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Feedforward, I. A. Richards, Cybernetics and Marshall McLuhan

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Abstract: I. A. Richards' development of feedforward is reviewed. The impact of feedforward on the work of Marshall McLuhan is then surveyed and shown to have influenced his use of figure/ground, the user as content, the content of a new medium is some older medium, the use of the probe, effects preceding cause, avoidance of a point of view and roles versus jobs.

Keywords: Feedforward, cybernetcs, McLuhan, Richards, figure/ground, media

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1 Introduction

The term feedback is a commonly used term that most people are familiar with. Googling the term feedback resulted in about 2.48 billion hits. Less familiar is the term feedforward, which elicited only about 2 million hits less than 0.1% of the hits for feedback. The concept of feedforward, which I will introduce to you in this essay, is a very powerful concept that was first formulated by I. A. Richards in 1951 and which subsequently had an important impact on the work of Marshall McLuhan. The thesis that I intend to develop in this essay is that I. A. Richards' notion of feedforward had a feedforward effect of the work of Marshall McLuhan and helped McLuhan or at the very least influenced McLuhan to develop a number of his key ideas, including:

1. the notion of figure/ground,
2. "the user is the content,"
3. the content of a new medium is some older medium,
4. the use of the probe as a research tool,
5. the idea that effects can precede causes,
6. the notion that a point of view is best avoided in doing research, and
7. the prevalence of roles versus jobs in the electric age.

We will first examine Richards' development and use of the notion of feedforward in his study of rhetoric and then demonstrate how the notion of feedforward impacted McLuhan's approach to the study of media. This essay as suggested by Peter Zhang is basically about "the migration of 'feedforward' from I. A. Richards to Marshall McLuhan in the age of cybernetics."

2 I. A. Richards and the Formulation of Feedforward

I. A. Richards' area of research was rhetoric, which he considered to be more than just the art of persuasion. Richards was concerned with the accuracy of human communication. He considered the field of rhetoric to be about finding remedies for avoiding misunderstandings and hence improving communication as well as understanding how words work. He believed the notion of feedforward was an important tool for achieving these ends. Feedforward is basically a form of pragmatics where pragmatics is the use of context to assist meaning.

Richards considered his formulation of feedforward to have been one of his most important accomplishments. In an article entitled The Secret of "Feedforward" he was invited to write for the Saturday Review summing up his life's work, he wrote,

> *The process by which any venture of [a] creative sort finds itself, and so pursues its end, is something I have learned, I hope, something about. Indeed, I am not sure I have learned anything else as important… I realize now what a prime role belongs to what I called "feedforward" in all our doings. Feedforward, as I see it, is the reciprocal, the necessary condition of what the cybernetics and automation people call "feedback."*

The term feedforward according to the Oxford English Dictionary (OED) was first introduced into the English language by I. A. Richards in 1951 at the 8th Macy Conference entitled *Cybernetics: Circular Causal and Feedback Mechanisms in Biological and Social Systems* in a talk entitled "Communication Between Men: The Meaning of Language." Here is the full entry for feedforward in the OED:

> *feed-ˈforward n. [after feedback n.] (a) the use of calculated or presumed future states of a process to provide criteria for its adjustment or control; anticipatory control; (b) the modification of the output signal of a circuit by a part of the input signal that has not passed through the circuit.*
>
> *1952 I. A. Richards in Cybernetics: Trans. of Eighth Conf., 1951 54. You have no doubt fed forward enough to see that what I am going to talk about from now on is feedforward. I am going to try to suggest its importance in describing how language works.*
>
> *1961 E. J. Baghdady Lect. Communication Syst. Theory xix. 505 The feedforward operation… can be extended so that the amplifier bridges two or more cascaded narrow-band limiters.*
>
> *1963 Engineering 6 Dec. 726/3 Anticipatory (feed-forward) control predicts the effect of input variables on output variables by solving transfer equations.*

Richards as the OED noted first introduced the term feedforward in his address to the Macy conferees in 1951, which subsequently appeared in print in the transactions of that meeting published in 1952. Here is the full passage from Richard's 1951 talk where he first introduces the term feed forward:

> *Perhaps this thing on which I want to put the spotlight will be considered to be included in some ingenious way under the word "feedback." But what I am going to stress stands in an obvious and superficial opposition to "feedback," and it will, in certain frames of thought, be given nearly, if not quite so much, importance, and sometimes more importance than feedback itself in certain connections. It is certainly as circular. You have no doubt fed forward enough to see that what I am going to talk about from now on is feedforward. I am going to try to suggest its importance in describing how language works and, above all, in determining how languages may best be learned (Richards 1952, 54).*

