FAST - AN INTUITIVE THINKING TECHNIQUE

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ABSTRACT

This paper tells how intuitive thinking was responsible for the development of the FAST Diagramming Technique.

Accepting the Challenge

It has been 27 years since I presented my first paper on FAST Diagramming in Boston. I will try to shed some additional light on this subject today. The initial seeds for FAST Diagramming were planted in 1960 while attending the first university offered course on Value Engineering (VE) at UCLA. During the course Ed Heller made a presentation on Function Analysis. His explanation of the verb-noun method of expressing functions developed by Larry Miles was fascinating. It sparked within me a seemingly unlimited amount of creativity and understanding.

During the next three or four years this new method of identifying functions using a verb and a noun became part of my life. I soon discovered I could isolate the basic function by asking this question. "If I didn't have to perform the function I've selected would I still have to perform any of the other functions listed?" If the answer was no, then I knew I had identified the basic function. This method of analysis soon caused me to askother questions about each of the other functions, such as "Why must this function be performed? and "How is this function actually performed or proposed to be performed?"

One day when an instructor working with another team failed to have the same degree of success as I enjoyed, I was invited to assist him. Within a few minutes we had lots of ideas, one of which appeared to be patentable. A day or two later, my boss, C. S. Gray, said to me "Whatever you're doing, it works for you, but it won't work for anyone else because no one else knows what you are doing different." Then he said, "Why don't you try putting down on paper what you do and how you think?" Frankly, I thought everyone's thinking was the same as mine.

Seven years after I published my 1965 paper on FAST Diagramming I finally discovered why other people couldn't duplicate what I was doing. I will try to convey that secret today. I have tried before, but my own lack of under- standing of my intuitive thought process prevented me from conveying the concept.

To ensure the basic function was included in my list of functions, I started asking these three additional questions: 1. "What am I really trying to do when I perform this function?" 2. "Why do I want to perform this function?" and 3. "Whatfunction caused this function to come into being?" If the answers yielded new functions, they were added to the list.

The secret of my success occurred when I asked these questions of team members. As I pointed to each member I asked them to give me an answer. In addition to these requests, I also evaluated their responses. If their responses failed to display any in-depth thinking, I would ask the same question again and again until someone responded with an answer that was not obvious, at least not obvious to me.

Now I want to impress upon you that this interrogation for a non-obvious answer required considerable thinking on my part and often left me exhausted because of the in-depth thinking I forced myself to perform. I evaluated what each team member said to determine if any new insight was provided by their responses. Frequently I would answer the question myself because my in-depth evaluation sparked an innovative answer. I would continue the question interrogation until I had obtained additional insight into the subject under investigation.

The Secret

What I'm going to tell you now is what I was doing for years without knowing it. I discovered it purely by accident with the help of a nice young lady. In 1972 Dick Park invited me to participate in the SAVE North Central Regional Conference at Troy, Michigan, which was sponsored by the Detroit Metropolitan Chapter. It was basically a conference on FAST Diagramming. Several of the attendees requested a demonstration of how I applied my own technique, and I consented. We discussed the high-jacking problem which was of major concern to everyone who flew on the airlines in those days.

I interrogated the participants with my "Thought Provoking Questions." As different people responded, I recorded their verb-noun answers. I evaluated whether their responses provided new insight into the problem as I had been doing for years. After several attempts to obtain a creative response either from me or from the audience. I intuitively went back to a function I had investigated earlier. Once again I was showered with responses. One of those responsesexcited my understanding so I told the group a particular answer was the answer I was after.

Suddenly a young lady, Donna Rogers, spoke up and said, "How come you like that answer now when five minutes ago you didn't like it?" I replied, "I'm now president of the air lines; before I was a passenger on the high-jacked plane." At that very moment I realized I had been switching rolls to stimulate understanding and creativity within myself without even knowing it. It appears, every time I couldn't increase my understanding of the subject at hand when analyzing a given function, I intuitively switched rolls. I think I was doing what Charles Kettering did when he discovered a new hydro-carbon. He pretended, according to his writings, that he was a molecule of gasoline being forced through an intake valve or being compressed by a piston.

I don't think it makes any difference whether the roll switching is done intuitively or is planned as Mr. Kettering suggested. I do, however, think that FAST Diagramming is much more productive if different rolls are played by each team member as they unitedly analyze functions.

When team members don't know the rolls being played by other members, the more likely there will exist a disagreement on the answers to the Thought Provoking Questions. This type of disagreement forces the participants to discuss their answers in greater detail. As they do so, each person in the group adapts what is said to the roll he or she is playing. This is the ideal situation for expanding understanding and stimulating creativity. It allows the team to explore all facets of a problem in just a few minutes which, otherwise, might take hours to accomplish.

Several years ago I tried to write a book on FAST Diagramming. I never completed the book because I realized my method was completely different from everyone else's method. Not only that, I've never been able to teach anyone how to do it the way I do it. Perhaps my explanation today will help a few of

you to try it my way, as Frank Sinatra would put it.

I use the process for developing the diagram as a creativity tool rather than a tool to organize functions. Oh, the diagram organizes functions alright, but the only reason I organize morefunctions is to stimulate more creativity and understanding. The diagram is just the outgrowth of this activity. Let me illustrate what I mean.

