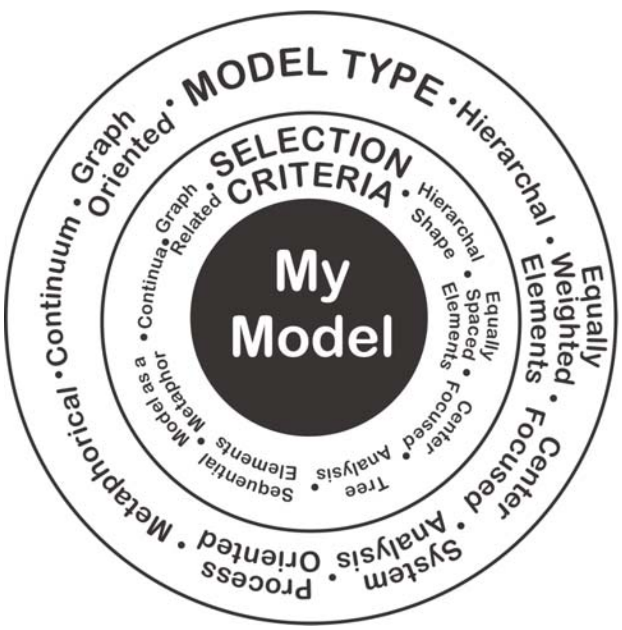
Designing Models in an Academic Setting



by

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Preface

Over my career, I have generated numerous graphics and models. Some of these models delineate the content within books, courses, power points, and videos. Some models explain processes. Other models are adaptions of other people's models and graphics. I reviewed my repertoire of models, developed a classification system, classified them by type, and present them as a primer for others to use. This publication assists others in the development of their models so that they can better express themselves and their concepts spatially.

Classification System

Developing the classification scheme was an organic process. I would encourage others to reclassify or expand upon my classification. I actually spent some time trying to find commonalities with which to group models, and to find reasons to differentiate between them. Sometimes, I had a model in one category and then changed it to another because, on further analysis, it was a better fit there. It led me to differentiate categories better. Also, some models incorporate multiple model types. Sometimes, the model was drawn as one type of model, but could have easily been drawn as another type of model. I have noted some of these instances.

The Simplified Flow Chart for Selecting Model Type found in Chapter 4 can provide a usable decision-making model (Figure 4.2). From a process perspective, it is functional.

However, I wanted a model that was more conceptual and less complicated. I settled on a three step linear flow chart and a center focused model incorporated as the finished product (Figure 0.1). The model is titled the Model for Designing Models. First, consider the selection criteria. The selection criteria help to identify the message of the model and the type of model chosen. The selection criteria are discussed in the next section.

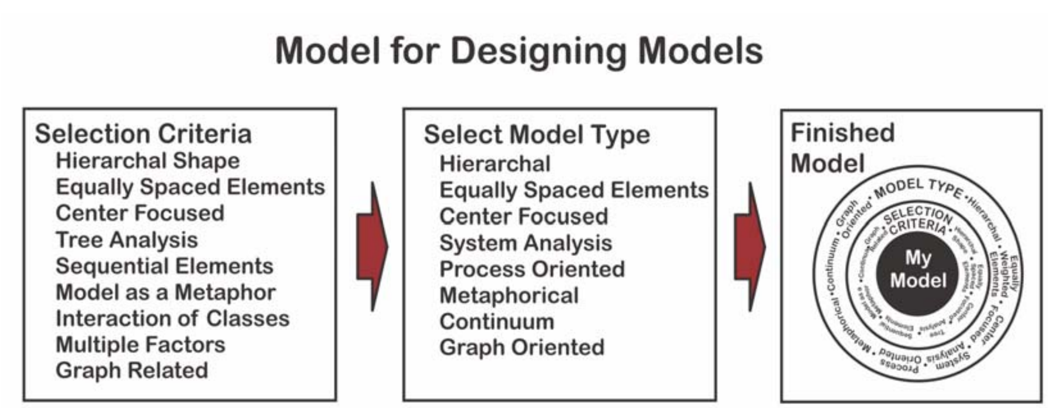

Figure 0.1: Model for Designing Models. Source Author.

The selection criteria help to determine the type of model depicted. Except for Chapter 7, model types correspond to the chapter title. Chapter 7 is a potpourri. Continuum and graph oriented models are listed separately in the model.

In the Model for Designing Models, the finished product is the model. The finished model was an example of a center oriented model. Different model types can be used. Again, different model types can display the same information or concept. The reader can take their choice regarding which of the two models they prefer.

Definitions

As I was organizing the materials, I realized I needed to define some terms used in the classification scheme. The definitions are mine and they are tailored to the classification scheme presented in this publication. These definitions aid in differentiating between different model types and in determining the selection criteria for which model to use.

Hierarchal. The elements of the model are defined by terms of their rank (e.g. high/low, importance). As used here, sequential events are treated separately. For example, in Chapter 1, Nash's model is hierarchal but not sequential. Also in Chapter 1, Maslow's Hierarchy of Needs is both hierarchal and sequential (see Figure 1.1). Hierarchal, self-actualization is considered the goal. Sequential, a person needs to fulfill lower needs before moving to the next level of needs. A person obtaining any one of the levels is satisfactory.

Sequential. As used here, the sequential elements are time related. Event "A" comes before "B" which comes before "C." An end product is not required. Although some might consider that "self-actualization" is the end product in Maslow's hierarchy of needs, a person's needs can end at any level (see Figure 1.1).

Process. Process refers to a series of actions or steps taken in order to achieve a particular end. A key difference with sequential is that processes typically have an end product. In general, process models are also sequential. For example, the Grant Proposal describes a process where the grant writer identifies how to write a grant that has an outcome to satisfy a need or problem (see Figure 5.1). The outcome is the end product. Figure 5.8 describes a process for selecting the model to use. The model to use is the end product.

Spatial. The distance between elements or the location of elements in relationship to other elements is significant to the model. The location of these items has some importance in the model. As a general rule, if the elements in the model were rearranged, the meaning of the model would change. In the Child's Outdoor Play in Chapter 3, the backyard, community, and parks are spatially oriented (see Figure 3.3 and Figure 3.4). In contrast, the concentric circles of Surviving the Unexpected Emergency model can be interchanged without changing the meaning of the model (see Figure 3.6). In this case, the model is not spatial. Change the order of the concentric rings and the meaning of the models change as well. Maslow's Hierarchy of Needs is also spatial. It suggests fewer people are at the top of the pyramid than at the bottom.

Selecting Model Types

The following discussion discusses the chapter structure, the evolution of the materials in the chapters, and assistance in selecting the model to use. Figure 0.2 summarizes selecting a model using the definitions and the message desired. Quick perusal of the summary table reveals that the four definitions alone are not sufficient to select the model type to use. The key selection criteria was added. The table is a quick summary of why that model type should be used.

Figure 0.2: Summary Table of Model Types by Selection Criteria

Model Type	Hierarchal	Sequential	Process	Spatial	Key Selection Criteria
Hierarchal (Ch.1)	Yes	Yes	No	Yes	The elements are hierarchal.
Equally Weighted Elements (Ch.2)	No	No	No	Yes	No one element is more important than any other element.
Simple Centered Focus (Ch.3)	No	No	No	Maybe	A central or unifying theme displayed in the center circle.
Center Focused Triangle (Ch.3)	No	No	No	Yes	Equally weighted elements focus on common element
System Analysis (Ch.4)	Yes	No	No	No	Tree analysis which creates multiple subsystems
Process Oriented (Ch.5)	Maybe	Yes	Yes	No	A process with an end product
Metaphorical (Ch.6)	na	na	na	na	The model itself is a metaphor.
Continuum Models (Ch.7)	Yes	No	No	No	Multiple continua used to define an overall classification.
Graph Oriented (Ch.8)	Maybe	Maybe	Maybe	Maybe	A graph relating two variables conceptually

Hierarchal Models. Chapter 1 focuses on models that emphasize a hierarchal presentation. There was some movement in this chapter's content. Originally, pyramidal, triangular, and center focused models started out in their own chapters. Then they were all included in this chapter. The common theme was geometric shapes. Then the center focused chapter was moved back into its own chapter. Upon further thought, I was dissatisfied with using geometric shapes. Conceptually, pyramidal and triangular models serve different purposes. Pyramidal and ladder models serve a common purpose. They went into Chapter 1. Triangular models have equally weighted elements where no one element is more important than another. They went into Chapter 2.

Equally Spaced Element Models. Chapter 2 focused on models where the elements are spaced equal distance from each other. No one element is more important than any other. The elements have equal weight or importance. Originally, the triangular model was included in Chapter 1, Geometric Shapes. Pyramids and triangles are geometric shapes. However, conceptually, they were very different models with very different foci. For this reason, equally spaced element models were placed in their own chapter, this chapter. Venn diagrams were moved into this chapter as well.

Center Focused Models. Center focused models are the focus of Chapter 3. Consider using this model if there is a central or unifying theme present. These models place their primary focus in the center of the model. The center focused triangle is an interesting situation. Without the center element, the triangular model has equally weighted elements. It was placed in Chapter 2. Add the center element where the equally spaced interacting elements surrounding the center element focus on the center element, and the model more appropriately belongs with the center focused model. The center focused model simply states your focus.

I find the center focused model useful in organizing a course or textbook. The center circle contains the central theme of the book or course. In the prepper course and unpublished textbook, the central theme was survival and enjoyment (see Figure 3.6). Two of the concentric circles are the Type of Emergency and Planning. They constitute the content of the course. In the boating safety manual, the central theme is safety and enjoyment (see Figure 3.5). How does the reader or student have a safe and enjoyable boating experience? They need to know about the human, environmental, and equipment factors. The outmost concentric circle contains these three factors which form the content of the textbook. The content of the course is subdivided by these three accident prevention processes and addresses the question of how to have a safe and enjoyable experience.

System Analysis (Tree Analysis). Chapter 4 focuses on systems analysis (tree analysis). It is clear from the titling in this chapter and in the next chapter that there is some confusion or overlap regarding what is a tree analysis. I am not sure that I solved the confusion. Returning to the definitions, the systems or tree analysis in Chapter 4 is static. One element is not required to precede the next. The system or tree analysis in this chapter does not delineate a process which is the underlying foundation of process oriented models in the next chapter. A key ingredient is that there is no end product. It is simply an analysis process of breaking systems into subsystems which create the trees.

Process Oriented Models. Chapter 5 focuses on process oriented models. The underlying factor of process oriented models is that they denote a process, and that there is an end product. As noted in the previous paragraph, there is an overlap between the different types of tree analysis. Hopefully, my analysis and classification will be helpful in making the differences understandable.

Metaphorical Models. Chapter 6 includes metaphorical models. What differentiates metaphorical models from other models that may seem to be metaphorical is that the model itself is metaphorical. In the accident process, barriers are like a wall or slices of Swiss cheese. Accidents are depicted as a series of dominos or as a meter.

Continuum Models. Originally, continuum models and graph oriented models were include in one chapter titled: Potpourri of Models. I decided to split the chapters even though Chapter 7 is a short chapter.

Continuum models utilize multiple continua to define an overall concept. The model has the ability to spread metaphorically a wide net of the subject matter. The Recreation Opportunity Spectrum is a classic continuum model that has received wide use. It includes a wide range of continua used in defining the management of the land.

