with Microsoft's wishes. As the data discussed in the previous chapter has illustrated, a majority of the texts I found classified the HoloLens as an augmented reality device instead of the 'holographic computer' Microsoft wants it to be. This framing of the HoloLens as an augmented reality device instead of a holographic computer could arguably result in people understanding the HoloLens as an augmented reality device, which to the masses is already a somewhat familiar conception (i.e. mainly due to the Google Glass project). As a result, Microsoft, who does not want people to understand the HoloLens as an augmented reality device, toned its discursive framing of the HoloLens, for example by claiming on the "FAQ" page of the official HoloLens webpage: "Holographic computing experiences with Microsoft HoloLens are different from existing experiences, such as augmented reality […] With AR, the user sees a layer or screen of data that overlays the real world. While this data can be contextual to the user's location, or where the device's camera is pointed, it is not the same as being able to see holographic objects pinned, or anchored, to specific physical locations or objects in the real world" (Microsoft 2015). The example above shows how the feeding and framing of the HoloLens' technological imaginary can be affected due to the discourse provided by technology reviewers, which in this case caused Microsoft to reinforce their favoured discursive framing of the HoloLens as a holographic computer, by explicitly rejecting the discursive framing of the HoloLens as an augmented reality device.

Microsoft's second big event, the Developer Build Conference, started a similar chain of events to proceed. Microsoft introduced a lot of new discursive material that functioned to frame to HoloLens as a technology that is able to

symbiotically merge reality and virtuality, and updated its official HoloLens webpage to the version that was analysed in the first chapter of the analysis part of this thesis. Technology reviewers were quick to react, as the data from the previous chapter illustrated, this time by being especially critical towards the supposed symbiotic merging between reality and virtuality. So in this sense, Microsoft's discursive framing of the HoloLens post Developer Build conference provided yet more recourses that helped to feed and frame the HoloLens' technological imaginary, followed by more recourses provided by technology reviewers. Summarizing, in this chapter I have illustrated how both Microsoft and technology review websites, in a dialectical sense, both produce discourse in which they discursively frame the HoloLens, and that they thereby both provide recourses that help to feed and frame the HoloLens' technological imaginary. I have also illustrated how these recourses, that either conflict or comply with Microsoft's preferred way of framing the HoloLens as being a technology that is able to provide a symbiotic mergence between reality and virtuality, can result in Microsoft providing recourses (in the form of discourse) that explicitly reject undesired framings of the HoloLens. So in this sense, the discourse provided by Microsoft and technology review websites partially constitutes the HoloLens' technological imaginary, and the HoloLens' technological imaginary is in turn constitutive for the discursive framing of the HoloLens.

Conclusion

The general theme of this thesis is the HoloLens' supposed capability to provide a symbiotic mergence between reality and virtuality. This thesis was predominantly concerned with how the HoloLens' capability to provide a symbiotic mergence is discursively framed, and how this discursive framing provided recourses that helped to feed and frame the HoloLens' technological imaginary. The capability to provide a symbiotic mergence, as has been argued in this thesis' theoretical chapter, already played a part in the technological imaginaries of earlier augmented reality devices. I have also argued how, from a ontological standpoint, the 'virtual' is not so different from the 'real' to begin with, and how, with the HoloLens, connotations of the virtual are shifting more towards the 'real' and 'tangible' instead of the 'transcendental' and 'intangible'. I thereby hope that by focusing specifically on the supposed symbiotic mergence between reality and virtuality, I have provided valuable knowledge and insights that will help people to better understand the HoloLens as a new media-technology. In addition, by focussing on the discursive framing of the HoloLens, and not on the technology itself, I hope to have illustrated the important constitutive role that discourse plays in its socio-technological construction.

