

## HYPERLINK AS INVOCATIONARY ACT

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### **Abstract**

*The conventional conception of hypertext suggests that browsers use links to navigate a trail through cyberspace from one document to another. This conception creates great confusion about the spatial nature of the web, which is never experienced as a cohesive space.*

*If the 'link' metaphor must be retained, it is better to think of it as something that is pulled in, drawing a new document onto the screen. The browser never moves - the document comes to them.*

*A better conception still is that clicking on a link invokes a new document by addressing it (speaking to it, not visiting it). Extending Austin's theory of speech acts, clicking on a link might be called an invocationary act. This event has both semantic significance in language, and technical significance to the computer system. More importantly, an invocationary act has some force in social relations. The distribution of invocations has political and economic significance.*

### **Stream:**

*New Media*

### **Hyperlinks as invocationary acts**

*Explorers discover new tracts of cyberspace. Robots drill down into deep links. Navigators steer through nets, dragging anchors. Surfers ride waves of information.*

Internet users are accustomed to pulling from a grab bag of mixed metaphors to describe what they are doing when using the web. Language is well equipped with terms of spatial relations. Internet discourse is often loaded to suggest that the web is equivalent to physical space: that it can be explored, experienced, colonised and built. Hypertexts are portrayed as textual labyrinths that readers explore (Aarseth 1997). It is easy to imagine that the web somehow exists *out there*, and that we can move around in it, follow its paths and visit its places. The topological imaginary has an ancient heritage. Spatiality has long been significant in religious and scientific belief systems (Wertheim 1999). Imagined space is significant in the rhetorical techniques of memory palaces. The dominance of spatial metaphors in thought is apparent in the term 'topic'.

The cultural partiality for spatial metaphors often connects with the Internet's status as a global infrastructure. Users can call up files from servers around the world simply by typing in a URL (Uniform Resource Locator), performing a search query or

clicking on a sequence of links. They become witness to documents from many different places around the world — an experience that resembles travel. Using the web seems to violate conventional categories of here and there by bringing images from other spaces into view almost instantly.

Space seems the most natural metaphor. However, if a designer tries to use space as the main principle for designing a site, the metaphor quickly breaks down in the a-spatial and non-linear environment of web addresses. It makes some sense for the first page of a website to appear as an entranceway with pathways leading to other spaces. However, the logic starts to fall apart when it is possible to link from a 'room' deep in the interior of a site to another 'room', somewhere else altogether. If the designer chooses to be strict with a metaphorical space, a site of any size quickly becomes tedious to navigate. Spatial consistency can only be maintained with significant effort from both designer and user. And the web may be global, but there are few reliable cues to indicate spatial differences between sites, apart from relative delays and domain names. Even these can be misleading.

Part of the problem is that hypertext standards are explicitly designed to work against spatial metaphors by allowing writers to include links from anywhere to anywhere else using universal resource locators (Berners-Lee 2002 [1989]). Unlike hierarchical file structures, which must be navigated by moving up and down levels, links can make connections to any-node-whatever.

How else might the web be imagined? Let's start with a simple image. Picture a hugely extended field with thousands of chain links criss-crossing into infinity. Each link runs out to a web object somewhere in the invisible distance. By the spatial-exploratory imagining of the web, you choose one of these chains and move along it, following the path of that link until you reach the destination page. You end up being at a different place. From there you can follow further links, moving each time to a new place.

A better way to conceptualise this scene is to think of yourself standing in one spot, but drawing links towards you. You choose the end of one of the chains and pull it up — like an anchor. You stay in the same place, but you have drawn an object to yourself. The object you have dragged in may have some value in itself; and it may also have further links attached that you may choose to haul in.

This image presents a slightly better metaphorical account of web browsing. When using the web, your screen and the browser interface remain the same: a constant framing for the text and images that appear on the browser window. Links offer a mechanism for drawing in something else that is not yet there. This accommodates the common practice of having multiple windows open at one time. It seems impossible to be in two places at one time, but it is possible to have two objects at once.