Graph Oriented Models. Chapter 8 focuses on Graph Oriented Models. Graph oriented models depict a conceptual or hypothetical relationship between two variables rather than empirical data. The flow and TR Service models illustrate the use of a graph to depict a conceptual relationship between two variables. A sub-category is where time is depicted on the X-axis. A three-step debriefing process and moving from hunter/forager to conceptual age models illustrate this sub-category.

Model Content

I apologize for the content of most of the models and graphics. The reader will note that my professional area of interest is the recreation and parks field and that most of the subject matter in the models involves this subject area. It includes risk management also. Hopefully, readers can easily separate the content from the purpose of the model and apply the lessons learned to their area of content. In order to provide context, I provided some of the model's background and use for most of the models.

Multiple Models

Multiple models can be portrayed two ways. The same information can be displayed using different models. The question is which type of model best conveys the message. Second, one type of model can easily incorporate another model type into it.

The same information can be displayed using different models. Barrier analysis and the accident process use three different model types. The original model was part of the MORT (Management Organization and Risk Tree) decision tree process and represents a decision-making process type model (see Figure 5.12). The accident portion of the risk tree analysis was converted into an Accident Triangle (see Figure 2.4). Representing a geometric model, the Accident Triangle presents the components of the model using a different format, while maintaining a sense of formality. The third model is the Swiss Cheese model (see Figure 6.3). A metaphorical model, it is more intuitive and usable by the public. Depending on the audience, any of the three models are suitable.

A second example is the Three-Step Debriefing Model. Its original format was as a graph (see Figure 8.3). However, it could be portrayed as a process-oriented model (see Figure 8.4). As noted in Chapter 7, there may not be much difference between the two presentations.

Multiple models also include using one model type as a component within another model type. The systems analysis approach is easily incorporated into other model types. The site planning process is a process-oriented model that incorporates the systems analysis approach as part of the inventory phase (see Figure 4.3). Similarly, the master planning process is a process-oriented model that incorporates the systems analysis approach in the inventory phase (see Figure 5.2).

Uses for These Materials

The first use of these materials is to assist anyone who is creating a model. These materials will provide some insights and direction. Second, educators will find these models useful. Initially, these materials grew out of an exercise for students. This book can serve as resource material for a class exercise. Model building can aid in the growth of students in organizing their thoughts and expressing themselves spatially. Models can define their discipline, philosophy, or who is serviced. Last, the material begins a process of organizing and categorize models.

About the Author

Dr. Kauffman is currently professor emeritus at Frostburg State University. Throughout his career, he has developed a variety of educational materials, including wallcharts and award-winning videos distributed nationally to state boating law educators. The models in this book result from courses taught, books written, wallcharts created, and movies created.

The following awards represent the recognition of the quality of materials developed by Dr. Kauffman. In 2014, he earned a Regent's Award for Public Service for his boating safety materials, which saved lives across the country. In addition, he received several Outstanding Faculty Awards from Frostburg State University. Its highest award, he received in 2005 the Citation Award from the Maryland Recreation and Parks Association for the significant educational contribution made to the recreation and parks movement in Maryland. He received the CINE (Council for International Non-theatrical Events) Golden Eagle Award for three of his safety videos, their highest award. Dr. Kauffman earned other awards not mentioned here.

Robert B. Kauffman

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Hierarchal Models

Hierarchal models emphasize the hierarchal relationship of the elements in the model. Sections include pyramidal and ladder models.

Pyramidal Models

The purpose of pyramidal models is to show the elements arranged according to their rank. By design, they are hierarchal. Often, the hierarchy implies a progression of events. They differ from triangular models in the next section, which are not hierarchal.

In general, shape refers to two dimensional and form relates to three-dimensional objects. Normally pyramidal refers to a three-dimensional object. Used here, it refers to both twoand three-dimensional models with a base and sides that slope inward to the apex.

Two pyramidal model examples are provided. Maslow's hierarchy of needs is used to demonstrate the general principles. Nash's model demonstrates a potentially flawed model.

General Principles for Pyramidal Models:

1) **Hierarchal.** Pyramids are hierarchal. The apex or top of the pyramid is considered better, more desirable, or the goal. Maslow's model is hierarchal, with people fulfilling physiological needs before being able to self-actualize.

2) **Begin at the Base.** If the pyramidal model is hierarchal, the reader needs somewhere to start. Normally, the reader starts at the base and works themself upward. In the model, people begin with fulfilling physiological needs.

3) **More People at the Base than at the Apex.** The tapering of the pyramid implies fewer people at the top of the pyramid than at the base. Since the levels are cumulative, more people as seeking to fulfill physiological needs than self-actualizing.

4) **Cumulative Rungs.** In some models, the lower levels or rungs need to be fulfilled before higher levels are fulfilled. In Maslow's model, lower-level needs are generally filled first.

5) **Dimensionality.** Pyramidal models include both two and three-dimensional pyramids. Maslow's model is two dimensional.

Maslow's Hierarchy of Needs. This is the classic example of a pyramidal design (Figure 1.1). A quick glance at the model reveals the workings of the model. Self-actualization is at the apex of the model. As suggested by the model, fewer people experience it. In this model, the levels are cumulative. People need to meet lower needs before being able to meet higher needs.

Maslow's model is hierarchal. Self-actualization is higher on the scale than physiological needs. It is sequential in that lower-level needs need to be fulfilled before higher-level skills can be fulfilled. Without an end product, it is not a process. The model is spatial. The narrowing pyramid suggests fewer people reach self-actualization than reach safety or belonging or love.

Figure 1.1: A Classic Pyramidal Shaped Model.

J. B. Nash's Model of Man's Use of Leisure Time. J. B. Nash was one of the important educators in the recreation movement. Titled "Man's Use of Leisure Time – Participation Broadly Interpreted" is from his book Philosophy of Recreation and Leisure (Figure 1.2). The model is hierarchal, depicting people's use of leisure time. Uses were ranked in terms of their

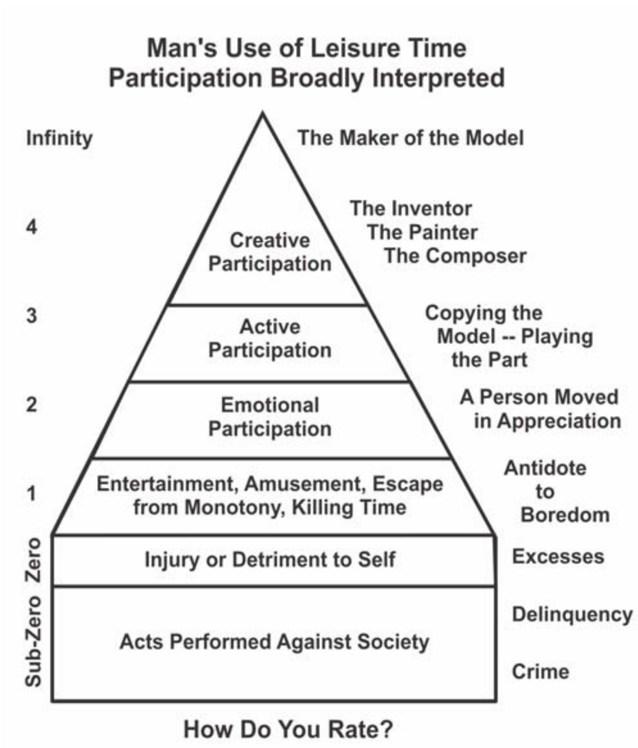

Figure 1.2: Man's Use of Leisure Time (Original Model).
Source: Nash, 1953.

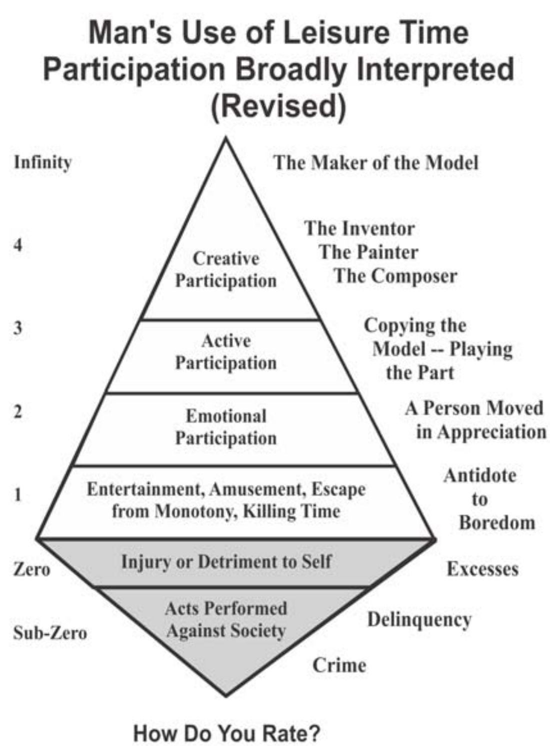

Figure 1.3: Man's Use of Leisure Time (Revised).
Source: Nash, 1953; author.

importance. “Creative participation,” where the person is the inventor, painter, or composer, has higher value than “antidotes to boredom,” which includes entertainment, amusement, escape from monotony, and killing time. As suggested by its pyramidal design, more people will use their leisure time for entertainment or killing time than creative participation.

Spatially, the base of the model is incorrect. Look closely at the model and think spatially. Spatially, the category of “acts against society” is the largest group. Hopefully, this is not the case. “Acts against society” looks like the foundation of the pyramidal portion of the model. It suggests that “acts against society” supports what people do with their leisure time. Clearly, this is not the desired effect. With the rectangular base, the model suggests that spatially there is just as much “crime” as there are “excesses.” Hopefully, this is not the case either. In addition, closer inspection reveals that the starting point at “zero” is not at the bottom of the model. Although this is okay, it can easily lead to confusion regarding the starting point in the hierarchy.

The model was modified by this author to address these issues (Figure 1.3). A double pyramid was created. More people have “excesses.” Fewer people have “delinquency” and even fewer people are “criminal.” Spatially, it helps to solve the oversized foundation created by “excesses, delinquency, and crime.” However, some people may misinterpret the second pyramid. Since “crime” is at the bottom apex, it is equivalent to “creative participation.” It suggests the difficulty that is often associated with spatially representing a concept.

A second approach would focus on only the positive aspects of the model and include just the top portion of the model (i.e. not shown). This eliminates the “excesses, delinquency, and crime” portions of the model. It would simply the model. A separate model can incorporate the “excesses, delinquency, and crime” portion of the model.

<u>Maslow’s Hierarchy as a Pyramid</u> (Figure 1.4). In order to show an actual pyramidal model, Maslow’s hierarchy was converted to a pyramid format. Essentially, both models are the same. One is two-dimensional, and the other three-dimensional.

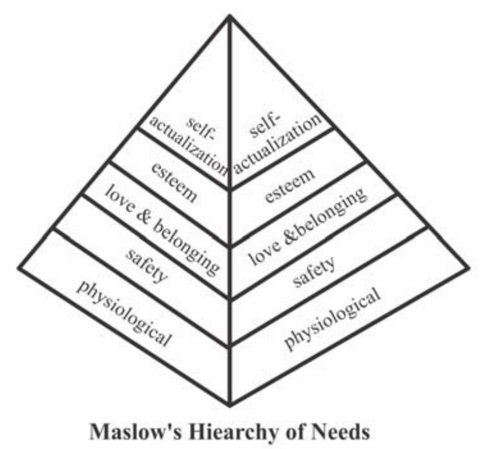

Figure 1.4: Maslow’s Hierarchy Expressed as a Three-Dimensional Pyramid Model. Source: Author.

