# An Age of Digital Media in Accounting and Audit

**The evolution of technology and the flexibility of audit standards**

*by Eric E. Cohen, CPA*

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Audit standards promulgators are considering whether their pronouncements are "broken" and need massive overalls to cope with the evolution of technology, or whether application guidance simply needs to better reflect the digital age.[1] There are many paths to consider, as we have written previously. This time, I wanted to focus on digital media: audio, graphics, images, video and holograms. Can a video be audit evidence? Can a video be part of your audit documentation?

**The Technology Transformation**

Those of us of a certain age remember when text (only) was the dominant output from (and input to) computers and "ASCII (American Standard Code for Information Interchange) art" was the height of graphics; dorm rooms were decorated with banners from large dot matrix printers with Snoopy[2] or more adult themes. Back then, available printers simply lacked graphics abilities, and we were happy to print our columns of text on a dot matrix printer. Soon, rudimentary art came from dot matrix printers, then print plotters with pens for color, followed by ink jet, and then color laser printers.

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Many years ago, spurred on by the evolution of technology around us, I noted in my monthly column in the *Rochester Business Journal*[3] that we had been forced as accountants to transform ourselves because of emerging technology – to move from "business experts" (here's the facts, expressed as text) to "document layout artists" (here's the fact, but doesn't it look good?) to "Steven Spielberg" (the facts are there, but the music and motion is captivating!) just to have our thoughts heard over our competition. This was especially true for onscreen Powerpoint presentations but had some applicability for word processing as well. As long as the final result was paper or paper parallel, like PDF, however, that was not as big a challenge.

Then things began to change. Youtube emerged in 2005, and we became obsessed with video. Want to learn to do something? Find a Youtube video. Cloud computing rolled in starting approximately 2006. The iPhone came out in 2007 and our phones starting becoming our still and video cameras. The Sharing Economy launched in the late 2000s, with AirBnB (2009), Uber (2009) and others of their ilk. I would be remiss to not mention also the virtual world, Second Life, in which some substantial business was taking place.

Office 2010 ushered in interactive documents, and Office 2013 blurred the lines between word processing and "information sharing environment". The on-screen/online document itself became the focus rather than some output from it. Since then, electronic devices replaced paper and online first became mainstream. Webcams were everywhere, including residential front doors (with names like Ring Video Doorbell or Google Nest Hello Doorbell).

Now the use of Artificial Intelligence (AI), drones and imagery are breaking down barriers. A session on this tool for physical inventory was one with the most buzz at August's American Accounting Association (AAA) National Meeting. At the same time, technology is making reliance on digital media even more challenging; the same AI that *gives* also *takes*, with the emergence of "deepfakes."[4] As the Public Company Accounting Oversight Board (PCAOB) and International Auditing and Assurance Standard Board (IAASB) have long noted that original documents are more reliable than electronic copies of those documents[5], even videos are now being altered in very convincing and disturbing ways.

> If you have a chart or graphic, and that chart or graphic has XBRL code inside and represents data from a financial statement, do you have assurance within assurance on assured information?

How is the profession adapting to the trend from static text and the paper paradigm to interactive and digital? When the Sarbanes Oxley (SOx) Act of 2002[6] called for "real time issuer disclosure" with both "trend and qualitative information" including "graphic presentations," has the profession prepared to provide opinions on information, in real time, in images rather than text? Or is the profession – and in particular are the audit regulators – mired in the written-word, paper-based past? Can we audit graphics and video? Can graphics and video be the basis of our audit documentation?

In this article, we discuss the use of digital media – including sound, images, video – as part of the financial reporting and audit supply chain, how audit standards (in particular, those related to audit evidence and audit documentation) contemplate or challenge their use, and additional issues related to digital media.

**Are Audit standards Still Up to Their Job?**

My own study in this area has been with a focus on whether today's audit standards stand in the way of the use of digital media within audit documentation. I presented[7] on this topic at the 2018 World Continuous Auditing and Reporting Symposium (WCARS) conference: images, audit documentation, and support in the audit rules. That presentation served as the catalyst for this article. I explored in particular whether audit standards consider these emerging technologies, and focused on whether the PCAOB's AS 1215[8] had room for images as a core aspect of the audit documentation, as it focuses on the word "written." That standard also speaks to "other media" (beyond "paper" and "electronic" – what else is there: clay tablets?) I expand on the former topic in this article.