In the analysis part of this thesis, by adapting Fairclough's three-dimensional framework for doing critical discourse analysis, I have conducted a threefold analysis. First, on the level of 'texts', I have analysed the specific ways in which Microsoft, in their official HoloLens webpage, discursively frames the HoloLens as a technology that is able to symbiotically merge reality and virtuality. Second, on the level of 'discursive practice', I have analysed how technology review websites have interpreted Microsoft's specific framing of the HoloLens. Here I also explained how technology review websites thereby enter into a struggle with Microsoft's specific framing by either complying or rejecting

Microsoft's discourse, and how they together in turn provide recourses that help to feed and frame the HoloLens' technological imaginary. Third, on the level of 'social practice', I have illustrated how, in a dialectical sense, the HoloLens' technological imaginary helps to constitute the discursive framing of the HoloLens, and how the HoloLens' technological imaginary is in turn partially constituted by the discursive framing of the HoloLens.

From the analysis of Microsoft's official HoloLens webpage on the level of texts, we have seen which discursive elements (i.e. vocabulary, grammar, and images) Microsoft ubiquitously deploys in order to frame the HoloLens as a technology that is able to symbiotically merge reality and virtuality. Think for example of the recurring presence of the "come to life" metaphor, as well as the hijacked term 'mixed reality', which for Microsoft is more suitable for their desired framing of the HoloLens than the terms augmented reality and virtual reality. From the analysis of the discursive practice associated with the interpretation of Microsoft's specific framing of the HoloLens by technology review websites, we have learned that from the texts that I found that were written post Windows 10 Event, the majority classified the HoloLens as an augmented reality device, and thereby downplayed Microsoft's labelling of the HoloLens as a holographic computer. The majority of the texts that I found that were written post Developer Build Conference were not positive towards the framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality. As the content of these texts showed, this is predominantly due to the disappointingly small field of view of the HoloLens devices that were present at this event, which according to these texts shatters the illusion of a symbiotic mergence between reality and virtuality. In addition, I have explained how technology review websites either comply with Microsoft's discourse and thereby reinforce the framing of the HoloLens as a technology that is able to symbiotically merge reality and virtuality, or do the opposite by rejecting Microsoft's discursive framing of the HoloLens. I subsequently explained how both Microsoft and technology reviewers in turn together provide recourses that help to feed and frame the HoloLens' technological imaginary. Finally, in the analysis of the third dimension, I explained how the discourse provided by both Microsoft and technology review websites, in a dialectical sense, partially constitute the HoloLens' technological imaginary, and in turn, how the HoloLens' technological imaginary is constitutive for the discursive framing of the HoloLens.

I would like to end with the following methodological considerations and ideas for future research. An adaptation of Fairclough's three-dimensional framework for doing critical discourse analysis has proven to be suitable to address the layered dimensions of the analyzed discourse, and subsequently presented to be a well-equipped methodology to systematically tackle the three respective parts that together comprise this thesis' research question. However, it must be emphasized that Faiclough's methodology ordinarily focuses on power. Critical discourse analyses that adhere to Fairclough's methodology should, when followed in a more literal sense, include questions that relate to the challenging or strengthening of unequal power relations through discourse. Such questions render a critical discourse as 'political' (Ibid. 2002, 87). I have done no such thing, nor did I mean to, since that was not the scope of my research question. However, it could be interesting, as an idea for a future research, to

look at the HoloLens from a more political point of view, by for example investigating how the HoloLens, as a discursive construct, is ideologically invested, by for example dictating how people should “create”, “connect”, and “interact” in their daily lives when using the HoloLens (Microsoft 2015). It could be interesting to investigate the kinds of power struggles that are at stake here, and to subsequently analyse these critically. Another idea for a future research arises from the substantial role that this thesis has given to technology reviewers. As I have argued, technology reviewers play a significant role in the discursive framing of new technologies, since they can provide ‘hands-on’ reviews during periods where the masses have no access to new technologies. It could therefore be interesting, as an idea for a future research, to zoom in on technology journalism, by analysing how their discourse precisely functions as a link between technology producing corporations and consumers in periods where consumers do not yet have access to new technologies.