Ladders

Ladders have the same characteristics as pyramidal models except that they don’t narrow at the apex. There are an equal number of occurrences at the top and at the bottom of the ladder. The focus of the model is to show a hierarchal relationship. The top rung is higher or better than the lower rungs. Two examples are presented.

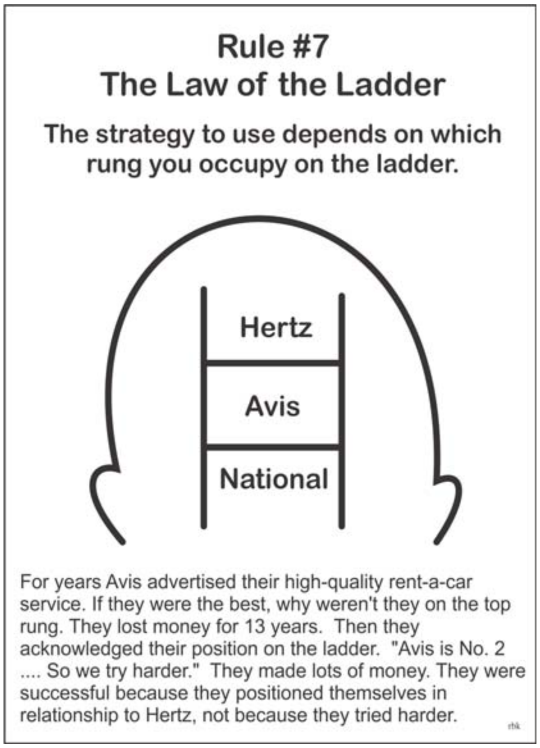

Figure 1.5: Law of the Ladder. Source: Author; adapted from Reis andTrout (1994).

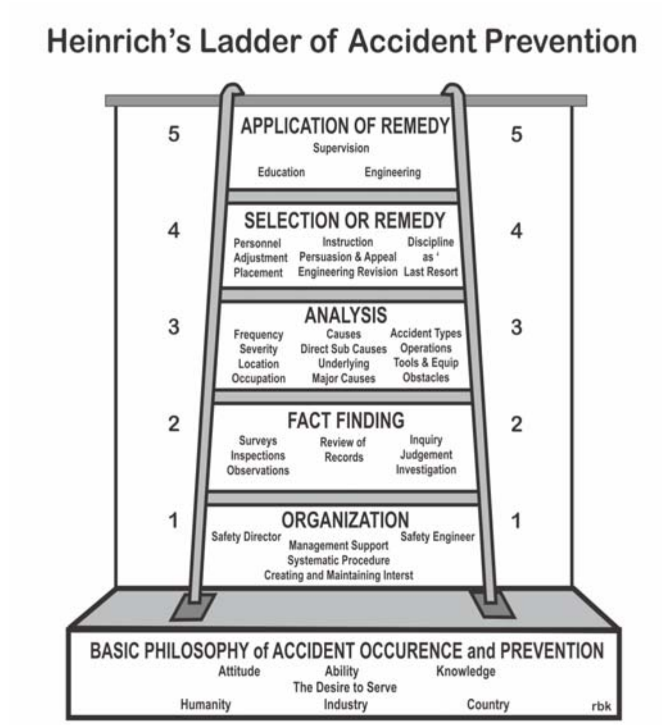

Figure 1.6: Heinrich's Ladder of Accident Prevention. Source: Heinrich, et al (1980).

<u>The Law of the Ladder</u> (Figure 1.5). The law of the ladder states that your marketing strategy depends on which rung of the ladder you occupy. Avis occupied the second rung on the ladder behind Hertz. For years, their advertising campaign emphasized their high quality. They lost money. Then, they recognized their position as number two on the ladder. They changed their advertising theme to recognize their position. Their new theme was "We try harder." They were successful and made money.

<u>Heinrich's Ladder of Accident Prevention</u> (Figure 1.6). Heinrich is considered the father of safety management. He developed his theories in the 1920s. He advocated for adding safety managers and safety directors within the organization. Their role in the organization is reflected on the first rung of his ladder model. Reflecting the research process, the role of the safety manager is fact finding (i.e. Rung 2). On the third rung, the safety manager analyzes the data to identify problems. On the fourth rung, the safety manager selects remedies, and on the fifth rung, implements the remedies. The chapters and organization of his book reflect the model.

Close inspection of Heinrich's ladder suggests the model is less hierarchal and more process oriented. Regardless, the model is a metaphor for the organization to climb the ladder and to apply the appropriate remedies to achieve organizational safety.

References:

Heinrich, H. Peterson, D. and Roos, N. (1980). *Industrial accident prevention - A safety management approach*. New York: McGraw-Hill.

Nash, J., (1953). *Philosophy of Recreation and Leisure*. St. Louis, Missouri: C.V. Mosby Co.

Ries, A and Trout, J (1994) *The 22 Immutable Laws of Marketing*. New York: Harpers Business.

2

Equally Weighted Element Models

Spatially, the elements in equally weighted element models are organized equal distance from each other or in a manner not to emphasize one element over another. By definition, this type of model is not hierarchal. Sections include triangular models and Venn diagrams.

Triangular Models

In contrast with pyramidal models, triangular models are not normally hierarchal. Spatially, the elements or sides of the triangle are equally important or interact equally. Often, additional elements can be added while maintaining the integrity of the basic triangle.

General Principles for Triangular Models:

1) **Model Characteristics.** Triangular models are not hierarchal. Their elements are equally important. The elements are not normally sequential. Nor do they normally relate to processes.

2) **Triangular Model**. Normally, an equilateral triangle is used to spatially represent the equal importance of the elements. Other geometric shapes can be used also (e.g. square).

3) **Equal Importance of Elements**. All the elements are equally important. Again, the model is not hierarchal.

4) **Spatial Placement of Elements**. Elements can be placed at either the corners of the triangle or at the mid-point of its sides. The general effect is the same.

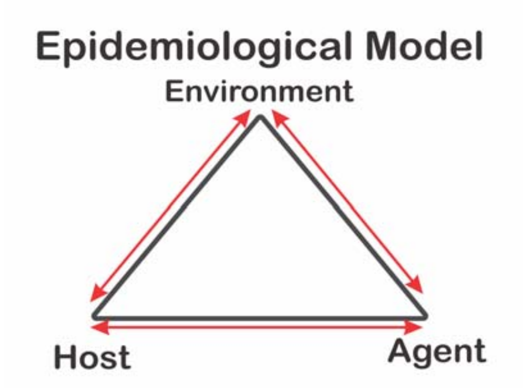

Figure 2.1: An Example of a Triangular Shaped Model. Source: Kauffman and Moiseichik (2013).

<u>**Epidemiology Model**</u>. The epidemiological model is an example of the basic triangular model with the elements placed at the corners. Considered causal, the epidemiology model has three elements. The host or vector, the agent, and the environment (Figure 2.1). Using malaria as the example, the vector or host is the Anopheles mosquito (Figure 2.2). The agent is the Eukaryotic Protist, which is carried by the mosquito,

and stagnant water is part of the environment necessary for the mosquito to propagate.

To be causal, the model needs to be necessary and sufficient. Necessary means that if any of the elements are not present, the disease, in this case, malaria, will not occur. Sufficient means that if all the elements are present, the disease will occur (Copi, 1964, p.355).

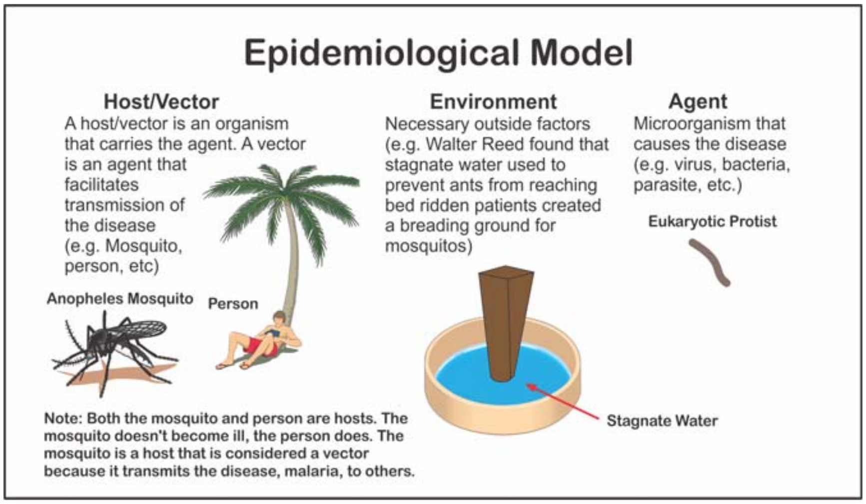

Figure 2.2: Epidemiological Model Applied to Malaria. Source: author.

The epidemiological model is spatial. Unlike other spatially oriented models, the position of the elements can be rotated without changing their impact. The model is spatial because the equal distance between elements suggests that there is no differentiation in importance between them. The model is not hierarchal. It is not really sequential, nor is it a process. It can be argued that the environment results in a habitat for the vector, which in-turn results in the agent. The arrows emphasize that each of the elements interacts and affects the other elements.

Fire Triangle. A familiar model, the fire triangle, is a second example of the basic model. It shows the elements at the mid-point of the sides. It is also a causal model (Figure 2.3). The candle in the center of the triangle provides an illustrative accent. The wax is the fuel. Oxygen is present in the air surrounding the candle. The burning candle creates sufficient.

A sidebar, the heat from the burning candle, melts the wax (i.e. a solid) into a liquid. The liquid wax is wicked or transported by the cotton wick to the tip of the wick where the heat of the burning candle converts the liquid wax into a gas where it burns.

Figure 2.3: Fire Triangle. Source: author.

The fire triangle has the same attributes as the epidemiology model, except that the elements are in the middle of the legs of the triangle rather than at the corners. The elements are not hierarchal. They are not sequential, nor do they describe a process. Again, some might argue that the model might describe a process, since the end product is to create a fire.

Accident Triangle. The accident triangle shows the basic triangular model with more than three elements. As a footnote, the same elements used in this model reappear as other models later in this booklet (e.g. tree analysis [see Figure 5.12] and metaphorical models [see Figure 6.2 and Figure 6.3].

Considered causal, the accident triangle is derived from the MORT (Management Oversight and Risk Tree). It is a modified triangle (Figure 2.4). The model includes the elements of unwanted energy source, a target, and barriers that are less-than--adequate (LTA). It states that an unwanted energy flow from a source transfers its energy to the target (e.g. person or object). There are barriers which are less than adequate that can reduce the likelihood of the energy transfer. If the energy transfer does not result in injury, damage, or loss, an incident occurs. If it does, it is an accident (Kauffman 2020).