However, the link-pulling metaphor is still very problematic. First, as everyone knows, the impression that the web is comprised of content objects that can be retrieved is an illusion. There are no actual objects to retrieve. No atoms move (Negroponte 1995). All the pages and other things on the web are simulated objects. And the web is not alone in working with this kind of artifice. All the icons of boxes, folders and files in graphical user interfaces (GUIs) stand for objects that don't really exist. In fact, there's nothing a computer does that doesn't use this trick. Files have always been reified as things that can be opened, closed, saved and trashed. But these

entities only exist to the extent that they have been given names and addresses, and will appear again if they are summoned. Their ongoing existence and functional consistency is a technical convention. The apparent persistence of variables as entities masks a far less bounded material existence.

Second, the image that users pull in content objects across a homogeneous space doesn't account for the sequence of material changes involved when a user clicks on a hyperlink. Something that users experience as quite simple is actually very complex. A link is an articulated event that passes through a series of transductions, conversions and transmissions. For a start, the mouse is a transducer that converts the user's physical movements into electrical signals. These mouse signals are sampled and translated into x and y cursor position values. These values alter the system state and appear as changes to the animated images being sent to another transducer — the screen. The user is also part of this circuit, making motor-neural adjustments with the mouse to position the pointer over some linked text. When the user clicks the mouse button, this becomes a mousedown event. If the x/y values correspond with a link hotspot, a click on the link is registered, and this in turn sets in process network operations to retrieve the addressed file. Networking functions handle another part of the event — transmitting http requests to a web server. Finally the event is completed when an html file and embedded objects are translated into a new web page in the browser window. The contrast between the unity of the event and the heterogeneity of its manifestations must be accounted for.

Third, the act of clicking on a link is hardly strenuous. The infrastructure described above concatenates an unimaginably complex set of events into an apparently simple task. The mechanisms of the web — browser address bars, links to click on, menus to choose from, text fields for entering queries — are strategies to minimise the effort required from users. If users are asked to make significant efforts in traversing a hypertext, as Aarseth's (1997) theory of ergodic literature explores, this necessity for exertion is added afterwards as programmed puzzles. The general tendency of the web is in the other direction of minimising effort. Other forms of computer use (programming; command line interfaces etc) do require significant effort, but it is not an exertion of travel, but of composing proper commands.

Users experience a link as a single event: it brings up a new web page, as if by magic. The page seems to materialise from nowhere; and in a sense it has! It exists only as magnetic traces on a remote hard drive. The transductions and transmissions that transform it into a screen image are mediated seamlessly through several material forms before becoming perceptible in physical space. The process resembles magic even more closely when you call up a web page by entering a specific URL: the address must be entered exactly if it is to function properly.

### ***Web invocation***

An alternative metaphor that better captures both the technical specificities and the cultural form of the hyperlink is the invocation. Websites are not visited — they're invoked. This term is already part of computer science's grab bag of technical terms, but its usefulness has not been generally recognised. Programmers often talk about one program or process calling or invoking another. Of course the term comes before this from ancient mythology: an utterance that calls to a higher power for immediate

assistance and support. Invocation is a less metaphorical metaphor than the dominant concept of cyberspace.

Invocation is a distinctive cultural form, but is transformed somewhat in its manifestations in computing. It is worth breaking down the characteristic features of the invocation to see how ancient and contemporary modes compare.

### ***1. Voice***

An invocation must be uttered. In the ancient modes of oral cultures it involves a human voice. With the web, the voice of the speaker is delegated to a technical assemblage. Clicking on a link infers some kind of agreement to the terms offered by the hyperlink. A link offers something; clicking on it accepts that offer.

It's important that invocations take time: they are singular, temporal events. Even if a CPU's invocations operate millions of times faster than a human mouth, they always entail duration. However, this duration does not relate to travel time, but to cumulative delays in invocations being answered.

### ***2. Point of crisis***

An invocation is always made at a specific time, place and circumstance. An invocation to gods may respond to an urgent crisis — a crop failure, a flood, an enemy at the gates or whatever. Or the crisis may be more general — about the values of a community; or individual faith. A web user's invocation is also usually motivated by a specific and immediate desire. Some of the more common web searches relate to consumerism (shopping); sexual desire (porn); cultural identity (music, sport, cinema); and health.

In cyberspatial terms, moments of decision are often problematically represented as forking paths. But often users might want to follow more than one path at a time, and this is impossible. By contrast, it is quite possible to make several invocations, even if they are logically contradictory.

### ***3. Shared code system***

An invocation must follow proper rituals. Invokers must know the name of the entity that they are invoking, and the conventional protocols to communicate with it. In magic there is often power in true names and in secret incantations. In computing, there are also conventions that must be followed and names that must be articulated correctly. Broken links and empty search results are the consequences of failed invocations.