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Attachments

Post Windows 10 Event Data

Name of Technology Review Website, Author, and link to text	Technology classification of HoloLens in text as: Mixed Reality (green), Hologram related technology (green), Augmented Reality (red), Virtual Reality (red)	Discursive framing of relationship between virtual and physical by technology reviewer as form of 'augmentation' (red) or mergence (green)
MIT Technology Review (Simonite 2015) http://www.technologyreview.com/news/534356/microsofts-new-idea-a-hologram-headset-to-rewrite-reality/	"augmented reality headset"	"holograms [...] overlaid on the real world" "virtual objects can be interactive and integrate smoothly into the real world"
MIT Technology Review (Metz 2015) http://www.technologyreview.com/news/535806/reality-check-comparing-hololens-and-magic-leap/	"HoloLens is a holographic system"	"a future in which virtual objects are merged seamlessly with the real world."
Wired (Hempel 2015) http://www.wired.com/2015/01/microsoft-hands-on/	"a head-mounted holographic computer called Project HoloLens"	"In the very near future, you'll compute in the physical world, using voice and gesture to summon data and layer it atop physical objects." "Cyberspace will be all around you."
CNET (Tam and Statt 2015) http://www.cnet.com/news/microsoft-jumps-in-augmented-reality-with-hololens/	"AR technology"	"incorporates apps and services into the real world"
The Guardian (Stuart 2015) http://www.theguardian.com/technology/2015/jan/26/microsoft-hololens-augmented-virtual-reality-developers-kinect	"the Hololens, a stand-alone augmented reality heardset"	"capable of projecting computer generated objected into your real-world environment."
The Verge (Bohn and Warren 2015) http://www.theverge.com/2015/1/21/7868251/microsoft-hololens-hologram-hands-on-experience	"a headset that projects holograms into real space"	"But before we could enter this virtual world — actually, the virtual entered our world" "It's wildly impressive that these objects really do feel like they're out there in your living room"
IEEE Spectrum (Choi 2015) http://spectrum.ieee.org/tech-talk/consumer-electronics/audiovideo/cautious-optimism-about-microsofts-hololens	"a new augmented reality headset, the HoloLens."	"superimpose images onto the real world to create a mixed reality"
Business Insider (Rosoff 2015) http://uk.businessinsider.com/microsoft-hololens-hands-on-2015-1?r=US	"HoloLens is augmented reality"	"which means it projects images on top of the real world." "superimposed on the real surroundings around me" "superimposed on the coffee table in just that spot."

Ars Technica (Bright 2015) http://arstechnica.com/gadgets/2015/01/hands-on-with-hololens-making-the-virtual-real/	"HoloLens is an engaging and effective augmented reality system"	"I saw virtual objects—Minecraft castles, Skype windows, even the surface of Mars—presented over, and spatially integrated with, the real world." "Microsoft's HoloLens system, a headset that creates a fusion of virtual images and the real world."
Engadget (Gilbert 2015) http://www.engadget.com/2015/01/21/microsoft-hololens-hands-on/	Microsoft's "mixed reality" holographic headset, HoloLens	"the world you build exists around you, pushed into the room you're in."
The Guardian (Alderman 2015) http://www.theguardian.com/technology/2015/feb/09/hololens-microsoft-virtual-world-augmented-reality-	"Augmented reality is like HoloLens"	"HoloLens promises a future where you can add a layer of computer-generated information to your vision"

Post Build Developer Conference

Name of Technology Review Website, Author, and link to text	**Technology classification of HoloLens in text as: Mixed Reality (green), Hologram related technology (green), Augmented Reality (red), Virtual Reality (red)**	**Discursive framing of relationship between virtual and physical by technology reviewer as form of 'augmentation' (red) or mergence (green)**
Techradar (Fitzsimmons 2015) http://www.techradar.com/reviews/wearables/microsoft-hololens-1281834/review	"HoloLens, Microsoft's AR viewer"	"HoloLens doesn't just tag the physical world with information you can get other ways; it adds a realistic 3D digital world on top of (and underneath) it in a way that feels like magic and is delightful to use.
Wired (Barrett 2015) http://www.wired.com/2015/04/microsoft-build-hololens/	"augmented-reality HoloLens"	"What Microsoft showed today was an understanding that the near-future potential of reality-bending compu-googles isn't games and gimmicks."
Wired (Metz 2015) http://www.wired.com/2015/05/microsoft-hololens-narrower-than-you-think/	"HoloLens, the holographic headset"	"In other words, your apartment may be filed with holograms, but you have to work to get your head in a place where you can really see what you want to see. The effect is that you only see a small picture of a virtual world"
The Verge (Robertson 2015) http://www.theverge.com/2015/5/1/8527645/microsoft-hololens-build-2015-augmented-reality-headset	"augmented reality"	"it's still struggling hard — and failing — to break down the walls between fantasy and reality."
Cnet (Ralph 2015) http://www.cnet.com/products/microsoft-hololens/	"Microsoft's vision of augmented reality"	"the field of view is rather small." "creating a holographic field that feels like looking at a 20-inch screen from a few feet away."
MIT Technology Review (Simonite 2015) http://www.technologyreview.com/news/537651/microsofts-hololens-will-put-realistic-3-d-people-in-your-living-room/	"The HoloLens augmented-reality headset"	"It has developed a way to make you see photorealistic 3-D people that fit in with the real world."