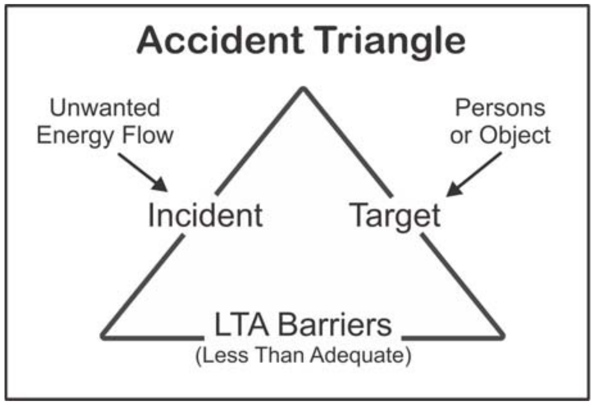

Figure 2.4: Example of a Triangular Model with Additional Elements. Source: DOD reported in Stephenson (1991); Original Source: MORT Workshop. DOE/SSDC**.**

For example, a stove is used to boil a pot of water for a cup of coffee. The pot of boiling water is a wanted energy transfer. Barrier analysis seeks to prevent an unwanted energy transfer such as knocking over the pot of boiling water and burning the cook. Barriers that might reduce the likelihood of the energy transfer include wearing a bib or using a pot with a wide base. They are less-than-adequate (LTA) in that they are barriers that reduce the likelihood but can't prevent the energy transfer.

From a modeling perspective, the accident triangle shows the integration of more than three factors into the basic triangular model. Otherwise, it has the similar characteristics as the other models in this section.

Venn Diagrams

Venn diagrams are named for the John Venn, the nineteenth century English mathematician and logician, who first introduced them. Their purpose is to show logical relationships between sets or classes of elements. For this reason, Venn diagrams are included in this chapter. Diagrams using three intersecting Venn diagrams can be used in explaining syllogistic relationships.

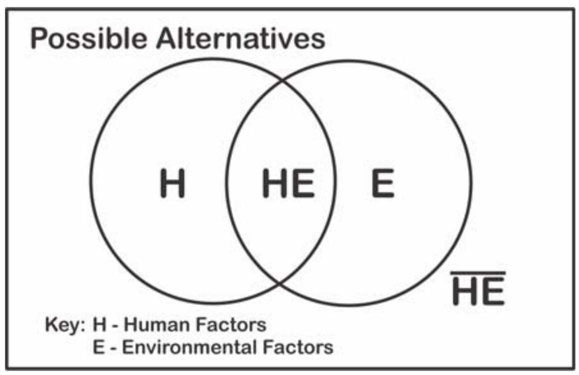

Figure 2.5. Four Possible Venn Diagram Alternatives. Source: Copi (1964); Adapted by Author.

General Principles for Venn Diagram Models: There are several potential relationships available with a Venn diagram. Most people constructing Venn diagram models use the intersection of the two diagrams shown in Figure 2.5. However, the diagram can be used to show three and even four relationships also. Consider the following guidelines:

1) **Identify the Two or Three Interacting Elements**. Define or describe the overall classification.

2) **Identify the Common Area**. Identify the common elements between the two elements. One theory suggests that potential accidents result from the interaction of human and environmental factors. The common area is where both factors are present (i.e. HE in Figure 2.6).
3) **Consider other Venn Relationships**. In addition to the common area, there are four other potential relationships and these can be used to show relationships. There is H but not E (Figure 2.7). The potential accident was caused by only human factors. No environmental factors were involved. There is E but not H. The potential accident was caused by only environmental factors. No human factors were involved. There is neither H nor E (Figure 2.8). Something other than human or environmental factors caused the potential accident (e.g. Act of God).

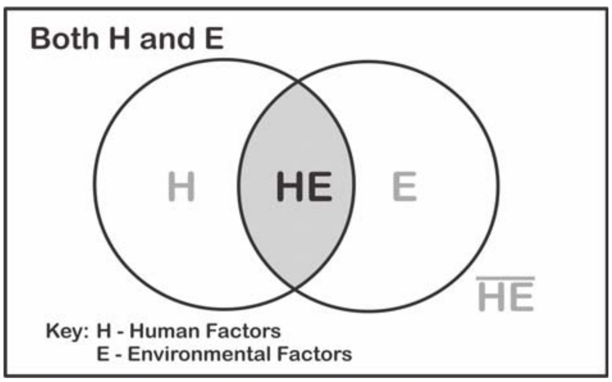

Figure 2.6. Intersection of Two Concepts. Source: Copi (1964); Adapted by Author.

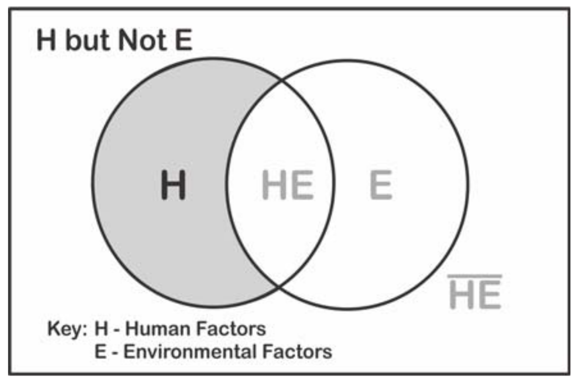

Figure 2.7. Human but Not Environmental Factors. Source: Copi (1964); Adapted by Author.

<u>**Hale's Outward Bound Experience**</u> (Figure 2.9). In reporting on his Outward Bound experience in Hawaii, Hale used a Venn diagram to explain the accident process (Jilling, 2005, and Kauffman and Moiseichik 2013). His model is similar to the one portrayed in Figure 2.6. It suggests that the human and environmental factors intersect to create the accident potential (i.e. HE). Technically, accidents need not involve both human and environmental factors but can involve just one of the factors although as a practical matter both factors are usually involved.

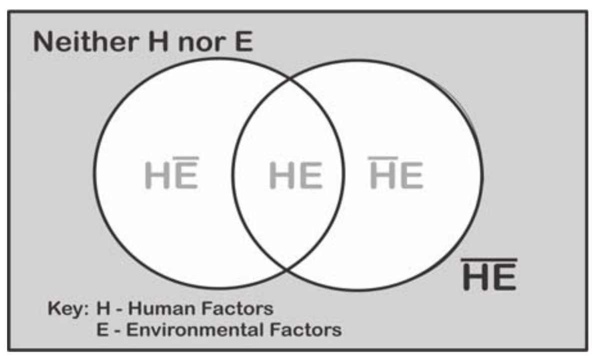

Figure 2.8. Neither Factors (e.g. Act of God). Source: Copi (1964); Adapted by Author.

Although the Venn diagram shows the general relationships, they can be misleading in suggesting that both human and environmental factors need to be present. Typically, accident investigators emphasize human factors as the primary contributors to

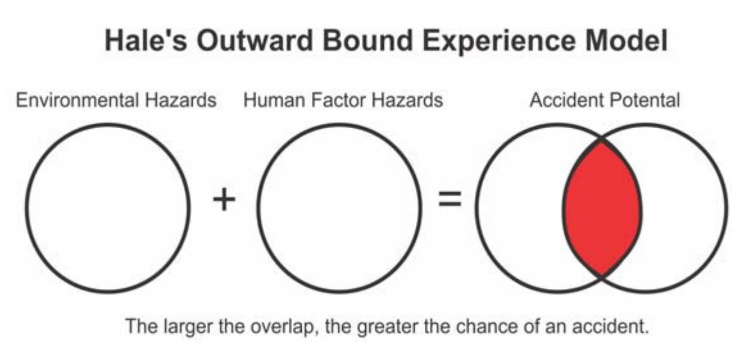

Figure 2.9: Hale's Outward Bound Experience Model. Source: Kauffman and Moiseichik (2013); Jillings (2005); Hale (1983).

accidents, although in the outdoor field, environmental factors can be expected to be a significant contributor (Figure 2.6). Using the Coast Guard statistics, Kauffman (1995) found that roughly 63% and roughly 33% of the boating accidents were human and environmentally related, respectively. This is in contrast to highway and other areas where human factors contribute roughly 80% and environmental factors contribute roughly 15% of the accidents.

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3

Center Focused Models

As the name suggests, centered focused models have the primary or most important element placed in the center of the model. Other elements surround the center focused element. The surrounding elements can be simple graphics like arrows, concentric rings, or geometric shapes. This chapter covers three different cases: Simple Center Focused Models, Concentric Ring Models, and Centered Focused Triangles.

Simple Center Focused Models

The simple center focused model has a central item located in the center of the model surrounded by several elements. The central item is the primary focus of the model, and the perimeter elements directly relate to the center item. Generally, the surrounding elements are of equal weight or importance. The composting model illustrates the basic principles of the basic center focused model (see Figure 3.1).

General Principles for Simple Center Focused Models. Spatially, concentric circles models suggest the interaction of its elements.

1) **Center Circle**. The central concept or theme is placed in the center circle. It is the main focus or theme of the model. The central concept or theme is surrounded by additional graphics or elements.

2) **Element Weighting**. In general, the elements surrounding the center circle are of equal importance or have equal weighting. Or if there is unequal weighting, the differences are not usually identified.

<u>**Composting Model**</u>. The first example shows a simple center oriented graphic without additional rings or concentric circles (Figure 3.1). The model quickly conveys its message. Composting requires the elements listed around the central concept. Successful composting needs micro-organisms to eat the compost (i.e. organic matter, food). To thrive and digest the compost, the micro-organisms need air or oxygen, water or moisture, heat to make the mico-organisms comfortable, and nitrogen. Other than nitrogen, these are the common element needed to sustain most life.

What the model displays, it does very well. However, it doesn't tell the entire story. What the model does not portray is the story of how the elements interact together to create successful composting. The composting story in the previous paragraph provides this narrative, however, it

is not communicated in the model. An important consideration is not to make the model too
complex. In addition, the model does not indicate the amounts needed of each element.

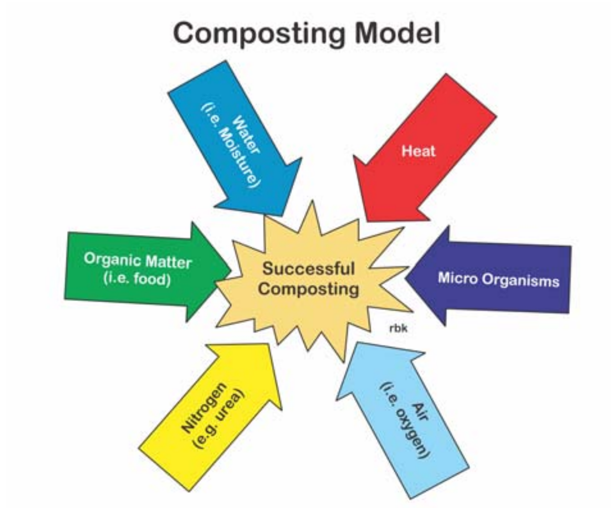

Figure 3.1: Example of Basic Center Focused Model. Source: Author.

In terms of the modeling criteria, the composting model is not hierarchal. The elements are presented equally around the center. They are neither sequential nor is it a process other than in the generic sense that composting is a process. The model in Figure 3.1 is not process oriented. If the purpose of the model is to show how composting works, a flowchart might be a more appropriate model. Last, the model is not spatial. The order of the elements around the center focus can be changed without changing the meaning of the model.

<u>Radial (Hub) Design</u> (Figure 3.2). A radial or hub design is a fundamental design principle in park and facility design. It is part of creating “bubble diagrams” which show the basic spatial relationship between program areas. In facilities, the atrium or lobby is often the hub and other areas radiate outward from it. In a hotel, the restaurant, lounge, bar, shops, and entry to the rooms radiate outward from the lobby. In a recreation center, the major program areas may connect with and radiate outward from the lobby or entrance. These program areas may include the gymnasium, swimming pool, snack bar, fitness room, and meeting area for clubs.