### ***4. Power relation***

An invocation is most often made to a more powerful, and absent entity with which the invoker already has some form of a relationship. The web has an implicit hierarchy that privileges the permanent and stable website over the impermanent and fleeting web browser. Invocations are requests for power, but also confirm the power of the entity invoked. The invocation gives the invoker some immediate satisfaction, but, as part of a multitude, also affirms the greatness of the god.

The economy of the websites is based on hit counts and click-throughs: the attention economy (Goldhaber 1997). The number of invocers gives authority to a website, and is convertible to advertising dollars. Other Internet applications operate in a more democratic peer-to-peer manner that allows mutualistic invocations. But every event of invocation implies some operation of power.

### ***5. Media to carry a call***

Where the ancient invocation allows mortals to speak to immortals across the boundaries of metaphysics, contemporary technical invocations cross over through to the worlds of mechanical, magnetic, analogue and digital electronics. Invoking a link triggers a series of transductions and transmissions, as discussed above, which carry the request through to a conclusion (successful or otherwise).

The call within invocational media contrasts with other media. The broadcast voice radiates outwards from a central point. Computer networks establish invocable domains that define the fields of possibility for more distributed invocations. Print leaves permanent marks on archival surfaces, and carries the fixed authority of printed words. Invocational texts, by contrast, must be invoked again to be read.

### ***Invocationary acts***

A brief survey of the features of the invocation already raises a number of themes with some significance in conceptualising the web as a media form: Who is speaking when a user clicks on a link (is the user simply following a script laid down by the webmaster)? How are the conventions for the invocational codes established and maintained? How does the web invoke cultural identity, or pragmatic social actions? What makes the web medium distinctive?

In order to answer these questions, we need to develop a concept that is equivalent to the 'visit' in the cyberspatial conceptions of the web. If a website is not visited, then what happens when a web address is invoked?

An invocation must be some form of speech act. There are many times when a natural language utterance doesn't claim to speak a truth, but actually does something just by saying something (Austin 1975). If I make a bet, make a promise or name something, I am not making some empirical claim or logical proposition. In saying certain words, under particular conditions, I am actually doing something. Austin dubbed these uses of language as performative (as opposed to constative).

A web address is clearly not something that is true or false. It is a use of language that does something. I can read the text 'http://www.abc.net.au' or 'http://www.amazon.com' as somewhat comprehensible in natural language. But obviously these are web addresses that are not supposed to mean, so much as to function. If I enter these sequences of characters into a live web browser, I should expect to invoke a web site.

Austin points out that where a constative can be judged as true or false, a performative is judged according to its felicity — as 'happy or unhappy'. If a speech act is unhappy, that means it does not take effect: the bet is not valid; the promise is not made; the name is not taken up. A speech act might misfire if the conventional procedures are not followed correctly and completely; or if the circumstances around

the act are not appropriate; or if everyone who should be involved doesn't participate. A bet must be accepted. A promise must be believed. The speaker must have the authority to assign something with a name.

This question of felicity — whether a speech act is happy or unhappy — makes immediate sense in a theory of computers as invocational media. A web site's URL cannot be judged as a truth or a lie; it either works or it doesn't. There may be a number of reasons for a web invocation to fail — a misspelt address; network overloading; technical misconfigurations and so on. These sorts of infelicity are clearly quite different from those that Austin identifies in natural language speech acts. Unhappy technically mediated invocations seem to be of a different nature.

If invocations to websites are language acts, they are operating at a different level from speech acts in natural language. Invocational acts complicate rather than simply replace natural language acts. The two are intimately connected. On some occasions, clicking on a button or link in a web site has the same force as a natural language speech act. On a shopping website, the 'Buy Now' button has the same force as saying 'I'll take it' in a face-to-face situation with a seller. The same goes for online gambling sites, Internet opinion polls, library book reservations, and so on.

However, the speech act is already more complicated than Austin's focus on linguistics and philosophy had allowed. As Pierre Bourdieu observes, speech acts only work if there's a social infrastructure that hears and enforces the utterance.

Austin's account of performative utterances cannot be restricted to the sphere of linguistics. The magical efficacy of these acts of institution is inseparable from the existence of an institution defining the conditions (regarding the agent, the time, the place, etc) which have to be fulfilled for the magic words to operate (Bourdieu 1991: 73).

