

Previous Attempts to Debunk the Mythical Retention Chart and Corrupted Dale's Cone

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Critics have been attempting to debunk the mythical retention chart at least since 1971. The earliest critics, David Curl and Frank Dwyer, were addressing just the retention data. Beginning around 2002, a new generation of critics has taken on the illegitimate combination of the retention chart and Edgar Dale's Cone of Experience—the corrupted cone. Because the corrupted cone has flared up in the literature of different fields, we tend to see a variety of firefighters trying to beat back the brush fires in their own particular fields, including teacher education, engineering education, and educational technology.

Introduction

We are not alone in noticing the proliferation of the fictitious retention chart, and later the conflation of that chart with Edgar Dale's Cone of Experience, in the form of "the cone of learning" or "the learning pyramid." Scholars have commented on one or another of these aberrant constructs since the early 1970s, continuing up to the present time. They call attention to the murky provenance of the retention data, as well as the total implausibility of the data as a product of research, and then to the inappropriate overlay of those figures onto Dale's Cone. The purpose of this article is to document some of the most significant critiques that have been offered over the years and comment on their scope and reach.

Early Claims and Early Critics

Letrud (2014) has documented the appearance of primitive versions of the data that were later incarnated into the

infamous retention chart early in the 20th century. They appeared more and more frequently in published form in the years after World War II, roughly correlated with the growth of the audiovisual movement. The retention chart lent credence to the notion of superiority of auditory and visual media over simple verbal transmission. The neat and easy generalizations of the retention chart appealed to audiences unfamiliar with actual research on the learning process, so it is not surprising that usage proliferated among instructors in the large domain of non-formal adult education.

In the companion article, "Timeline of the Mythical Retention Chart and Corrupted Dale's Cone," we document versions of the retention chart in publications of the US Department of Agriculture, with diffusion to agricultural extension agents around the United States; in publications of the US Department of Labor and several of its units, such as Mine Safety; and in publications of the US Navy, particularly the Bureau of Naval Personnel.

Prior to the conflation of the retention chart with Dale's Cone, there was only a scattering of reference to the bogus retention data in the literature of K-12 or higher education, and it tended to be labeled as "an old maxim," not fresh research data. The audiovisual movement was gaining traction in formal education, but its advocates generally were conversant enough with educational research to know the difference between old maxims and experimental research findings.

Hence it is not surprising that the first published criticisms of the fallacious retention chart came from audiovisual professionals and were directed toward audiences in non-formal adult education.

David H. Curl

The earliest critic we have found is David H. Curl in 1971. He is speaking to an audience of training directors in his regular monthly column, "AV Training," in *Training in Business and Industry* (Curl, 1971). He presents the canonical retention statistics—10% of what they read, 20% of what they hear, and so on (see Figure 5),* but he does not cite any specific source, stating only that "they have appeared in textbooks, have been cited as gospel in countless training seminars and courses, and have been used to justify great expenditures of funds" (p. 12). It is important to note that at this point in time, 1971, there had been no examples that we have found of the retention data overlaid on Dale's Cone of Experience. Dale is mentioned nowhere in Curl's column.

Concerning the genesis of these figures, he notes that "I remember learning these figures (by rote) in a college course back in the early 1950s" (p. 12). And where did

* As explained in the *Introduction*, all of the 16 Figures referenced in the articles comprising this special issue are placed together in a separate, dedicated section of this issue rather than being dispersed across the issue.

they come from? Curl says "We were told that research by the Armed Forces had established those classic learning and retention figures and that Socony-Vacuum Oil Co. had substantiated their validity" (p. 12).