My fanboy report is that my primary technical resource for that conference session, Prof. Touradj Ebrahimi, recently was awarded an Emmy from the US Academy of Television Arts & Sciences for his ground-breaking work on the JPEG standard.[9] Perhaps, as digital media finds a place in audit, he will be inducted into the Accounting Hall of Fame.[10]

**The Emergence of Graphics, images and Digital Media**

I began installing accounting software for my clients in the early 80s. That software was all text-oriented. If you wanted graphics, you could pull the data into Lotus 1-2-3 or later Excel and create charts or graphs from it. With the move from DOS to Windows, and Windows to Windows 95, accounting software developers began building in more graphics; in particular, you could associate a picture with a master file record, such as with an inventory item or an employee. In addition to pictures, many packages also began to work with bar codes, to facilitate data entry and information exchange. Paper documents were being incorporated into computer environments through document management and scanning, and Optical Character Recognition (OCR) was used to pull out information from the documents for data input and searching; many of our standard tools today (Adobe Scan, Google Drive) are performing OCR on documents to facilitate finding documents at a later time.

Even before the Windows era, however, the issue of graphics – table and charts – in financial statements became an issue. Even back in the early 80s, graphics were seen as an important tool in decision support, and companies were finding ways to manipulate graphics for their

favor.[11] A leading book on the use of graphics, Edward Tufte[12]'s *The Visual Display of Quantitative Information* (2001), is still listed as an Amazon Best Seller as of this writing.

Researchers began considering issues such as interpretation accuracy, decision quality, viewer preference, speed of comprehension, and decision speed. I recall numerous presentations at early WCARS conferences on research related to how graphs are used to "manipulate the perception of the data through selections of graph type, color, scale, base, size, and other treatments to create distortion and lead to different decision making."

At the same time, the profession did not consider those tables, images and graphs to be part of the financial statements, but as "other information," with the auditor's responsibility limited to pushing back only if there were "material inconsistencies" between the graphics and the financial statements themselves.[13] We knew this as "SAS 8" – the relevant IAASB, American Institute of Certified Public Accountants (AICPA) and PCAOB standards now are ISA 720, AS 2710 and AU-C 720, respectively. And they all say pretty much the same thing: the auditor "should 'read' the other information and consider whether such information, or the manner of its presentation, is materially inconsistent with information, or the manner of its presentation, appearing in the financial statements." And in the application guidance, they mention specifically "Tables, charts or graphs containing extracts of the financial statements" – which raises many questions, especially with the word "extracts."

One of the reasons I raise that terms "reads" and "extracts" is because of the Extensible Business Reporting Language (XBRL). From our earliest considerations of assurance and XBRL, we considered whether XBRL was "other information" or not (and the early answer was "or not," although the PCAOB came up with ways to provide assurance early on XBRL,[14] and the US SEC later permitted assurance under AT 101.[15]

XBRL was not about readability or images or viewability, at least until the era of *Inline XBRL*. It never focused on a standard presentation or images or graphics, although a few taxonomies called for binary content (particularly PDFs) to be stored. In fact, we were encouraged by a technical committee of the American Bar Association to stay away from presentation, due to the challenges and inconsistencies found in rendering by different Web browsers.[16] And "reading" an XBRL document was an exercise in maneuvering through the angle brackets – you might look at a rendering of XBRL, but it was not designed to be "read" on its own.

Creating taxonomy concepts to provide standardized metadata for the reporting context of an image is possible, but rarely done in practice. (For the techies amongst us, I'm aware of a couple of taxonomies that leveraged XBRL's base64BinaryItemType to embed binary content like images or PDFs, but that's it). Regulators (and XBRL is not limited to regulatory reporting, however important their role in the business reporting supply chain) do not generally collect and consume images or video.

With all of these potential uses of photos and graphs and images and videos as part of audit processes, it was important to look at how digital media that auditors rely on could be incorporated into audit documentation.

XBRL was, of course, originally based on the Extensible Markup Language – XML.[17] The XML family of recommendations includes a special specification related to graphics, known as Scalar Vector Graphics (SVG).[18] I was hawking SVG and XBRL transformations to SVG very early on. Charts and graphs are potentially a natural by-product of numeric reporting; SVG is an XML-based file format for images, and that means that there can be an automatable and auditable way to vouch and trace between XBRL instances and SVG charts, graphs and other visualizations from that data.

This seemed important, as I noted previously that SOx 409 was not limited to words and numbers; this section, focusing on Real Time Issuer Disclosures, said of those disclosures "*in plain English, which may include trend and qualitative information* ***and graphic presentations.***" What if graphic presentations were an automated transformation from text and auditable?