For Bourdieu, the efficacy of any language act is related to social institutions that establish the possibility to perform it. Debt collectors enforce the bet; lawyers witness the promise; and a bureaucracy records the name.

With invocational acts, the situation becomes more complicated, since speech acts can be performed without anyone hearing them. A purchase, a bet or a reservation can be made without the intervention of another human. Vending machines, bank ATMs and punch-clocks support invocational events that actually produce immediate material outcomes. In each case there has been a delegation of language acts to non-human components, and a concatenation of complex events into a sequence that fulfils the transaction.

In the company of these devices, some responsibility for participating in speech acts is delegated to non-humans. The statement is translated through the artefact, where 'the word "statement"... refers not to linguistics, but to the gradient that carries from words to things and from things to words' (Latour 1991: 106). Invocational acts concatenate a whole series of routine human (and artefactual) interactions into automated commands. In some ways this is just another case of other modern technological arrangements that store things up so that they are available to be called into action: the plane standing ready on the runway or the dam storing water to be used to generate hydroelectric power — what Heidegger refers to as standing reserve (Heidegger 1977). However, the capacity to perceive and act upon standing reserves

of materials is significantly enhanced by invocational media. Computers are not only repositories of databanks that can be called into action. Their greater significance is in their capacity to articulate calls. Computers are very versatile prostheses that participate in articulating language acts and tracking promises, commitments and other acts (Winograd and Flores 1986).

So what makes invocatory acts distinctive? If we return to Austin for a moment, he identifies three types of speech act: locutionary, illocutionary and perlocutionary. These are not different types of act, so much as different dimensions or levels that may apply to any language act. The locutionary is the act of speaking. It is felicitous if the utterance is grammatically coherent and comprehensible. The illocutionary act is what speaking the utterance does. It is successful if the promise is made, the bet is taken or name is believed. This illocutionary transformation occurs virtually instantly at the moment that the utterance is made. The perlocutionary act is the effect produced in the addressee. The person to whom the promise is made may be reassured; the person you are betting with may be unnerved or excited.

In natural language interactions, the relationships between locutions, illocutions and perlocutions can already be quite complex. A promise must be heard, believed and followed up on. Hyperlinks offer pre-constituted locutionary acts — what I refer to as avocations. An avocation offers a specific invocational function, which in this case is suggested by the text within the link: '[click here for more details](#)', and also in the status bar, which specifies more precisely the invocatory effect that will result, by showing the URL. The URL is the key to the invocation, as it is both comprehensible to humans and readable to the machine. It both names the invocatory act, and performs it.

Avocations call on users to invoke. The hyperlink text is written to invite, seduce, implore or otherwise persuade users to click. Often spatial metaphors (back, forward, up, down) operate as naturalistic systems of avocation that structure how users imagine what they are doing when they are invoking other web pages. But these spatial cues are secondary to the invocatory mechanisms of the avocation.

The link itself works like a button that summons up a whole set of performative effects, including both technical operations and natural language acts. The invoked web page appears in a browser window, replacing the existing page. Usually the new page bears some meaningful relation to the page that invoked it; but this is technically arbitrary (and must be written in by the web author). At the same time, the web server registers a hit. In some websites, the user may also make an ordinary language illocutionary act — such as making a purchase — that may be recorded on a database on the server. If so, the force of this promise is sealed by the system. A perlocutionary act may also be set in train if the order is made, and begins to be processed. The bureaucratic procedure for shipping the purchased object is set in train. Avocations concatenate complex sequences of language acts — promises, orders, records and so on — into simpler invocatory acts.

### ***Web evocation***

Of all the events triggered after a click on a hyperlink, the most obvious to the user is that there is a new page in the browser window. The page presents a new spatial configuration: typographic forms; visual design; possibly photographic or graphical

images. The way the new screen has come up is like a cinematic edit, which often switches to a new angle within a consistent imagined space. If the web is read purely as a visual form, this parallel would be quite irresistible.

When the browser reconstitutes a web page in space, this is the evocatory dimension of the invocatory act. The invocational assemblage, with its inputs, processors and outputs, drew from available technical and cultural resources. Outputs are based on technologies of the spectacle: television screens, loudspeakers and motors. These give a face to what is invoked, and summon all manner of tricks and illusions to evoke effects that users will recognise and respond to. The evocations of webpages are predominantly typographic, and summon texts that are recognisable as equivalent to writing on paper.