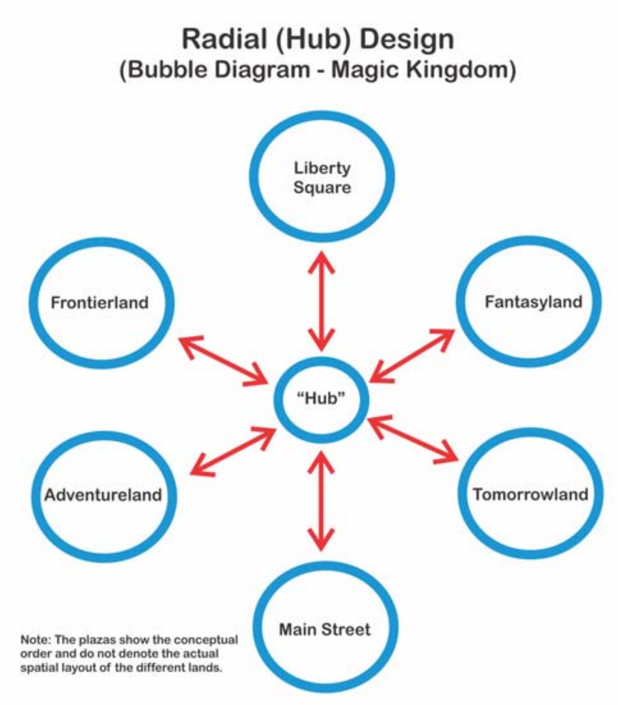

Figure 3.2: The Radial or Hub Design for the Magic Kingdom. Source: Author.

At the Magic Kingdom at Disney World, Main Street leads into the Hub (Figure 3.2). The Hub connects all the lands which radiate outward from the hub. Each of the “lands” is a program area. They connect with and radiate outward to the different lands. The hub and radiating axises illustrated in the basic spatial layout of the Magic Kingdom at Disney World. The following passage provides insight into the basic design of the Magic Kingdom as a series of radiating spokes from the hub. In addition, Walt Disney notes in the passage that the hub approach provides a sense of orientation for visitors.

> The Magic Kingdom's most interesting design element is perhaps its overall layout. Main Street, U.S.A. is an entrance corridor – a sort of long "hallway" that can absorb many guests in a short time. The far end of Main Street, U.S.A. opens into a spacious central Plaza, or hub. From here, pathways fan out like the spokes of a wheel, leading to Adventureland, Frontierland, Liberty Square, Fantasyland, and Tomorrowland. Each land features a visual centerpoint and is easy to enter and exit.
>
> "That gives people a sense of orientation," Walt Disney said. "They know where they are at all times [because all paths lead back to the Plaza], and it saves a lot of walking."
>
> This unique "people-flow" system is referred to as the "miracle of the hub." Disney introduced the concept in the original design of Disneyland in California. (Walt Disney Productions, 1982, p. 26)

In terms of modeling, the radial or hub design is center focused. It is not hierarchal, nor is it sequential. Regarding spatiality, it is spatial because it represents the conceptual layout of the actual lands in the Magic Kingdom. In the design process, designers will expand the circles or bubble diagrams into the layout of the actual lands that will eventually be built. If it wasn't for this spatial relationship, the model would look fairly similar to the composting model.

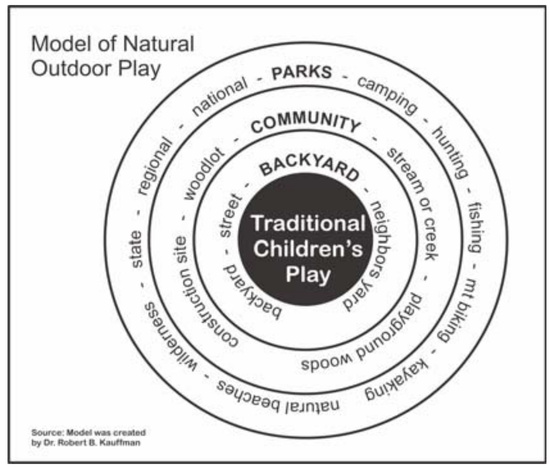

Figure 3.3: Model of Natural Outdoor Play – The backyard is closest to the house and the child, followed by the local community and then regional and national parks. Source: Author.

Natural Outdoor and Indoor Play Models. The first two examples illustrate models that are spatially oriented. In his book, Last Child in the Woods, Richard Louv advanced the thesis that there is a "Nature-Deficit Disorder." It results from a lack of interaction with the outdoor environment. To show his thesis and the change in children's play, this author developed two concentric circle models. The first model shows traditional children's play (Figure 3.3). Spatially, children's play moves outward from the home (i.e. implied in the model) to the backyard, community, and parks. Listings experiences or locations on each ring are of equal importance. The second model shows the modern areas for children to play based on Louv's book (Figure 3.4). The backyard has moved indoors. Community and parks locations and experiences have changed accordingly. The two models have parallel designs to emphasize the sphere of children's play based on Louv's work.

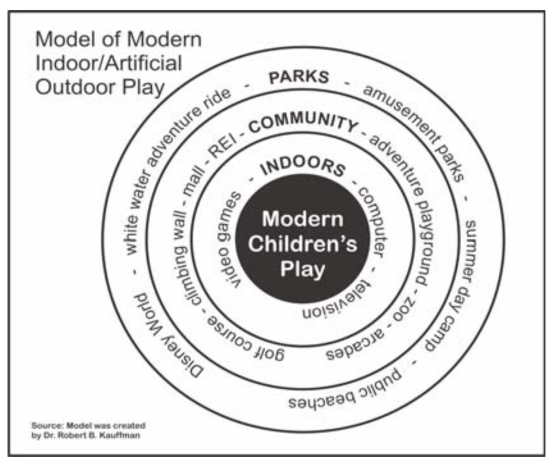

Figure 3.4: Indoor/Artificial Outdoor Play – This model suggests that the computer, internet, and video games are the new play area, followed by man-made play areas in the community and regional and national parks. Source: Author.

In terms of modeling, these two models are spatial. Each concentric circle relates the distance from the home. Changing their order would change the meaning of the models. The models are not hierarchal. They are not sequential, nor are they process oriented.

Boating Safety and Enjoyment Model (Figure 3.5). Unlike the previous outdoor models, this model's concentric rings are not spatially oriented. Its message is simple. In order to have a safe and enjoyable boating experience, you need to prepare for the activity by considering human, environmental, and equipment factors. As noted in the preface, this model is useful for books, course outlines, or other situations where there is a large amount of interrelated content and where there is a unifying or central theme for the content.
Boating Fundamentals: A Manual of Boating Safety was a boating safety manual to be used by the states with their boating education programs. This model formed the structure of the book. Government agencies sponsoring the creation of the manual were interested in safety.

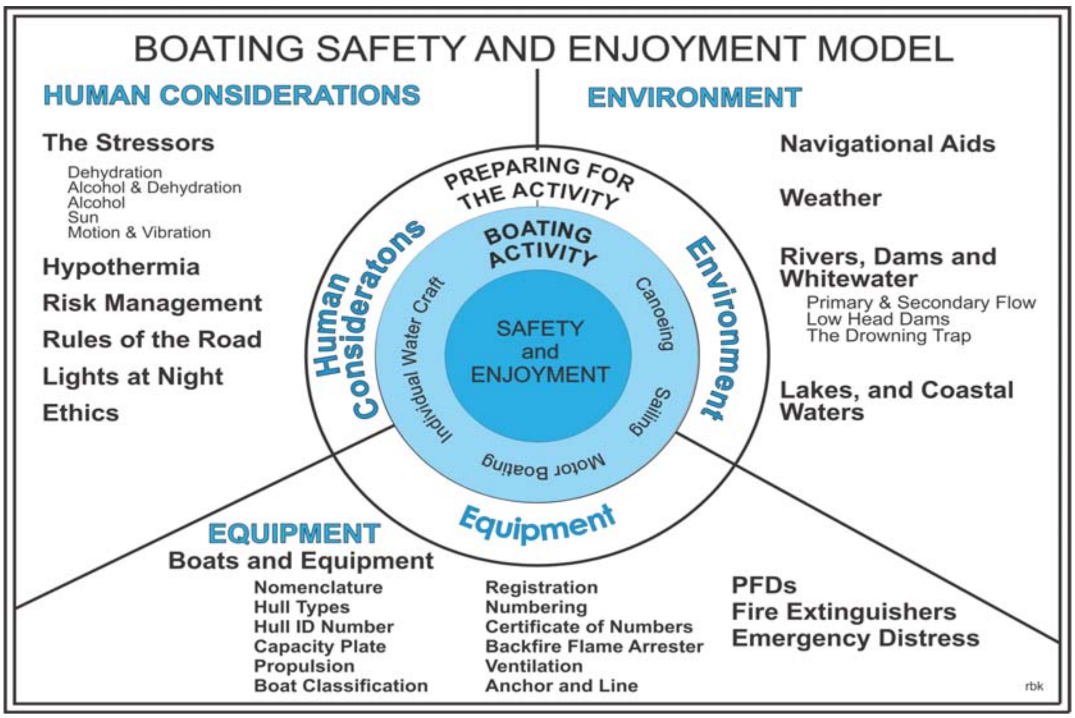

Figure 3.5: **Boating Enjoyment Model** – The objective of the model is to have a safe and enjoyable boating experience. It is dependent on the type of boating activity and preparation for that activity. Source: Author.

Safety and enjoyment occupy the center focus. Enjoyment is linked with safety because most people go boating to have an enjoyable experience. "Enjoyment" was borrowed from Fear and Mitchell's book Fundamentals of Outdoor Enjoyment, which utilized a concentric circle model to indicate the knowledge, skills, and abilities needed to have an enjoyable outdoor experience in the backcountry. The goal of the boating safety manual was straightforward. By addressing the human, environmental, and equipment factors, boaters can have a safe and enjoyable experience.

The second concentric ring is the "boating activity." It lists a wide range of boating activities on its concentric ring. These are the vehicles used in the boating activity.

The third concentric ring is "Preparing for the Activity." In the accident process, the factors influencing accidents include human, environmental, and equipment factors. The ring is further delineated with the breakouts. These breakouts comprise the chapter topics. Some topics are further subdivided into subsections. The breakouts are an example of the systems analysis modeling approach (i.e. tree analysis).

The parts of the model reinforce its message and the concept in the central circle. The message of the model is quite clear. If a boater wants a safe and enjoyable experience that reduces the likelihood of having an accident, they need to know the knowledge, skills, and abilities listed in the outline and in the manual. The model is not hierarchal. It is not sequential nor is it process oriented. As previously noted, this approach is not spatially oriented either.

<u>Surviving the Unexpected Emergency Model</u>. Surviving the Unexpected Emergency Model has a lot of similarities with the Boating Safety and Enjoyment Model (Figure 3.6). It was a model used for a prepper course. The purpose of the model was two-fold. First, it provided a conceptual outline for the course and second; it dovetailed with a survey designed to have students determine the level of their preparedness for surviving a disaster. Hence, surviving the unexpected emergency.