It can get a little "Inception"-ey; inception is about a dream within a dream. If you have a chart or graphic, and that chart or graphic has XBRL code inside and represents data from a financial statement, do you have assurance within assurance on assured information?

**Imaging in Audit**

Fast forward to the present. We are now hearing about theory[19] and practice[20] where audit firms are leveraging advanced audit technologies – virtual presence, drones, Internet of Things, artificial intelligence, with computer vision and pattern recognition – as part of their audit procedures – to create and analyze images and videos. At the same time, we are recognizing that video can be used to document procedures performed in a more informative way than written commentary, and illustrations can also better convey information more rapidly than the written word – the proverbial "a picture is worth a thousand words."

I had the opportunity to take part in a joint effort a few years back known as the *Rutgers Center for Dynamic Data* Analytics (the CDDA was led by Rutgers, in conjunction with SUNY Stony Brook). Although the project is now over, and the web site expired, the very informative defunct web site was archived and is available on the Wayback Machine.[21] The project focused on Data Mining and Decision Making (DM-DDA), Graphics and Visualization (GV-DDA), Medical (M-DDA) and Security (S-DDA) and showcased amazing things related to analytics and images/video.

The need for these kinds of tools is even greater as the profession considers how it can perform *continuous auditing* tasks, which require more automation and limited manual intervention. Technology has to compensate for limiting the involvement of the knowledgeable and observant auditor on-site with new tools for observing changes in the business environment, assessing the way management and personnel are acting, observing processes and activities, and otherwise acting as an experienced human auditor would. While many organizations are

calling for the off-site, analytics-driven audit, speaking about the reduction in disruption for the client, we would once make quick judgements on trouble at a company when the controller wouldn't look at us when we first showed up, where they were all garrulous and inviting the prior year; imaging may be used to detect stressors instead.


**Imaging and Conducting an Audit**

Digital media is coming into play as part of audit processes. The standards seem to allow room for them, although some – the PCAOB's requirement for an auditor to be "present" for a physical inventory (AS 1215.11) – have room for growth, unless you can be "present" through a drone, virtual presence or other remote means. The AICPA's June 2019 exposure draft on Audit Evidence[22] seems to anticipate this. Speaking to inspection and observation procedures, it offers automation as a new option (bolding is mine):

"Inspection

A57. *Inspection involves a physical examination of an asset or an examination of records or documents, whether internal or external or in paper form, electronic form, or other media. An example of inspection used as a test of controls is inspection, using manual* ***or automated techniques****, of records for evidence of authorization.*

*A58. An example of an automated technique for inspection is the use of* ***text-recognition programs to examine large populations of documents****, such as contracts, to identify items for further audit consideration.*

*Observation A60. Automated tools and techniques such **as a camera accessed remotely** (for example, a **camera mounted on a drone**) **may aid the auditor in performing an observation procedure, such as management's physical inventory count**."*

**Imaging as Part of Audit Documentation**

Likewise, with all of these potential uses of photos and graphs and images and videos as part of audit processes, it was important to look at how digital media an auditor relied upon could be incorporated into audit documentation. Some descriptions of audit documentation include:

*records of the planning and performance of the work, the procedures performed, evidence obtained, and conclusions reached by the auditor (AS 1215.02); information the auditor has identified relating to significant findings or issues that is inconsistent with or contradicts the auditor's final conclusions … procedures performed in response to the information, and records documenting consultations on, or resolutions of, differences in professional judgment among members of the engagement team or between the engagement team and others consulted (AS 1215.08); see also .10 and others.*

While technology kept evolving, the PCAOB's standards on Audit Documentation did not evolve as much. The PCAOB may have evolved from AS No 3. to AS 1215, but the content didn't change much. The AICPA's clarification project brought its AU-C Section 230 much closer to ISA 230, which left doors open to more options.

> It is important to continue to assess accounting and audit standards so they are neither watered down to become ineffective or so constraining that they hold the profession back.

The PCAOB's AS 1215 has a troubling word in it: the word "written." AS 1215.02 notes "Audit documentation is the **written** record of the basis for the auditor's conclusions that provides the support for the auditor's representations, whether those representations are contained in the auditor's report or otherwise," although 1214.04 says audit documentation may be in the form of paper, electronic files or **other media**.