Curl is the first to locate the retention chart in the immediate post-World War II era and to connect it both with the military and an oil company, indicating that the retention chart was either codified or at least popularized by Col. Paul John Phillips, who served as a trainer at Aberdeen Proving Grounds during World War II and later taught extension courses related to the petroleum industry. Curl bases this origin theory on the form letter originating from the University of Texas sent out during the 1970s by the Mobil Oil Corporation in response to inquiries about a purported "Socony-Vacuum" research project (Cyrus, 1963; shown in full as *Exhibit 13*).^{*} This is the same form letter received by Dwyer (1978) and discussed in greater depth elsewhere in this special issue in "The Mythical Retention Chart and the Corruption of Dale's Cone of Experience." As is typical of research on this topic, Curl encountered this information in the draft of a report by a graduate student, John Pollak, circulated informally. There is no trace of a formal publication by that student on this topic, and Curl no longer has the draft document, so all we have is what Curl gleaned from that draft and reported in his column.

Still, Curl demolished the pseudo-scientific basis of the retention chart on logical grounds, and he also provided a plausible story about where the mythical data came from. But the myth did not die.

Francis M. Dwyer, Jr.

Frank Dwyer's 1978 book, *Strategies for Improving Visual Learning*, is not exactly a myth-busting source. It presents the retention chart (as in *Figure 5*) and discusses it in the context of naïve beliefs about visual learning (p. 11). However, since the caption on the chart does not explicitly refute the chart's claims (it merely says "How we remember"), a superficial reading might even leave the impression that these figures are worth consideration. This is in no way a legitimate interpretation of Dwyer's intent—which is to consign it to the scrapheap of naïve formulations—but it is a mistake that could be made.

Dwyer's source for his version of the retention table, which he refers to as "data distributed by the Socony-Vacuum Oil Company," is DeForest G. Treichler's 1967 article. Given Dwyer's status as a leading researcher in the field of visual learning, it is likely that his citation of Treichler and "Socony-Vacuum," unfortunately, lent confidence to later writers to view these sources as worthy of some credibility.

^{*}As explained in the *Introduction*, all of the 13 Exhibits referenced in the articles comprising this special issue are placed together in a separate, dedicated section of this issue rather than being dispersed across the issue.

In any event, after 1978 there is an absence of further critique of the mythical retention data in the literature of educational technology. It is fair to conclude that the issue had been put to rest among serious scholars of visual learning. Further critique only resumed in the 2000s after the retention data had been overlaid on Dale's Cone to form the corrupted cone, which gestated in the murky world of ephemeral literature and eventually bloomed profusely on the World Wide Web.

Conflation of the Retention Chart with the Cone

As is discussed in greater depth in "The Mythical Retention Chart and the Corruption of Dale's Cone of Experience," it is unknown exactly when and by whom the mythical retention data were overlaid onto Edgar Dale's Cone of Experience, but it was certainly before 1977, when Ann R. Bauman's manual (*Training of Trainers*, 1977) and Nutting's book (*Family Cluster Programs*, 1977) were published, displaying visuals similar to our *Figure 14* and *Figure 16*. Stice (2009) and others testify to seeing the corrupted cone in the early 1970s.

Once the two concepts were conflated, uncritical educationists were drawn to it like bees to clover. After all, Edgar Dale was a famous and serious scholar in audiovisual communications, so his name added extra credibility to what was already a most attractive factoid. Further, Dale retired in 1970 and died in 1985, so he was not around to defend himself. In the 1980s and 1990s the most common representation of the corrupted cone resembled our *Figure 11*.

The corrupted cone was not subjected to much scholarly scrutiny because it did not appear in published books or articles of a scholarly nature; it appeared mainly in the form of handouts given out by college instructors, corporate training directors, and adult educators and in the form of slide presentations given at conferences. The corrupted cone has tended to be used in situations in which the user could get away with a vague attribution or none at all. In papers where authors expect more scholarly scrutiny, they sometimes reach to connect the corrupted cone with some respectable source. Some mythical sources are created out of thin air, such as "British Audio-Visual Society" (*Exhibit 1*), an organization which does not exist, or "Chi, Bassok, Lewis, Reimann, & Glaser" (*Exhibit 2*), an article that exists but has nothing to do with Dale's Cone.