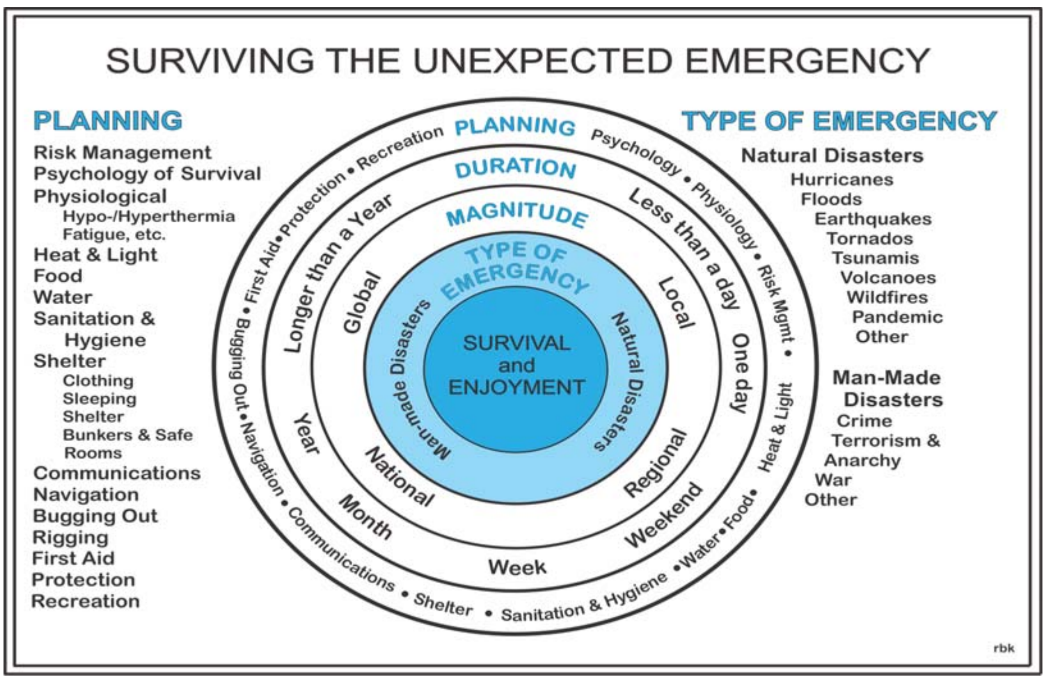

Figure 3.6: Surviving the Unexpected Emergency Model. Source: Author.

In the center circle, and the focus of learning the knowledge, skills, and abilities of prepping is the concept of survival and enjoyment. Enjoyment is a philosophical carryover of the previously mentioned models. The first ring is the type of disasters. They are either natural or man-made. The types of disasters are further delineated on the right side of the model.

The next two rings determine the duration and magnitude of the disasters for which to prepare. Duration can range from less than a day to more than a year. Magnitude can range from local to national or global. Using a self-administered survey instrument, most students choose a four or five-day preparedness, regional in scope, typified by a major snowstorm or hurricane.

Once the students make the decision regarding duration, magnitude, and the type of disasters, the question becomes how to prepare for those disasters. The last ring is planning for the disaster. Units are listed on the left side of the model. An observant reader will note that most of the units are similar to those needed to prepare for an outdoor recreation experience. This is the connection between outdoor recreation and camping skills with prepping.

The model aids visual learners and it presents in a model a conceptual overview of the course and its content. In addition, it aided students in determining their desired level of preparedness.

The primary model is the concentric rings model version of the center focused model. It is not hierarchal, nor is it sequential. The rings and other elements are not spatially oriented. The secondary model is for the planning and type of emergency rings. They utilize a systems analysis (tree analysis) covered in Chapter 3. The subsystems indicated the units in the course and the chapters in an unpublished text.

Center Focus Triangular Models

Conceptually, the center focus triangle has a lot in common with basic center focus model represented by the composting model and the triangle model. It is a combination of both models. The elements on the perimeter follow the same general principles of triangular models, however, like the composting model, the elements of equal importance surrounding the center item focus their emphasis on the center item.

General Principles for Center Focus Triangle Models: The center focus triangle has the same characteristics as triangular models, except that the perimeter elements focus on the center element. In addition, these models have the following characteristics:

1) **Model Characteristics**. Consistent with triangular models, they are not hierarchal. The perimeter elements are of equal importance. The elements are not normally sequential. Nor do they normally relate to processes.

2) **Spatial Relationship.** Consistent with center focused models, the center element is related to or directly influenced by the perimeter elements which have equal weight or importance.

<u>**Design the Experience Model**</u>. The Design the Experience Model illustrates the Center Focus Triangle (Figure 3.7). It is the backbone of the author's course in park and facility design and an unpublished textbook with the same title. In the recreation and parks field, there is traditionally a bifurcation between the recreation and parks components of the field. Recreation or active

recreation focuses on the activity where the resource or facilities are predetermined. In contrast, parks focus on the resource to provide recreational opportunities. This is not a criticism of either discipline. It is simply that the recreation programmer is usually provided with a facility or resource to conduct their program. They do not have the ability to significantly change the facility or resource to create the desired experience.

Given this brief philosophical history, the model states that the recreation programmer seeks to combine the elements of the facility, resource, and program to create the desired program. Anyone who has visited Disneyland or Disney World can understand how the Disney people have integrated these three elements of the resource, facilities, and program to create the desired experience (Kauffman, 2021).

Figure 3.7: An Example of Center Focused Triangle. Source: Author.

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4

System Analysis (Tree Analysis)

As used here, system analysis refers to the process of breaking larger systems into smaller subsystems. Normally, its purpose is to create smaller subsystems that are more easily understood and managed. The approach used in this chapter is more of a structural approach to system analysis. An organizational chart can subdivide a large organization into smaller, more manageable units. Or, a complex park system can be subdivided into cultural, physical, and biological factors. In turn, these factors can be further divided into more manageable subsystems. The end product of system analysis is a tree analysis, box method, or simple outline that subdivides the larger system into smaller, more manageable units.

In this chapter, system analysis, or creating a tree analysis, has the following characteristics. It is hierarchal. It is not sequential nor is it process oriented. A key indicator differentiating it from process oriented models in the next chapter is the absence of an end product. In contrast, the end product of system's analysis, if there is an end product, is the creation of additional multiple subsystems. The system analysis approach can be used with the process approach in the next chapter. Breaking larger systems into subsystems makes the system analysis approach hierarchal. Normally, the supra-system is placed at the top or the left of the chart. Its subsystems are listed at the bottom or the right of the chart.

General Principles for Systems Analysis Models. Systems analysis is a systematic and analytic way of looking at the world. It is systematic because it provides order. It is analytic because it enables breaking systems into smaller, more understandable parts. The following rules and principles are an abbreviated list of rules and principles.

1) **Supra, System and Subsystem Levels**. The current level of the tree being viewed is the system level. The level above the system is the supra-system and the level below it lists the subsystems.

2) **Arbitrary but Logical.** Although the process of creating the subsystems is arbitrary, they should make logical sense. Normally, the subsystems are organized and related to the system by some criteria.

3) **Top to Bottom and Left to Right**. Vertical trees work their way from the top of the page to the bottom of the page. Horizontal trees work from left to right.

4) **Levels**. Each successive tree of subsystems creates a new level.

5) **Numbering.** Numbering is optional. Each successive subsystem level adds a decimal and number to the preceding level. The first level is numbered 1.0, 2.0, 3.0, etc. The

second level is numbered 1.1, 1.2, 1.3, etc. The third level is numbered 1.1.1, 1.1.2, 1.1.3, etc. (Notes: For a variation, see also the numbering of MORT in the Chapter 5.)

6) **Combining with Other Models**. The system analysis approach, and in particular, the outline version, can easily be combined with other models. The Site Planning Process Model is a process model combined with a systems analysis approach (see Figure 4.3).

Tree Method

A tree branches out from the trunk of a tree. The branches subdivide into multiple smaller branches, which eventually support the leaves. Likewise, the tree method of systems analysis branches into smaller subsystems. Metaphorically, the diagram which is created often looks like an inverted tree.

Organizational Chart. Most people are familiar with organization charts (Figure 4.1). The purpose of an organization chart is to break down a large organization into work units where the activities of a group have a common function (e.g. marketing, planning, maintenance, etc), they offer similar programs or services (e.g. pool, golf, zoo, etc.), or the activities occur within the same geographic region (e.g. North District, Central District, South District, etc.). The chart is hierarchal. It begins at the top with the Director and works its way down the organizational chart toward the bottom of the chart. There are other variations of charting, but this is the primary approach.

The organizational chart in Figure 4.1 is a hypothetical organizational chart used in the administration course. Initially, the Park and Recreation Department is divided into subsystems based on product or service (e.g. Parks, Special Facilities, Recreation, and Construction). The

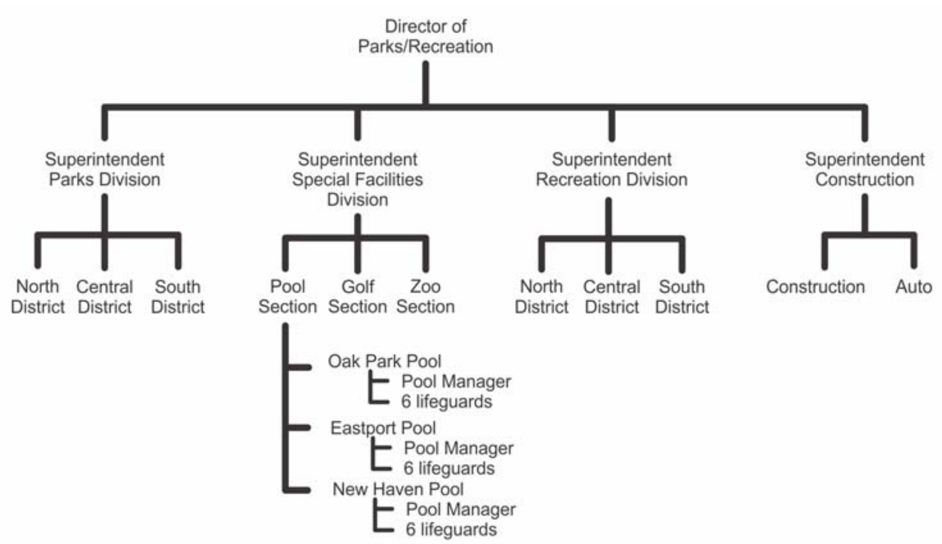

Figure 4.1: Example of a Hypothetical Organizational Chart. Source: Author.

Director supervises or has a "span of control" of four superintendents. The next level is by either geographic districts or program and service. Usually, but not always, there is a person associated with the position or with several positions.

In terms of the systems analysis principles, if the Superintendent of Special Facilities Division is the systems level being examined, the supra-system is the Director and the subsystems are the Pool, Golf, and Zoo Sections. Subdividing by function, program or service, or geographic region is logical and seems appropriate. Because the process is arbitrary, it could have been done differently. As depicted, the Director is Level 1. Superintendents are Level 2. Districts and Sections are Level 3. The subsystems are not numbered, but easily could have been.

Inventory of Onsite Factors. In resource or park management, the systems analysis approach is used to breakdown large park systems into smaller subsystems. The subsystems are more easily understood and managed. An important component of either the master planning process (see Figure 4.8), or the site planning process (Figure 4.3) are the inventory of onsite factors (Figure 4.2).