The coining of the term by Richards was no doubt influenced by the term feedback used by cyberneticians and according to the OED first introduced into the English language in 1920. But as Richards pointed out feedforward stands in superficial opposition to feedback. Feedback is basically reactive whereas feedforward is proactive. Feedforward anticipates where one is headed and sets one's goals. Feedback allows one to see how close one gets to their goals. Richards who stressed the importance of providing the context of what one wanted to communicate might have coined the term feedforward to complement the term feedback used by cyberneticians precisely because the audience that he was addressing at the Macy Conference included the man who coined the term cybernetics, namely Norbert Wiener as well as other prominent folks in cybernetics including Ludwig von Bertalanffy, Warren McCulloch, Walter Pitts, Claude Shannon, Gregory Bateson, and Heinz von Foerster.

The term feedforward as used by Richards suggested that in order to have one's communication understood it was necessary to literally feedforward the context of what one

was planning to talk about. If I were to suddenly tell an audience that Jackie Robinson was a great ball player because during the first game of the 1955 World Series he singled to right, stole second and then third and then stole home, many unfamiliar with baseball might not know what I was talking about. Even if they knew that Jackie Robinson was a famous baseball player they might not understand Robinson's incredible feat unless I provided a little background as to how the game of baseball is played. This is an example of the way in which feedforward can improve the accuracy of human communication. Richards once suggested that for there to be perfect communications between two people they would have to have had the exact same experiences throughout their lives. As this is impossible one way to remedy this situation is through feedforward.

Ironically Richards' lack of feedforward in the written account of his Macy Conference presentation led to a misunderstanding on my part when I read the transaction of his talk where he made use of the term 'tapings.' When I read the transcript of his 1951 talk I could not for the life of me understand his use of the term tapings in the following sentences: "I am trying to draw to attention to what is the distinctive mark of what I am calling feedforward. Very probably some of you will be thinking that there is nothing here but 'taping'–if I may use that as a technical term here." It was only after I read his 1955 book *Speculative Instruments* where I learned that taping was a verb referring to feeding information into a computer with the use of tapes. Today with microelectronics and integrated circuits we no longer use tapes to feed information to a computer but back in 1951 the technical term taping meant feeding information into a computer which Richards associated with his new term feedforward since the information fed forward into the computer determined its output. By 1951 the tapes used to feed info into the computer were magnetic but the term dates all the way back to the use of the term by Alan Turing for his description of a 'Turing machine,' defined as a hypothetical device that manipulates symbols on a strip of tape according to a table of rules. My misunderstanding illustrates Richards' thesis that feedforward is essential for avoiding misunderstandings. Richards' lack of feedforward for the term 'taping' in his 1951 talk to a group of cyberneticians had no consequence for his audience because they were familiar with the metaphoric use of the term but for me reading his text in 2013 the term 'taping' completely baffled me.

The term feedforward that Richards coined for his Macy Conference presentation caught on and was picked up at first by the cybernetics community, which up until then had only made use of positive and negative feedback. Negative feedback is feedback that reduces changes in the system to some preset norm. The effect of positive feedback is that a small perturbation in a system tends to build and the perturbation grows bigger with time. Perhaps it was because Richards had introduced the term feedforward to the leaders of the cybernetics community that the term was picked up by them and through them introduced to other fields such as control systems, management, neural networks, cognitive studies and behavioural science.

3 McLuhan's Explicit Use of the Term Feedforward

Richard's term feedforward also made a big impression on his former student Marshall McLuhan. McLuhan wrote to Richards on June 12, 1968 thanking him for mentioning in his book, *So Much Nearer: Essays Towards a World English*, McLuhan's thoughts on the idea of complementarity in quantum mechanics. "I want to mention at once my gratification at your kindly reference to me on page 63 of So Much Nearer. Naturally, I owe you an

enormous debt since Cambridge days." Towards the end of the letter McLuhan writes, "Your wonderful word 'feedforward' suggests to me the principle of the probe, the technique of the 'suspended judgment', which has been called the greatest discovery of the 20th century." (Molinaro, C. McLuhan, and Toye. 1987, 355).