Other authors at least cite actual works by Edgar Dale (*Exhibit 3*) but do not go to the trouble of looking at the works to find out that they do not actually contain the fallacious percentages. Also falling into this category are those who cite "Wiman and Mierhenry" [*sic*] (*Exhibit 12*). If the users of this citation had actually looked at the book edited by Ray Wiman and Wes Meierhenry, they would have seen that the only—passing—references to Dale were made by authors other than Wiman and Meierhenry. And, of course, those passing references refer only to the

Cone of Experience that was actually devised by Edgar Dale (see *Figures 2 and 3*), and not the bogus retention data or the corrupted cone. This widespread erroneous attribution is discussed further in "The Good, the Bad, and the Ugly: A Bibliographic Essay on the Corrupted Cone."

Some authors—or their representatives—have the effrontery to claim ownership credit for the retention chart or the corrupted cone, for example, Forrester Research (*Exhibit 7*), Glasser (*Exhibit 8*), and National Training Laboratories (*Exhibit 10*). As we will demonstrate throughout this special issue, while the origins of the bogus retention chart and corrupted cone are cloudy, they were certainly not created by Forrester Research, William Glasser, or National Training Laboratories (NTL). The Forrester case is egregious as an act of knowing appropriation. The Glasser and NTL cases are more forgivable because third-party authors seeking some authoritative cover used Glasser and NTL as sources, and then the organizations decided to simply accept the accolade, even though they could not show any intellectual contribution to either the bogus retention chart or the corrupted cone.

The corrupted cone spread slowly in the 1980s and early 1990s, mainly via hand-to-hand transmission. However, once the World Wide Web gained traction in the mid-1990s, reaching over two billion users by 2012, ideas—both good and bad—could be disseminated to more and more people by more and more people. And so the phenomenon of so-called "Dale's Cone of Learning" or the "Learning Pyramid" took flight.

More Recent Critics

As the corrupted cone spread far and wide in the 1990s and 2000s, David Curl's 1971 critique and Dwyer's 1978 critique were lost in the distant haze. But a new generation of myth-busters began to speak out.

Lawrence J. Najjar

One of the earliest critics in the Internet Age is Lawrence J. Najjar, a psychology researcher at Georgia Institute of Technology, in 1996. His intent is to "determine whether there is empirical support for the assumption that multimedia information presentation improves learning" (p. 1). Najjar undertakes this quest because of the widely disseminated belief in the superiority of audiovisual presentation over verbal presentation, of which the infamous retention chart is only one example. So Najjar does not specifically debunk the retention chart, merely using it as a launching pad to examine the assumptions embedded in it. He concludes that although there is no general superiority of mediated presentation, there are specific situations in which specific types of auditory and visual presentation can improve learning.

Alan Januszewski and Anthony K. Betrus

A larger wave of critics emerged in 2002, including all of the authors of this special issue. At the 2002

AECT convention, Januszewski and Betrus, from the Educational Technology program at the State University of New York at Potsdam, presented an extensive review and critique of nine examples of the corrupted cone, including *Figures 4, 5, 10, 12, and 14*. They were the first educational technology scholars to comprehensively dissect the claims of Dale's original Cone, the original retention chart, and a wide range of corrupted combinations of the Cone and retention data. They demonstrated the fallacious nature of both the retention chart and a wide range of corrupted cones.

Deepak Prem Subramony

About the same time, Deepak Subramony, then a doctoral candidate at Indiana University, was writing his deep analysis (2003) of the original Dale's Cone itself and then the misuses of the Cone "as a practitioner's guide" (p. 26). He goes on to extend his analysis to include conflation of the Cone with the bogus retention data. He also adds five more examples of fallacious uses of the Cone beyond those examined by Januszewski and Betrus and Thalheimer.