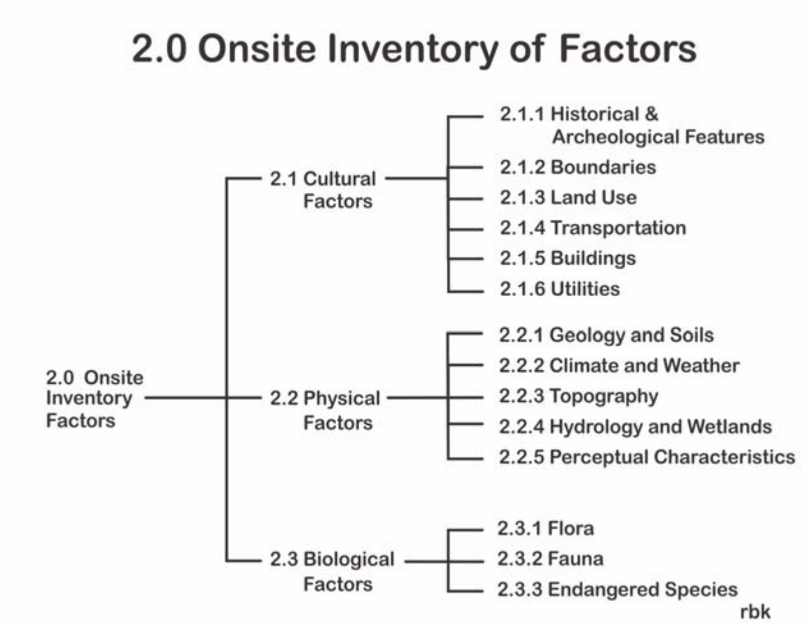

Figure 4.2: Onsite Inventory Factors. Source: Author.

In Figure 4.2, the Onsite Factors (i.e. Level 1) are subdivided into three subsystems (i.e. Level 2). These are Cultural Factors, Physical Factors, and Biological Factors. The division makes logical sense. Subdivision is by man-made, physical, and living factors. Cultural Factors are subdivided into six subsystems ranging from Historical and Archeological to Utilities (Level 3). The analysis can further subdivide the cultural factors into subsystems depending on what is actually present onsite. For example, utilities can be further subdivided into water, electricity, sewage, and gas. Numbering the subsystems is optional.

A second reason for including the onsite inventory of factors is that it shows how easily the systems analysis approach can be integrated into other models. In the next chapter, the Site Planning Process is a process oriented model shows the combination of two models where the inventory of onsite factors are part of the master plan or site planning process (Figure 4.3). It is included here also because it shows this integration.

The Site Planning Process Model is used to develop a site or facility within the park. Notice how 2.0 Onsite Inventory Factors in the Figure 4.2 dovetails with level 2.0 Onsite Inventory in the site planning process (Figure 4.3). This is by design.

Process oriented models are sequential with an end product. The Site Planning Process Model has steps ending with the final or construction plans. The arrows are an indicator of the sequential steps in the process.

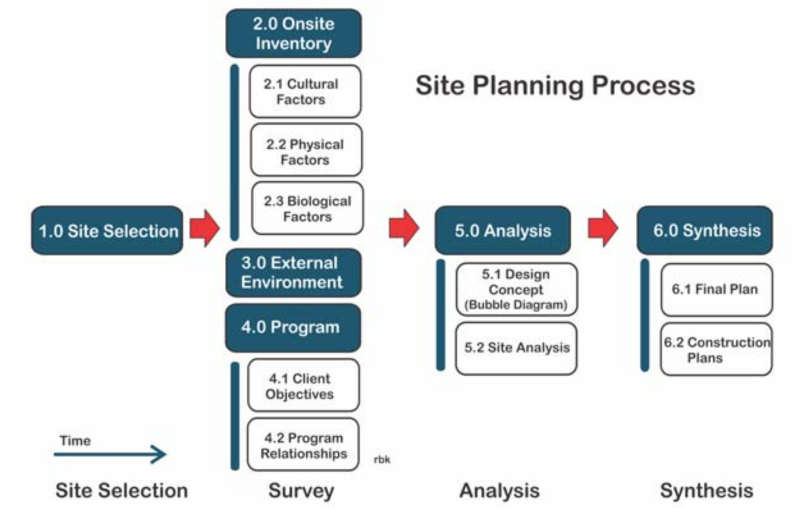

Figure 4.3: Site Planning Process Model. Source: Author; Adapted from: LaGro (2008), Dahl, and Molnar(2003), Calkins (2012), Lynch and Hack (1989).

The beauty of both models is that the sections can easily be compiled into a working document or plan where the sections become the outline. Section numbers can be included in the document within the section headings. Writing the document is as simple as filling in the sections listed on the outline.

The systems analysis (tree method) is hierarchal because systems are subdivided into mulitple subsystems. They are not sequenced or process oriented. In this sense, the tree method is static and doesn't produce an end product. It simply breaks down larger systems into smaller subsystems. The model is not spatial. The subsystems can easily be moved around within their level without impacting the meaning of the model.

Box Method

The box method has received lesser use than the tree analysis method since the tree analysis is more intuitive. It provides an alternative approach to the tree analysis.

Inventory of Onsite Factors. Using the box method, the tree analysis method in Figure 4.2 was reconfigured (Figure 4.4). The box method is not difficult to construct. Simply place the next level with its subsystems within the box of its higher level system. Cultural, physical and biological factor boxes are placed inside the onsite inventory box. Its six subsystems are placed in the cultural factors box. The five physical factor subsystems are placed in the physical factors box. And the three biological subsystems are placed in the biology factors box. As discussed in the previous section, the utilities box can include water, electricity, sewage, and gas, if needed (not shown). Boxes are numbered using the previously described approaches

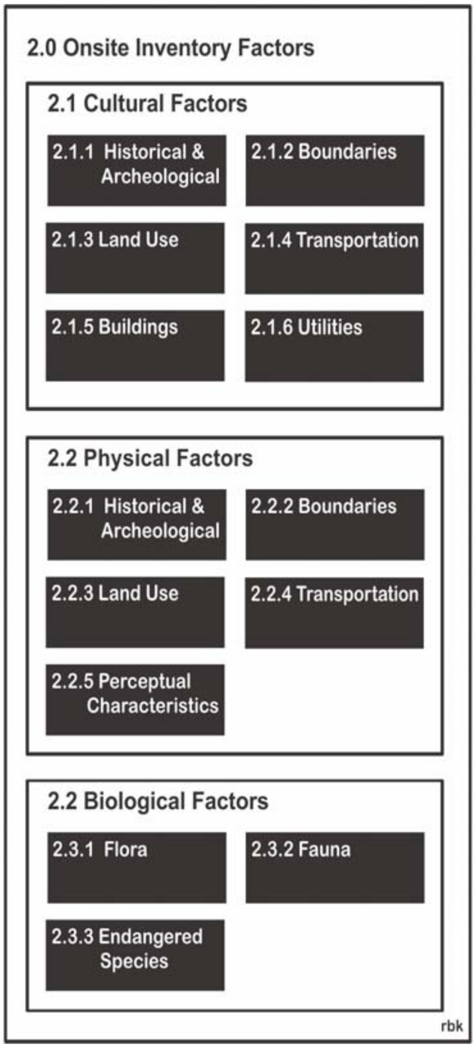

Figure 4.4: Example of a the Box Method. Source: Author.

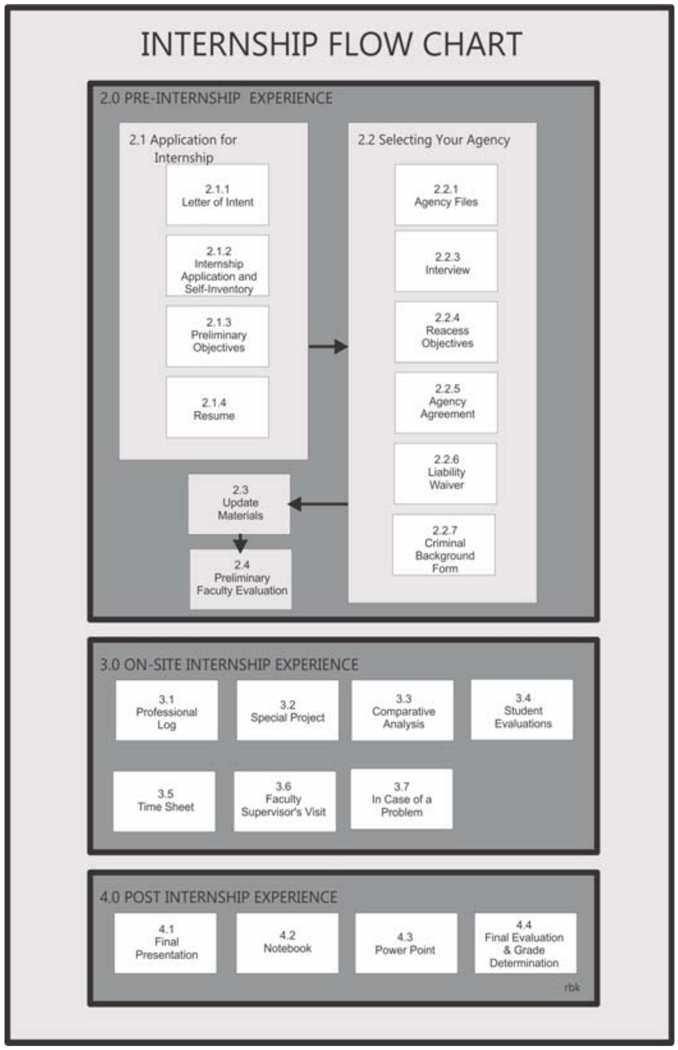

Figure 4.5: Example of a the Box Method for Internships. Source: Author.

<u>Internship Flow Chart</u>. A modified box approach was used with the internship flow chart (Figure 4.5). It is modified in the sense that the pre-internship has process oriented elements. There is an application for the internship. It requires a letter of intent, resume and other items. The second phase of the pre-internship is selecting your agency. Following this phase is updating student materials and a preliminary faculty evaluation. Each of the items refers to a section in the internship manual.

Seven activities comprise the onsite internship experience. They are not sequential. The post internship experience comprises four activities. As presented, they are not sequential. However, students complete the notebook and power point before the final presentation. Final grades are calculated last. Again, each of these items refers to a section in the internship manual.

In terms of the modeling attributes, the same analysis regarding the tree method applies to the box method since they are essentially the same.

Outline Method

Use of the Outline Method to Outline this Chapter

4.0 System Analysis (Tree Analysis)
- 4.1 Tree Method
  - 4.1.1 Organizational Chart
  - 4.1.2 Inventory of Onsite Factors
- 4.2 Box Method
  - 4.2.1 Inventory of Onsite Factors
  - 4.2.2 Internship Flow Chart
- 4.3 Outline Method

Figure 4.6: Example of the Outline Method. Source: Author.