It is important to keep the three functions distinct from one another. The invocation is the call sensed by input devices that summons up something new. The avocations invite the user to click, and establish vocabularies and fields of potential for invocatory acts. The evocatory processes present the invoked entity as something perceptible. What distinguishes the web as a media form is the particular configuration of avocations, invocations and evocations.

It is retrospectively possible to identify these features in other media forms such as cinema. Ellis talks about role of movie posters and promotion in establishing a narrative image of cinematic works that generate the viewers' desires to see a film (Ellis 1982). These are part of the avocational forces that call viewers to the film. The processes equivalent to invocations are more differentiated, and usually require deliberate interventions. Viewers travel physically to a special purpose location, purchase a ticket, eat popcorn and so on. Meanwhile, the cinematic apparatus also requires special preparation. Cinema privileges evocational rather than invocational mechanisms. The techniques for calling up a particular film are relatively cumbersome: involving moving large spools of celluloid film. The arrangements are highly appropriate for audiovisual spectacle and narrative.

If the familiar trope of media convergence means anything, it relates to the emergence of assemblages that smooth paths between these three operations in media technology: avocations, invocations and evocations.

### ***Invocatory actions***

Of all contemporary genres of invocational media content, the web is relatively static and lacks audiovisual intensity or invocational flow. Video games are much more slick and seamless than websites. Invocatory acts on the web occur as discrete events: one page replaces another page, and the action usually stops until the user invokes another link. The restricted palette of web design has actually been one of the reasons for its success, at both the level of production and consumption. Producers require minimal technical training to create adequate and functional pages and links between pages. Consumers of web content remain oriented by the simple (if problematic) navigation principles of back and forward along the sequence of pages that they have browsed.

But what happens to the discrete invocatory acts — the interplays between avocation, invocation and evocation — in computer games and other invocational

environments? It can often be impossible for users to distinguish between these three operations. These are no longer simple invocationary acts, but invocationary actions.

Invocationary actions string invocations into evocations that open onto further avocations. The output of one process becomes the input for another. This embodies the fascination that the discipline of cybernetics had for feedback loops (Hayles 1999). Even something as simple as moving a mouse across the screen is actually performing a series of invocations! The medium of the GUI seamlessly integrates the avocations (the capabilities in the icons, menus, and even the pointer itself), the invocations (the user's gestures and commands), and the evocations (screen images and sounds). The design priority in the GUI is given to offering users invocational flexibility and avocational transparency. Users should feel like they have constant opportunities to intervene. This is different from television, which privileges evocation, even if remote controls give some invocatory powers.

Like invocationary acts, invocationary actions also compress speech acts into their flow. This is most apparent in video game play. The games engine automatically registers the score and status of the players and other elements in the game. Locutionary acts (each player's movements), illocutionary acts (each player's score, health, weapons) and some perlocutionary acts (a player's capabilities are removed when they die!) are integrated into the flow of invocationary action in the game world.

Many invocationary actions generate a sense of cyber-spatiality. Computer games play fields or architectural walk-throughs are experienced as spatially integrated. However, these invoked spaces are always invocationary actions. Space is only one of many possible effects that may be invoked; and invocations can easily break out of the spatial logic of the simulation. The other preoccupation of computer science is to invoke intelligent behaviours — a function that lacks any spatial dimensions.

So now having passed through the critique of spatialising metaphors for the web, we have returned to them once again. Video games in particular allow players to perform complex invocationary actions within rich and consistent evocational spaces. However, invoked spatiality is always a secondary phenomenon. If the power fails you're always still in the same place!

### ***The theory of invocational media***

In this article, I have tried to introduce the theory of invocational media, and to show how it applies to the medium of the World Wide Web. In doing so I have used a series of unfamiliar terms centred on the premise that computers are characterised by their capacity to invoke. It is difficult to break out of the dominant conceptions of the Internet and of computer media: digital computation (Chesher 2002), artificial intelligence and cyberspace. My strategy is to critique the dominant conception of computers by developing an alternative. Many discussions in new media policy and theory lumber under the weight of cumbersome and misleading metaphors. In calling these into question, and proposing others, the concept of invocational media opens up discursive spaces to address relationships between aesthetics, ethics, politics and technology.

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