McLuhan would not have learned about feedforward in his student days when he took a course with Richards since Richards first used the term in 1951 by which time McLuhan was already teaching at St. Michael's College, University of Toronto. I presume McLuhan encountered the term feedforward reading one of Richards' essays, which introduced the term. Some have suggested that McLuhan encountered the notion of feedforward in the 1930's when he studied with Richards. Terrence Gordon (2010, 118) wrote, "The book [War and Peace in the Global Village] looks and feels light years away from the Cambridge University of the 1930s where McLuhan trained, but that was just where McLuhan had picked up the idea of feedforward from his teacher I. A. Richards." I do not believe this is the case as it was not until 1951 that Richards first used the term feedforward. Although McLuhan might not have heard the term feedforward from Richards in the 1930's at Cambridge, Richards introduced him to an approach to communications in which the notion of feedforward could be easily grasped by McLuhan once it had been formulated. In other words McLuhan was fed forward a way of looking at communications such that the notion of feedforward once it was formulated could be easily integrated into his thinking.

McLuhan made explicit use of the term feedforward in the following quotes where I have bolded the term feedforward and also in the title of his book *War and Peace in the Global Village: An Inventory of Some of the Current Spastic Situations That Could be Eliminated by More* ***Feedforward*** (McLuhan 1968).

> *Computers offer the potential of instantaneous translation of any code or language into any other code or language. If a data feedback is possible through the computer, why not a feedforward of thought whereby a world consciousness links into a world computer? Via the computer, we could logically proceed from translating languages to bypassing them entirely in favor of an integral cosmic unconsciousness somewhat similar to the collective unconscious envisioned by Bergson. The computer thus holds out the promise of a technologically engendered state of universal understanding and unity, a state of absorption in the logos that could knit mankind into one family and create a perpetuity of collective harmony and peace. This is the real use of the computer, not to expedite marketing or solve technical problems but to speed the process of discovery and orchestrate terrestrial — and eventually galactic — environments and energies (McLuhan 1969).*
>
> *Poets and artists live on frontiers. They have no feedback, only feedforward. They have no identities. They are probes.' (McLuhan 1970, 44).*
>
> *At instant speeds in our resonant Echoland, it is fatal to "wait and see". Feedback" relying on experience is now too slow. We must know in advance of action. The "feedforward" of knowledge based on pattern recognition of process is essential for reprogramming beyond ideologies. What had always appeared inevitable can thus be bypassed (E. McLuhan and Zingrone 1995, 77).*
>
> *The technique of cliché-as-probe, by contrast, 'is always at the "interface" of discourse': 'feed[ing]-forward ... but always engaged in retrieving old clichés from every sphere of human activity' (McLuhan and Watson 1970, 164).*

4 The Impact of Richards' Feedforward on the Thinking of Marshall McLuhan

Aside from these explicit uses of the term feedforward by McLuhan the idea of feedforward influenced many of McLuhan's techniques for studying media and their impacts. We will examine seven key ideas that McLuhan made use of in his analysis of media that might be linked to Richards' notion of feedforward. One cannot determine with absolute certainty that McLuhan developed these notions as a direct consequence of his professor but we offer these putative connections in the spirit of McLuhan's notion of probes.

1. Figure/ground

Perhaps the most important of these was McLuhan's use of the dichotomy between figure and ground, which played such a significant role in McLuhan's work (Logan 2013, 185-89). Essentially what a communicator feeds forward according to Richards is the ground for the figure of the primary message the senders wishes to send to the receiver. Just as the meaning of the primary message depends on the information that is fed forward so is the meaning of a figure dependent on the ground in which it operates. The impact of feedforward in helping McLuhan develop his thinking in terms of figure/ground is amplified because many of McLuhan's insights revolved around his figure/ground distinction such as "the medium is the message" where the content of a medium is the figure and the medium is the ground and hence the message. Others dichotomies include percept (ground) versus concept (figure); the service (figure) and disservice (ground) of technology; the producer (figure) versus the consumer (ground); and specialization (figure) versus interdisciplinarity (ground).

2. The user is the content

In the book The Making of Meaning co-authored by C. K. Ogden and I. A. Richards (1923) the thesis was developed that the meaning of a word does not intrinsically reside in the word itself but rather its meaning is determined by two factors, namely the context in which the word is used and the experiences of the reader or the listener. This is why Richards 18 years later proposed that feeding forward the context of one's principal message was the key to communicating one's intended message, which depends as much on the receiver's interpretation as it does on the sender's intention. If the meaning depends on the experiences of the reader or listener, then as McLuhan suggested, there is a sense in which "the content is the user" as it is the experience of the "user" which contributes to the meaning of the content of any communication. McLuhan's "the user is the content" parallels the insight of his teacher I. A. Richards.