Michael H. Molenda

Michael Molenda, in the Instructional Systems Technology faculty at Indiana University, was investigating the origins of the corrupted cone around the same time as part of an encyclopedia entry on the Cone of Experience (Molenda, 2003) that he submitted in November 2002. In it he focused on what Edgar Dale said about his Cone in the several editions of his textbook between 1946 and 1969. He added a brief discussion of the conflation of the Cone with the retention chart and reported his initial research into the origins of the retention chart.

Since Subramony's critique (2003) appeared shortly after, Molenda hitch-hiked on Subramony's article by writing a "Reader's Comment" that appeared in *Educational Technology* (2004) shortly after Subramony's article. In this "comment," he reported at greater length his inquiries into the origin story of the US Army Ordnance School during World War II, discussed at length in "The Mythical Retention Chart and the Corruption of Dale's Cone of Experience."

Will Thalheimer

Independently, and around the same time, Will Thalheimer, a leading research-based corporate training consultant, was preparing a devastating criticism of the retention myth. His blog, "Bogus Research Uncovered" (2003), appeared on his Website, "Work-Learning Research" early in 2003. In it, Thalheimer uses one of the bogus citations, *Exhibit 2*, as a particularly egregious example of the malpractice surrounding the corrupted cone. He goes on to examine other bogus citations, especially *Exhibit 12*, to trace their origins, and to demolish their credibility.

Jeremy E. C. Genovese

Busting the retention myth reached a mass popular audience in 2004 when Jeremy Genovese zeroed in on the retention chart in *Skeptic* magazine (Genovese, 2004). He was speaking to an audience interested in refuting pseudo-scientific claims that take hold in popular culture, such as UFOs and Ouija boards. To begin with, Genovese is bemused that the standard rendering of the retention data fall so neatly into rounded results—10%, 20%, 30%, etc. This clearly appears very suspicious. Then there is the projection of the retention data onto Dale's Cone. Genovese quickly grasps the absurdity of this, noting that Dale's works never mention any percentages. He notes that, indeed, Dale's Cone is describing a completely different dimension in its categorization of materials and methods. He concludes that "It could be argued that Dale's Cone presents a much more complex model that is trivialized when associated with the claim. All citations of Dale as the source of the [retention] claim are simply mistaken." (p. 56)

By the late 2000s many in the education community were beginning to smell a fish. Even though the corrupted cone was hardly ever cited in scholarly literature, it was polluting discussion of teaching methods *everywhere* on the World Wide Web. On November 1, 2007 a Google search for the search term Dale's Cone turned up 934,000 hits (individual results) and by November 1, 2008 it had risen to 1,100,000! The informal barbs launched by Subramony, Molenda, Betrus, and Thalheimer were beginning to be noticed by other educators and to stimulate them to serious analyses.

James P. Lalley and Robert H. Miller

Lalley and Miller (2007), speaking as education generalists, begin their debunking effort with an overview of the original Cone of Edgar Dale (*Figure 3*), then examine a dozen examples of the corrupted cone—often called "the learning pyramid"—citing several sources beyond those in the Thalheimer, Januszewski and Betrus, Subramony, and Molenda critiques. They do consider the internal inconsistencies of the data in these corrupted cones, but really focus on the issue raised by Dwyer in 1978: if you seriously wished to test learners' retention of presented information, how would you conduct the inquiry? They then proceed with a limited and selected review of recent well-conceived research on the sorts of teaching methods covered in the corrupted cones. Not surprisingly, they conclude that the literature does *not* support the claims of the corrupted cones: "The research reviewed here demonstrates that the use of each of the methods identified by the pyramid resulted in retention, with none being consistently superior to the others and all being effective in certain contexts" (p. 76).

