Lessons From the Great Masters

by Dr. Michelle Collins

Lessons from Leonardo and Company

At a recent meeting of NASA Project Managers (PMs), I noticed a striking similarity between an exercise in project management and what I had learned in a drawing class only a few days earlier. The art instructor gave a pre-class lecture on drawing live subjects and showed us the following drawings. (See figures below.)

Fig. 1"Nude on Horseback" by Leonardo da Vinci (Royal Library, Windsor)

Fig. 2 "Christ Rising from the Tomb" by Michelangelo (Louvre, Paris)

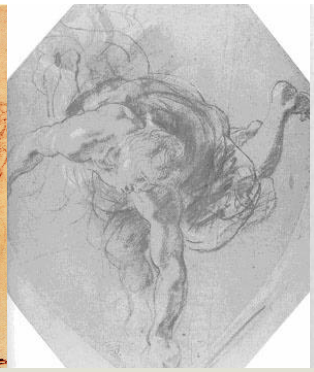

Fig. 3 "Study for Mercury Descending" by Peter Paul Rubens (Victoria and Albert Museum, London)

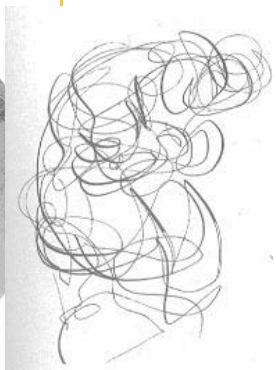

Fig. 4 A student drawing

The instructor asked the class to pay particular attention to the horse's legs in the drawing (figure 1) by the great master (and scientist) Leonardo da Vinci. The class had to chuckle because it appeared that Leonardo couldn't decide where to place the horse's legs. The instructor then asked the class to look closely at a Michelangelo drawing (figure 2) and try to determine which parts were arms and legs.

Next, the instructor presented a drawing by another great master, Peter Paul Rubens (figure 3), and asked the class to guess how many limbs Mercury had in this drawing. She then asked why the class thought these Great Masters would have made such drawings? The class pondered at length and offered their opinions, but by and large they were all surprised at the answer. It seemed strikingly self-evident. The Great Masters knew that they needed to leave their options open until the very last.

The placement of such important parts, such crucial parts as the arms and

legs, was so critical to the success of the piece that the artists devoted the bulk of their time and attention to this. The details such as the fingernails were easy for the Master to draw and thus received the least amount of time and effort. But more importantly, the details are left for last for a much more significant reason. If the artist were to draw say the ear in all its glory and detail, and found the head was not sized appropriately for the rest of the body or was slightly out of position, then the time the artist spent on the ear would have been completely wasted and may have required him to scrap the entire piece.

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The human eye and brain are extremely discerning and capable of detecting the slightest misplacement or disproportion. Hence, the artist must spend the bulk of his energies in placement and sizing.

Armed with this powerful insight, the class was instructed to spend the next two hours drawing a live model.

At the end of 1 1/2 hours, the instructor had the class pause to review each other's drawings. Many were working diligently on their details such as the ankle, the jaw, the hands, etc. She brought the class's attention to one individual's drawing and said, "this is what an advanced student's drawing should look like at this point" (see figure 4).

"The Great Masters knew that they needed to leave their options open until the very last"

The instructor directed the class to step back from their drawings and look at them from a few feet away. Sure enough there were legs floating in air, arms looking emaciated in comparison to the trunk of the body, and heads grossly under and oversized for the body; but they had all added too much detail to move or resize the figure. The instructor reminded the class - "you can add the details only after you have worked out the placement and size ... the master artist will leave his options open until the very last."

The following is from a textbook. "It doesn't matter where you begin to draw, with what part of the figure, because immediately you are drawing the whole thing, and during the minute that you draw you will be constantly passing from one end of the body to the other and from one part to another."

This sentence was taken directly from a book on drawing. Note how applica-

ble it sounds with just a few words changed to make it relevant to NASA projects.

"You will find by experience that the first things to note are the largest elements you have to deal with - the shape and proportion of the entire project, the arrangement and proportion of the various major components, the relation of the major components to the request for this project, and the funding source."

It was stunning to me to think about such similarities.

Lessons from NASA Project Managers

At the meeting of NASA PMs, the group was involved in an exercise, presented by one of the group, on *Requirements* The exercise was as follows: "You are given a project to develop the software for an Automatic Teller Machine (ATM). Write four requirements."

The exercise followed a discussion by this presenter on software requirements. The group was a mix of senior and junior PMs. We broke into pairs to come up with the four requirements for the ATM, and then we regrouped to discuss our findings.

Several of the pairs consisted of one senior PM and one junior PM. In three of these pairs, there was a consistent difference in how the senior and junior PM defined their requirements. All three senior PMs gave requirements that were extremely brief and general; the junior PMs offered lengthy and fairly explicit requirements.

An example of a pair of responses is provided here.

SENIOR PM REQUIREMENTS	JUNIOR PM REQUIREMENTS
Functionality	Provide money in the form of $20's with no fee and warn Home Office of empty condition at least one hour in advance of becoming empty.
Reliability	With minimal annual maintenance, the ATM does not break down.
Security	The ATM communicates with the Home Office continuously including a video feed.
User-friendly	The ATM accepts at least 10 major credit cards and operates in 6 major languages with complete instructions provided where a withdrawal transaction, including printing the receipt, occurs in less than 60 seconds.

As in the case of the art class, the less experienced practitioners can easily fall into the trap of specifying too quickly and thus minimizing or eliminating flexibility. As the senior practitioners observed, and so did the *Great Masters*, it is wise to leave your options open to the very last.

"All three senior PMs gave requirements that were extremely brief and general; the junior PMs offered lengthy and fairly explicit requirements."

LESSON

You should keep your focus on the entire figure (project) and you *should keep the whole thing going at once* (visualize the entire project as a whole, not separate pieces).

QUESTION

Did the Great Masters discover an underlying fundamental truth that can be used by anybody, or are these techniques that can be successfully welded by experts? Can you think of other endeavors where you should practice the art of retaining flexibility?