3. The content of a new medium is some older medium

The content of an older medium is fed forward to the new medium and hence becomes its content. The context in which the new medium operates is that of the older media from which it initially draws its resources. It is only after some time passes that the new medium generates content that is unique to it.

4. The use of the probe as a research tool

The probe, which was McLuhan's modus operandi for doing research, is nothing more than feeding forward an idea and then exploring what insights it provides and determining how well it illuminates or describes the phenomena that one is probing.

5. The idea that effects can precede causes.

Effects are a form of feedforward that leads to new causes. The effect of the printing press was a form of mass production and eventually became the feedforward that caused the Industrial Age. The effect of the telegraph was a form of feedforward that led to the

telephone. In a letter to Ashley Montague, McLuhan wrote, “I feel compelled to consider causation as following effects. The effects of the telegraph created an environment of information that made the telephone a perfectly natural development (McLuhan, M. and E. McLuhan 2011, 4).”

The effect of electric mass media and the speed up to the access of information was a form of feedforward that led to computing and the digital age.

> *The reversal of cause and effect is the technique of the artist who begins with the effect he or she wants to create in his or her audience and invents a work of art that achieves that end. The reversal of cause and effect is one of the consequences of electronically configured information patterns and the need for the cybernetic feedback and feedforward of information. The speedup of information flow requires planners to have complete knowledge of all possible ultimate effects, and hence the need for the reversal of cause and effect [and hence feedforward]. (Logan 2010, 373)*

6. The notion that a point of view is best avoided in doing research.

A point of view operates as a form of feedforward that provides a context through which the world is viewed. If one is to conduct research and begins with a point of view (POV) then one will bias their exploration. It was for this reason that McLuhan claimed that he did not operate from a POV nor did he have a theory. Of course as much as he protested that he worked without a theory or a point of view that denial in itself represents the denial of a POV point of view.

> *Whenever provoked, Marshall McLuhan would declare, Look, I don’t have a theory of communication. I don’t use theories. I just watch what people do, what you do…Just as he often said, Marshall McLuhan did not have A Theory of Communication and that he did not use theories in his work. Of course, he did have definite notions about what constituted communication and what did not. He would aver that he “used observation”; he used “probes.” It is a matter of how you begin: if you begin with theory, then one way or another your research winds up geared to making the case for or against the truth of the theory. Begin with theory, you begin with the answer; begin with observation, you begin with questions. A theory always turns into a scientist’s point of view and a way of seeing the job at hand. Begin with observation and your task is to look at things and to look at what happens. To see. That necessitates detachment, and training of critical awareness (McLuhan, Eric 2008, 26).*

7. Roles versus jobs in the electric age.

McLuhan (1969) wrote,

> *Acceleration of information movement can have, as one of its consequences, a multiplicity of jobs for everybody, joblessness as the consequence of automation may well mean the end of the single job for the single lifetime, and the switchover to a multiplicity of jobs for every lifetime.*

He went even further suggesting that, “in the electronic age… you cannot have jobs; you can only have a role (McLuhan, McLuhan, Staines 2003, 155).” A role is a form of feedforward that determines the kind of jobs that one will perform.

8. Quantum Mechanical Complementarity

The complementarity principle, a basic premise of quantum mechanic, was first introduced by Niels Bohr and states that the wave and particle description of the basic elements of nature such as electrons and photons are complementary and depend on the nature of the experimental apparatus by which they are observed. Complementarity influenced Richards' notion of feedforward and later McLuhan's idea of figure/ground and the reversal of cause and effect.

> *Niels Bohr's complementarity that represents 'atomic' interactions as both 'acoustic' waves and 'visual' particles is exemplified by every process involving the continuous interplay of simultaneous actions…. Such complementarity of figure-ground appears as a causal relation in all 'pre-packaged' processes. Complementarity is the process whereby effects become causes. Today, as causes and effects merge instantaneously, the new common ground is neither container nor category, but the vastness of space via media (McLuhan and Nevitt 1972).*

5 Conclusion

Although the role of feedforward is not given the attention it deserves I hope that I have demonstrated that it played a major role in the thinking of Marshall McLuhan and it is more worthy of the attention it has yet to receive. If I. A. Richards is correct and feedback and feedforward are circular, which seems rather obvious, the we best pay better attention to feedforward, which is the principle feedforward of this essay. McLuhan's use of feedforward and its integration into his work supports an earlier thesis of mine that McLuhan is a systems thinkers (Logan 2013, Chapter 4).

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