My Creative Approach

Whenever I lead a team in developing a FAST Diagram, I look for functions which stimulate my creativity; therefore I mentally screen the functions recorded as team members respond to the Thought-Provoking Questions. As soon as a function stimulates my creativity, I immediately stop the function analysis effort and ask the team members to brainstorm different ways of per-forming that particular function.

Whenever a person describes how to perform a function that has been identified by a verb and a noun, I believe, he or she intuitively picks a roll to play without realizing it, just as I had been doing for years. The roll they pick is based on a wide variety of factors. Their experience, education, interpretation of the meaning of the verb-noun, position, responsibility, past experience, plus many other factors all affect the roll a person ends up playing.

Some people become irritated when I ask them these simple function oriented questions, especially if they are skilled in the field we are discussing. Their usual response to me is, "Just tell us what answer you want." This is a natural response because I repeat the question over and over again until their response stimulates my thinking. I frequently say to them, "It's not what I'm looking for, but what you should be looking for." If they are not forcing themselves to perform in-depth thinking, then they fail to transform themselves into that "molecule of gasoline" as Kettering would put it, there is no mental motivation to intuitively switch into a different roll.

Years ago while I was conducting a seminar at Sperry Phoenix, a gyroscope engineer, who was assigned to work with our team, got frustrated and asked to be taken off the project. I think frustration occurred because I told him we were going to develop some new concepts in gyro design. To which he responded. "Do you know that there are only about a hundred people in the world that really understand gyros? And you think we're going to develop something new?" I responded by saying "That's right!"

The next day I was asked if I would accept a replacement on the team. I said, "No! We got this fellow half oriented already, and he doesn't even know it." As our team met that day he complained and said he was forced to go along with our silly game. Within a half hour this engineer was up at the board modifying someone else's concept. He became so enthused about this new concept within just a few days that he came in on his own time and made drawings of it. Five new gyro concepts were developed in just a few weeks using this approach. Sperry wouldn't allow me to publish a paper on our results because they considered the concepts to be proprietary.

If you can get the team members to respond with any answer that comes to their minds, their intuitive rolls will eventually become activated. Once these rolls have been activated, the opportunity for creativity is at its highest level. If I, during the function analysis investigation, become creatively stimulated by a particular function, then I must be the one who tells how else we can perform that function. If someone else is creatively motivated then they should tell how to perform it.

You see when I describe how to perform a function in the roll I am playing, other members of the team adapt what I say to the roll they are playing. They think they know what I am saying, but if they are playing a different roll than I am, then what I say doesn't quite fit. As they try to comprehend my concept, they adapt my descript-ion to the roll they intuitively selected.

This means they have an entirely new concept which is different than the one I just described to them. They, in turn, should be asked to explain how they think I proposed to do it. I and the other team members now adapt what this other member says to fit the rolls we are still playing. The result may be the development of several new ideas or concepts. At the very least, a broader understanding of the subject will be acquired.

If a member of the team fails to respond with any suggestions or with his own description of how he would perform the function, then that individual should be asked to explain one of the concepts presented by someone else. This way you are able to capitalize on every member's intuitive roll and creative abilities. Invariably, he will modifyor add to the concept presented by someone else because of the roll he is playing. Hitch-hiking or modifying other people's expressions to fit the various rolls of team members can, within minutes, yield several new concepts or ideas.

Once creativity has been spent on the function under consideration and all ideas and concepts have been recorded, then I as the team leader ask one or more of the Thought Provoking Questions of one of the other functions listed. Each time a spark of creativity raises it head, we run with it. In each instance a dialogue and sometimes an extensive discussion occurs. After all functions have been analyzed and new ideas and concepts have been recorded, then the team works together as they analyze, modify, develop and select those ideas and concepts which are practical and suitable for implementation.

As soon as these tasks have been completed, I ask the team members to agree on the functions that should be used on the FAST Diagram. At this point we have most of our solutions and some semblance of a diagram. We have not attempted to get agreement on what the diagram should look like. When the HOW-Why Logic is checked with the adjoining functions and the semantics of verb-noun expressions are agreed upon, other spurts of creativity generally occur.

As agreement on the semantics of functions is achieved, team member yield up their intuitive rolls to the roll of the project. At this point, everyone on the team should understand completely the scope of the project. What is proposed; what each function on the diagram means with respect to the project roll. How each function is to be accomplished, and why it is necessary for all functions to be performed in the manner specified.

By looking at a completed diagram, you should realize that "You will never find a function which doesn't have a higher level function, and the only reason a lower level function exists is because its higher level function caused it to come into being." This is a quote from my 1965 paper. Once a higher level function goes out of 'scope', we dis-continue our analysis of it.

This next quote from the same article is just as important and is equally applicably to non-hardware type functions. "We discovered that the basic functions of lower level parts and assemblies came into existence whenever the method selected to perform some higher level function was agreed upon."

You might want to ponder these two statements because both of them play an important roll in the success of any VE project.

I trust this brief explanation of how this technique was developed and how I use the procedure to stimulate creativity may open new doors for you.

I have listed seven articles as references. If you desire reprints of them, then make your requests known to SAVE and, perhaps, they will publish them in future issues of Value World.

References:

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