Drawings as Communication

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What is the purpose of a drawing?

Drawings are created in order to convey information. They are however, not the only way to do so. Information can be conveyed using any means perceptible to human senses. Each means has a limit as to how much information can be conveyed in a given period of time – that is, its' bandwidth. For example, most people would find it faster to read a book (visual) than to listen to an audio book (aural), and would find either much faster than braille (touch). Each means also has a learning curve associated with it and a popularity. Drawings are inherently visual.

In order for communications of any type to effectively convey information, both the originator and the receiver must agree on certain conventions. These conventions are often taken for granted because we grow up with them or have used them for so long that we stop consciously thinking about them. For example: red means stop and green means go. We run into problems communicating when the originators conventions don't match those of the receiver. This often happens when dealing with someone of a different culture or geographic region. Even if we agree on the alphabet and the language to be used, regional differences can make communication difficult. For example, what does the word "boot" mean? It may mean a type of footwear, the act of kicking a ball, or the trunk of a car.

At the same time that agreeing on conventions is necessary for effective communications, it is inefficient to negotiate the conventions every time we want to communicate. The result is that some conventions become standardized or codified. This reduces the amount of negotiating that must occur before communications can take place. It also increases the level of confusion and misunderstanding that happens when conventions aren't followed, or worse when conventions are violated. What would happen if someone decided to put South or East Northeast at the top of a map? Utter confusion; at least until people realized that North was no longer at the top, and then a lot of time would be spent checking each map to see what the orientation was. This is not to say that North is inherently better than any other option, just that North at the top is the convention. It is expected.

The less interactive the communications are, the more critical it is that conventions are employed and adhered to as there is less opportunity to get clarification.

To effectively convey information through drawings it is important to adhere to conventions, and where there are deviations, to document the deviations. This is especially so since the originator and the receiver may have no convenient or direct contact.

One of my university professors, Joe Somfay, had previously worked in Australia and he told us a story about his experience. What follows is my recollection of that story. At that time in Australia, drawings were drafted and printed in colour. As the project deadline approached, Joe's boss stood at his drafting desk waiting for Joe to finish the last drawing so it could be couriered to the printer. Feeling the pressure, and with only a North arrow to draw to be finished, Joe grabbed a pen, and inked the North arrow as his boss pealed the masking tape off the corners of the drawing. Several weeks later, Joe was conducting a site review for the residential project. He looked out of one of the bedroom windows into the backyard and saw a 3 foot high, 6 foot diameter poured concrete North arrow in the middle of the lawn. The pen he had grabbed had been filled with Hookers Green ink, and by convention, that was the colour used to indicate poured concrete. Fortunately for Joe, the client liked her concrete North arrow, thinking it would be a conversation piece.
Often with conventions, it is not a matter of right or wrong, but of what the majority agree on. You may have a better way, but if it doesn't adhere to the convention, it will cause confusion and misunderstanding which a the least will waste time.

Prime examples of this occur in the use and abuse of hatch patterns. During the development of the CSA B78.5 Computer-Aided Design Drafting (Buildings) standard, the committee discovered that there probably isn't a single hatch pattern that is universally accepted. One that means steel in North America may mean glass in Scandinavia. In order to avoid confusion and waste, we include legends on our drawings showing samples of hatch patterns and describing their meaning. We do similar legends for graphical symbols, and for abbreviations. By removing ambiguity, we make communications more effective.

Where possible, to facilitate communications, conventions should be adhered to. Whatever you define equally spaced lines at an angle of 45 degrees to mean, the first meaning that will spring to mind for many people in North America is that the material is masonry; either brick or concrete block, depending on the spacing. Every time that hatch is seen, many people will have to do mental gymnastics to replace the default meaning with your intended meaning. It would be more efficient and effective to use a different hatch than to try to redefine such a common conventional one.

AutoCAD® has been so dominant in the design industry that in many regions the default hatch patterns it provides and the options available for positioning leader lines have displaced the local preferences, conventions, and standards. This is a case of the tail wagging the dog. In some cases, it has resulted in greater uniformity than before. On other cases, as with the leader lines, drawings have become harder to read because of the limitations of the tool.

The manual drafting convention was to have all text left justified and to have the leader line at the beginning of the first word of the text block if it went to the left and to have the leader line at the end of the last word if it went to the right. This convention arose because it made the connection between the text and the graphic it related to easy to perceive. The eye slipped easily from text to object and back again.

AutoCAD® disrupted this convention in two ways. It was easy to mirror text and so to move it from the right side of an object to the left side. This was commonly done. A side effect of the mirror command was to change the justification of the text. What started out as left justified ended up as right justified. This made the text block (paragraph) more difficult to read, but it was not common for CAD operators to bother to change the justification back to left justified. The second issue was that AutoCAD® did not position the leader line at the end of the last word. If it had aligned to the left of the first word, after mirroring, it aligned with the last word of the first line of the text block. Combined, these two issues meant you had to figure out where the first and last lines of a note were and then find the closest leader line.

For those with manual drafting experience, this can be a constant irritant. For those who only know CAD, they may not even be aware of it as an issue, and yet may wonder why drawings aren't easier to read.

I won't get started on the use of different line weights and line types to denote objects above/in front of the cutting plane, objects being cut, and objects below/behind the cutting plane. I will say there was a reason the manual drafting conventions were developed; and it made drawings so much richer in content and a more effective means of communication.

CAD and now BIM have made it possible to do things that would have been impractical to do manually; but at the same time, their use has made drawing a less effective means of communication. In part this is because of the limitation of the tools. In part it is because of the default options chosen by the programmers. In part it is because of time pressures on the production process.

I am not advocating a return to manual drafting, rather a re-emphasis on the fundamentals of using drawings as a means of communication. It is long past the time that the software tools available limited our ability to communicate effectively.

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