Metiri Group

The bogus retention data have often been trotted out in support of commercial efforts to sell training products or services, as in the case of Forrester Research, discussed

earlier. It is to the credit of Cisco Systems, one of the commercial interests, that they sponsored a study (Metiri Group, 2008) to critically examine the claims of the corrupted cones; in their words, "There is a lot of misinformation circulating about the effectiveness of multimodal learning, some of it seemingly fabricated for convenience" (p. 2). The authors of this study comprehensively survey the same sources examined by Thalheimer, Januszewski and Betrus, Subramony, and Molenda. They include illustrations similar to our *Figures 9, 11, and 14*. They reach the same conclusions as Thalheimer, Januszewski and Betrus, Subramony, and Molenda, noting a plethora of inaccurate citations, unsubstantiated claims, and fallacious combinations of contrasting theoretical models. The bulk of the text, though, is devoted to the question, "Why do people find the Cone of Experience so compelling?" (p. 7). They conclude, for one thing, that "The person(s) who added percentages to the cone of learning were looking for a silver bullet, a simplistic approach to a complex issue" (p. 8). They then review the research on the learning outcomes of single-mode versus multiple-mode presentation, concluding that:

The reality is that the most effective designs for learning adapt to include a variety of media, combinations of modalities, levels of interactivity, learning characteristics, and pedagogy based on a complex set of circumstances. (p. 14)

Keith E. Holbert and George G. Karady

The last major myth-busting effort in this series speaks to a problem specific to the engineering education community. Holbert and Karady (2008) and Holbert (2009), presenting to the American Society for Engineering Education, demonstrate that the bogus retention table (*Figure 5*) has been widely—and wrongly—accepted within engineering education as a scientifically defensible generalization. They point out such absurdities as the fact that the numbers in the chart are reported differently, with six authors presenting six different versions of the numbers! The bulk of their argument is devoted to interpretation of the authors' flow diagram of citations of the bogus retention chart in engineering education literature. They show that the vast majority of authors who cited the retention data gave references that traced back to one article by Stice (1987). When Holbert and Karady contacted Prof. Stice to ascertain the source of his data, "Prof. Stice stated in an email that he received that Socony-Vacuum Oil Co. data 'as a one-page handout at a workshop I attended in the 1970s at the University of Wisconsin-Eau Claire.'" (p. 2) Holbert and Karady chide their fellow engineering education researchers for uncritically accepting bogus data, and appeal to them to expunge all reference to Stice and the "Socony-Vacuum Oil Co. data" as authoritative sources.

Prof. James E. Stice, the perpetrator so roundly criticized by Holbert and Karady, pleaded guilty in a conference presentation the year after Holbert and Karady's initial charges (Stice, 2009). He acknowledged that he could not

validate the percentages in the corrupted cone, and that "I obtained these data as a handout at a 'Train the Trainer' workshop held at the University of Wisconsin-Eau Claire in 1970" (p. 1). He also conceded that Dale's Cone of Experience should not have been conflated with the retention chart. He humbly asked for pardon for his scholarly lapse. Interestingly, Stice continued to maintain that the percentages, although not research-based, still held some intuitive appeal (p. 4).

Kåre Letrud

Critics of the retention chart have continued to come forward in more recent years. We will mention just one of them, because of the special perspective he has brought to the question. The gist of his research is that versions of the bogus retention data have been circulated since at least early in the 20th century in publications both in North America and Europe. So far, Kåre Letrud, of Lillehammer University College, has published only one major article on this question (Letrud, 2012), but unfortunately the text of that article was badly garbled in the editing process, making it difficult to interpret clearly. However, private e-mail communication with him in 2014 has established that he continues to extend his research and will be publishing some major findings about early versions of the retention data in the near future (Letrud, 2014).

Conclusion

In summary, we have shown that although the bogus retention chart has been accepted uncritically by many, a number of authors have striven since 1971 to debunk these fallacious data. Most of the debunking has taken place since 2002, after the mythical data had become associated with Dale's Cone and had metastasized across the breadth of the World Wide Web. The myth has not significantly penetrated serious educational technology literature, but it certainly has acquired a strong foothold in the ephemeral literature of teacher education, special education, engineering education, corporate training, and military and government training. Hence, further efforts at debunking are justified. □

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