In contrast, ISA 230 on Audit Documentation speaks to "record" 16 times, with no limitation to something being "written"); "One or more folders or other storage media, in physical or electronic form, containing the records that comprise the audit documentation for a specific engagement." (ISA 230.6.b)

What of this "written"? AS 1215 contrasts it with "oral": *Oral explanation alone does not constitute persuasive other evidence, but it may be used to clarify other written evidence*. (AS 1215.09) But does "written" mean it has to use words? Would they have used "recorded" if they meant something other than using words?

We know that even the use of words can lead to ambiguities. What of the following sentences? Can you see more than one potential interpretation?

- When you enter the facility, the custodian will check your bag.
- The partner saw there were two apples left and two supervisors left.
- The employee said his job was to check out the customers.
- Because of management's oversight, the corporation's international controversial action was sanctioned.

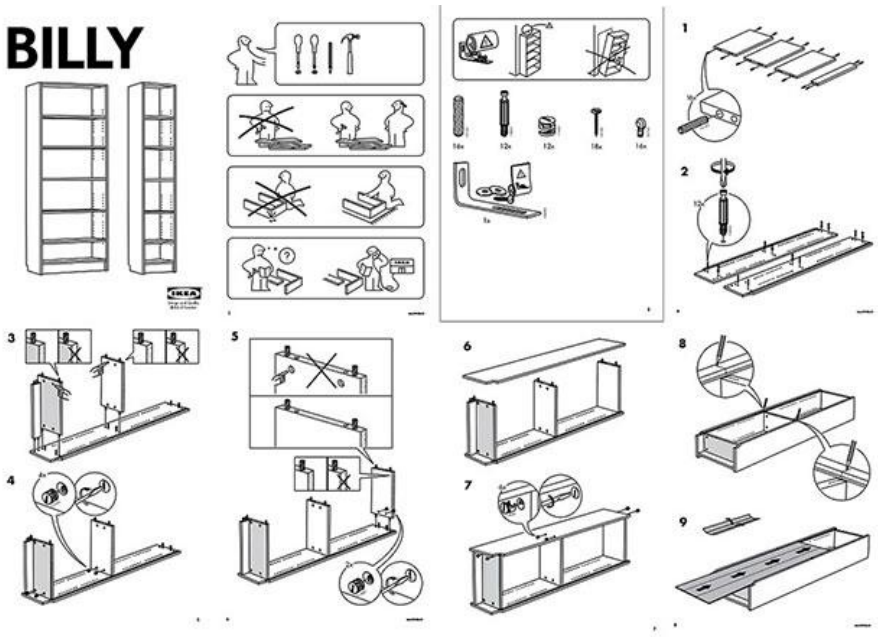
We must ask if "written" is superior to graphics, pictorial diagrams, photographic or video content without the written word when seeking to fulfill a goal of audit evidence: to be *sufficient to enable an experienced auditor, having no previous connection with the audit, to understand* (ISA 230.8). Table 1 compares writing with video for their expressive capabilities and usefulness.

*Table 1: Written vs Video*

| Writing | Video |
|---|---|
| Generally asynchronous (for later consumption), although synchronous communication (online chat) possible. | Generally synchronous and often two-way, although asynchronous (recorded) possible. |
| Visual formatting is explicit, including placement, color, graphics, tables. Leverages punctuation. | Descriptive information can be provided to emulate the visual formatting. |
| Readers can access information dynamically, consumption generally at speed of consumer. Footnotes/hyperlinks can permit user-selected sidetracking. | Listeners can access information serially; consumption generally at speed of producer. Side tracking/rabbit trails must be explicit. |
| No ambiguities between homonyms or similar sounding words/phrases ("it's hard to wreck a nice beach"; "it's hard to recognize speech"). | Ambiguities can only be disambiguated through explicit mention. |
| Can *indicate* timing, tone, volume, emotional state and timbre, using tools like emoticons. | Can include timing, tone, volume, and timbre; sarcasm easier to identify. |

The PCAOB also has current guidance saying that electronic information on EDGAR, or a corporate web site or other electronic venues aren't "documents" but just information.[23] This seems to contradict the other guidance that XBRL files were documents.[24]

This illustration, for example, shows instructions from IKEA on how to build the Billy Bookcase. The word "Billy" is written; step numbers are written; the rest is illustrated; is the commitment to a visual media as a document "writing"? What about this video on assembling a Billy?[25] Is it less suitable to document what was done and to help someone else understand?