TheNextWeb (Dove 2015) http://thenextweb.com/microsoft/2015/05/01/hands-on-with-microsoft-hololens-my-evening-at-the-holographic-academy/	"Microsoft HoloLens is an untethered transparent holographic computer" "Microsoft calls this "mixed reality" as opposed to the more familiar virtual reality or augmented reality."	"HoloLens is a headset device that allows you to see high resolution 3D content at a 1:1 scale within the existing environment." "that lets you view integrated holograms within a physical space." "Close up, it is an intriguing technology that has the potential to change the way we relate to each other and the world around us."
Extreme Tech (Hruska 2015) http://www.extremetech.com/gaming/204763-microsoft-demonstrates-new-hololens-prototype-talks-up-dedicated-holographic-processor	"HoloLens is meant to create […] (Augmented Reality)"	"HoloLens is meant to create holographic overlays over existing objects and structure in the real world"
AnandTech (Howse 2015) http://www.anandtech.com/show/9213/microsoft-hololens-handson	"Hololens, which is a completely new device from Microsoft which provides "Augmented Reality""	"Augmented reality projects objects into the actual room you are in" "The actual holograms had a very limited field of view"
International Business Times (McDougall 2015) http://www.ibtimes.com/hololens-review-microsofts-holographic-vr-goggles-will-change-how-we-work-play-live-1905706	"Microsoft Corp.'s new three-dimensional (3D), virtual-reality (VR) display technology"	"what made the experience a true epiphany in terms of realizing the potential of virtual reality was that the 3D, holographic images looked real. Not remarkably real or shockingly real or stunningly real. Just real, period." "What makes HoloLens stand apart, and what gives it such enormous industrial potential, is its ability to seamlessly blend the real and virtual worlds. I was adding holographic floors onto a model that existed in real life, and I could not perceive any differences between the two."
Popular Mechanics (Limer 2015) http://www.popularmechanics.com/technology/gadgets/a15324/how-microsofts-hololens-works/	"an effective hologram machine"	"HoloLens puts its floating windows and holographic dogs into the real world. Into your living room." "HoloLens then turns that information into a digital model where the holograms can live in 3D space" "These illusions—images that change like real objects as you move your head, and noise that sounds like its anchored to a real place—add up to a holographic illusion that is apparently pretty eerily convincing."
Financial Review (Davidson 2015) http://www.afr.com/technology/minor-glitches-aside-microsofts-hololens-could-change-the-world-20150504-1mx0jm	"HoloLens is a virtual-reality headset"	"Welcome to the dream-like world of HoloLens, a strange and not-yet-quite-right world that Microsoft has invented, that freely mixes objects that exist

		only in software - the shimmering notebook, the floating, rolling ball - with objects that exist in the real world - the table, the floor, my feet. "except this one lets you see the virtual world, and the real world, both at the same time."
Steam Community (Wong 2015) http://steamcommunity.com/news/post/518255472503233891/?insideModal=1	"the HoloLens, an augmented reality headset"	"projects digital 3D objects atop the real world."
Tom's Guide (Michaels 2015) http://www.tomsguide.com/us/hololens-hardware-hands-on,news-20865.html	"HoloLens, the virtual-reality headset"	"A see-through visor on the front of the HoloLens lets you view real-world objects and people, but it also superimposes the 3D holograms you can observe and interact with."