**Questions**

- A visit to the Thomas Edison National Historical Park[26] proves that sounds and information recorded to traditional media is still usable a century later. Digital obsolescence may, however, mean it is very difficult to use information in media formats (e.g., the Lytro[27] light field format) in a much shorter period of time. Is that a problem?
- Although the regulators recognize that auditors are not expected to be experts in document (and by extension other media – AS 1105.09), will that need to change and experts be expected to be employed if necessary?
- Can the audit procedure of "observation" be performed through a window, on a monitor nearby in real-time, on a monitor on a delay?
- Can the audit procedure of "inspection" likewise be performed in some abstracted fashion, where technology captures and later permits review?

**Standard Setting in the New World**

The world of committing information to storage has changed markedly in the last 40 years – from paper, to "analog" digital (requires OCR), to metadata enhanced "analog" digital, to digital, to metadata enhanced digital and beyond. Nevertheless, the profession is still focused on the superiority of "original documents" and text. The market moves forward with AI and other tools to capitalize on digital media and expedite information for decision making. It is important to continue to assess accounting and audit standards so they are neither watered down to become ineffective or so constraining as to hold the profession back.

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**End Notes:**

[1] https://www.ifac.org/system/files/meetings/files/20190311-IAASB-Agenda_Item_8-Audit-Evidence-FINAL_0.pdf.

[2] https://www.asciiart.eu/comics/peanuts.
[3] Reiterated in this article: https://rbj.net/2012/11/09/word-2013-is-a-useful-upgrade-not-just-pointless-tweaking/.
[4] Comedian/impressionist Jim Meskimen showcases his impressions and worked with a deepfake expert to transform himself into his celebrities at https://www.youtube.com/watch?v=5rPKeUXjEvE.
[5] AS 1105.08, ISA 500.A31.
[6] https://pcaobus.org/About/History/Documents/PDFs/Sarbanes_Oxley_Act_of_2002.pdf, section 409 *Real Time Issuer Disclosures.*
[7] http://raw.rutgers.edu/docs/wcars/43wcars/EricChohen_PDF_presentation.pdf.
[8] https://pcaobus.org/Standards/Auditing/Pages/AS1215.aspx.
[9] https://www.emmys.com/photo/530056.
[10] https://aaahq.org/AHOF.
[11] DeSanctis, Gerardine. "Computer graphics as decision aids: Directions for research" (*Decision Sciences* 15.4, 1984): 463-487.
[12] https://www.edwardtufte.com/tufte/.
[13] Steinbart, Paul John. "The Auditor's Responsibility for the Accuracy of Graphs in." Accounting Horizons 3.3 (1989): 60.
[14] https://pcaobus.org/Standards/QandA/05-25-2005.pdf.
[15] Now superseded by https://www.aicpa.org/content/dam/aicpa/research/standards/auditattest/downloadabledocuments/ssae-no-18.pdf although SEC Rule 33-9002 has not been changed.
[16] Cases such as Pennar Software Corp. vs Fortune 500 Systems, Ltd. relating to reliance of certain information on a web site were provide – see https://casetext.com/case/pennar-software-corp-v-fortune-500-systems.
[17] https://www.w3.org/XML/.
[18] https://www.w3.org/Graphics/SVG/.
[19] D Appelbaum, R A Nehmer, "Using drones in internal and external audits: An exploratory framework" (*Journal of Emerging Technologies in Accounting*, volume 14, issue 1), p. 99 – 113.
[20] *Auditing in the Drone Age*: https://www.ey.com/ca/en/newsroom/pr-activities/articles/2019-september-faster-cheaper-safer-better-welcome-to-auditing-in-the-drone-agel.
*EY Using drones to enhance audits* https://www.journalofaccountancy.com/podcast/using-drones-to-enhance-audits.html.

[21] Web site expired: http://www.cdda.rutgers.edu/; illustrative content from Archive.org Wayback Machine https://web.archive.org/web/20140712182719/http://cdda.rutgers.edu/.

[22]https://www.aicpa.org/content/dam/aicpa/research/exposuredrafts/accountingandauditing/downloadabledocuments/20190620a/20190620a-ed-sas-audit-evidence.pdf.
[23] https://pcaobus.org/Standards/Auditing/Pages/AI20.aspx 4.16-18.
[24] https://pcaobus.org/Standards/QandA/05-25-2005.pdf
[25] https://www.youtube.com/watch?v=JyH6igMVVBI.
[26] https://www.nps.gov/edis/index.htm
[27] https://en.wikipedia.org/wiki/Lytro