The outline method is the third approach. In some respects, it is the simplest approach to system analysis, and perhaps, the most widely used version. Most technical writing uses a form of the outline method. This chapter was written using the outline method (Figure 4.6). The same is true for the other chapters as well. The outline method in Figure 4.6 shows the corresponding numbering system, if desired, applied to this chapter. Since this is Chapter 4, the first number in the numbering outline is "4. "

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5

Process Oriented Models

Process oriented models include a series of sequential events or steps. “A” precedes “B” which precedes “C, etc. Most likely, any model with arrows connecting elements in it is most likely a process oriented model. The chapter starts with the linear oriented flow charts where there is a beginning and end, and circular models where the end becomes the beginning, forming what may seem to be an endless loop. A key characteristic of the linear oriented flow chart models is the absence of the decision symbol (i.e. diamond). Add the decision symbol creates the decision symbol flow charts. A key characteristic is the use of the “decision” diamond. Last, it includes fault, positive, and analytic tree analysis. They contain logical gates and basic events.

Linear Oriented Flow Chart Models

A characteristic of linear oriented flow charts is that there is a sequential progression of events or activities with a beginning and an end, and there is the absence of decision symbols (i.e. diamonds). The sequential progression of events leads to the end or conclusion. Three examples are included. They are the grant proposal diagram, the master planning process, and a link between recreationist’s desires and the opportunities provided by managers.

General Principles for Linear Oriented Flow Charts:

1) **Model Characteristics**. These flow charts have the same characteristics as decision symbol flow charts except that the decision symbol is absent. The beginning and end, the arrows, and process orientation are present.

2) **Linear or Circular**. These flow charts can be linear or circular. Circular models have a linear flow except that the end links with the beginning.

3) **Top to Bottom or Left to Right**. As with other techniques, start the flow chart at the top or left side of the page and progress to the bottom or right side of the page respectively. The line connectors with arrows indicate the direction of travel through the flowchart.

4) **Identify Processes**. Processes are sequential. They can be relatively simple (e.g. Figure 5.1) or complex (e.g. Figure 5.8).

Grant Proposal (Figure 5.1). The grant proposal process is included for two reasons. It is a simplified model that explains what is often considered a complex process. Or, perhaps, some make it more complex than it really is. Second, the model shows that the grant proposal process is quite similar to the program planning process in the recreation field. This is by design and not coincident.

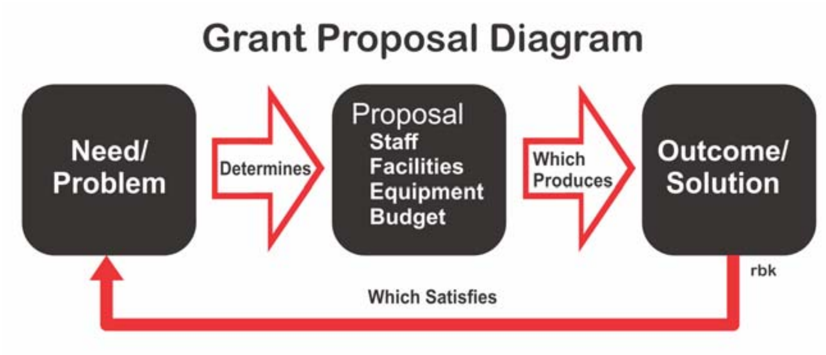

Figure 5.1: Grant Proposal Diagram. Source: Author.

The purpose of the grant proposal diagram is to simplify what can be a complex process. Essentially, the model states that there needs to be a need or problem. If there is no need, there is no need for the proposal or the outcome. The proposal is nothing more than a variation of a program plan where the factors of personnel, facilities, equipment, and budget produce an outcome which satisfies the need or problem. There is the problem of hunger in the community. A food bank is proposed to solve the problem (i.e. provide food). The proposal will request the financial resources to fund those who will obtain and distribute the food. Creating the food bank is the outcome and it solves the need or problem.

In terms of a flowchart, the model is sequential. It is a process with the end product of the outcome/solution. It is a process The first step is to determine the need or problem. Often, the people seeking the grant actually have an idea for a proposal and will start with the second step. Regardless, the proposal needs to fulfill a need or problem. The second step is to produce a proposal. The third step is that the proposal produces an outcome or solution. Flowing from left to right, the diagram is hierarchal. As defined, it is not spatially oriented. The relationship between elements is not based on the distance between them.

Master Planning Model (Figure 5.2). The master planning process model illustrates a four step master planning process. In addition, it combines both a flowchart format and system analysis approach. The first step is to determine the process used. The second step is to inventory the resource including the market, programs, site and facilities, and operations. The third step is to develop an implementation plan which determines projects for completion based on the financial resources available. Implementation plans are prioritized. In addition, the implementation plan is based on the findings from the inventory phase. The fifth step is a review of the plan by the stakeholders and finalizing the plan.

Each of the steps is further subdivided using a systems analysis. This is evident in the inventory phase. Item 2.3 Site and Facilities is a plug and play of the analysis discussed in the chapter on systems analysis. Actually, the items listed in the implementation plan and the review and final plan could be considered sequential also. The preliminary plan (i.e. 5.1) is reviewed before moving on to the final plan (i.e. 5.2).

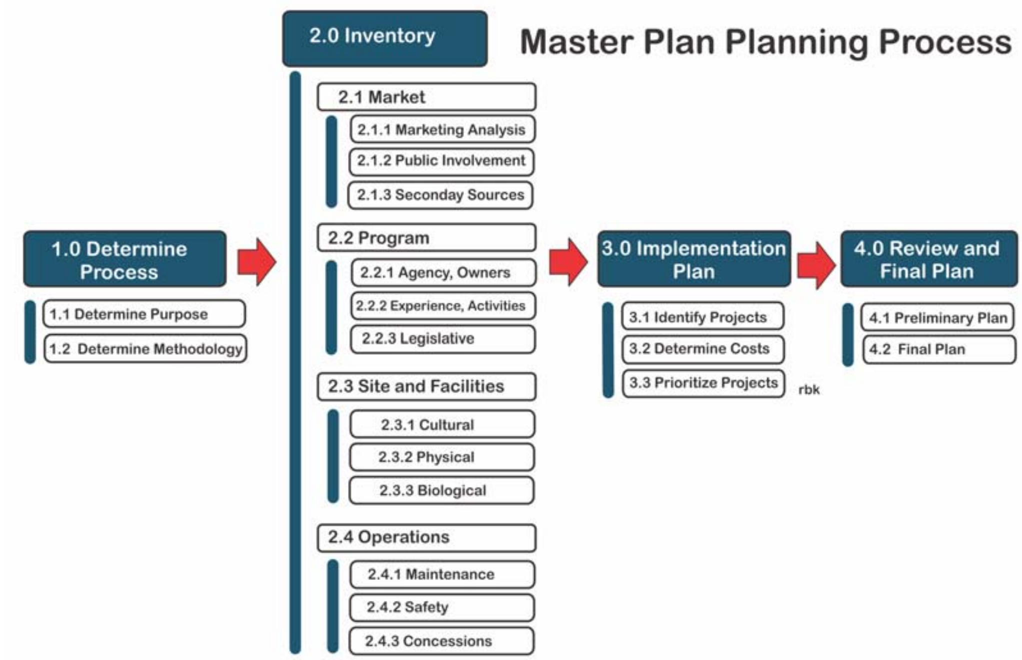

Figure 5.2: Master Planning Process. Source: Author, adapted from Copeland (2011).

The model is clearly sequential and defines a process. There are even arrows between the four steps suggesting the sequential steps taken. Moving from left to right, the items are hierarchal. The distances between the process rectangles are not critical, suggesting that the model is not spatially oriented.

<u>Link between Recreationist's Desires and the Opportunities Provided by Managers</u> (Figure 5.3). At first glance, this model doesn't look like a flowchart model. It looks more like a metaphorical model. However, the arrows give it away. It is a flowchart. Close inspection reveals that there are steps in the process. The model is not a metaphorical model. Although there is a model in the center which uses a circle, the model does not relate a concept to an object such as a slice of cheese, a wall, or a faucet.

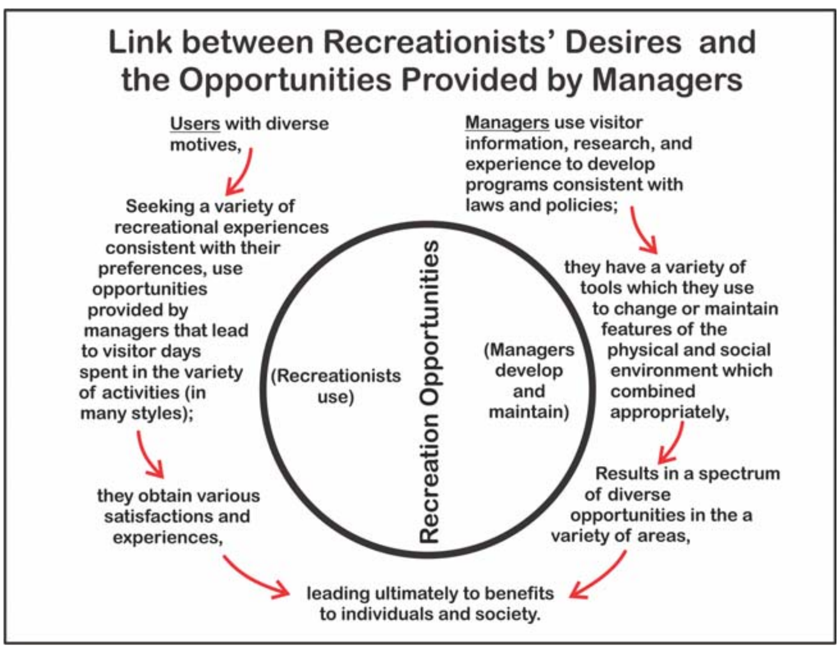

Figure 5.3: Link between Recreationists' Desires and the Opportunities Provided by Managers. Source: Author, adapted from: Clark and Stankey (2009).

The model in Figure 5.3 is from the classic monograph by Clark and Stankey, explaining the Recreation Opportunity

Spectrum (ROS). It is a bifurcated model expressing the desires of the recreationists or users of the resource, and the managers who are managing the resource to provide the desired recreational opportunities for the users. This basic relationship is portrayed in the circle located in the center of the model. On the one side of the model, recreationists seek recreational experiences. This leads to satisfaction and experiences. On the other side of the model, managers manage the resource to provide recreational opportunities. The ROS seeks to provide recreational opportunities. The end product is the benefits to individuals and society.

The model shows how the different model types can easily overlap each other. Although the steps or progression of events are weakly defined, they define different steps toward an end product. It is not hierarchal. However, it is spatial in the organization of elements. Recreationists are on the left and managers are on the right. Spatially, they meet and use/provide recreational opportunities. An argument could be made that this model is also a center focused model and could equally be included with that model type. It was included here because the end product or conclusion in the words of Clark and Stankey "lead[s] ultimately to benefits to individuals and society."

Circular Models

In circular models, the end of the flowchart dovetails directly back into its beginning. As previously noted, a feedback loop does not normally create a circular model. Usually, there is still a conclusion or an end product in the model. However, the end product directly feeds back into the beginning. This section includes conducting an investigation, an assessment model, and the Kachess Effect.

Model for Conducting an Investigation (Figure 5.4). This model shows the simplicity of a circular model. There are countless models that address different topics that have a similar theme. It is a variation of the research model with the following steps: identify the problem (Step 1), collect the data (Step 2), analyze the data (Step 3), write a report (Step 4), implement and evaluate the recommendations which begin the process again by generating new problems to address (Step 1).

The model is sequential with a series of steps or progressions where the end connects with the beginning. It is a circular model where the findings determine new problems or issues. It is not hierarchal, nor is it spatial.

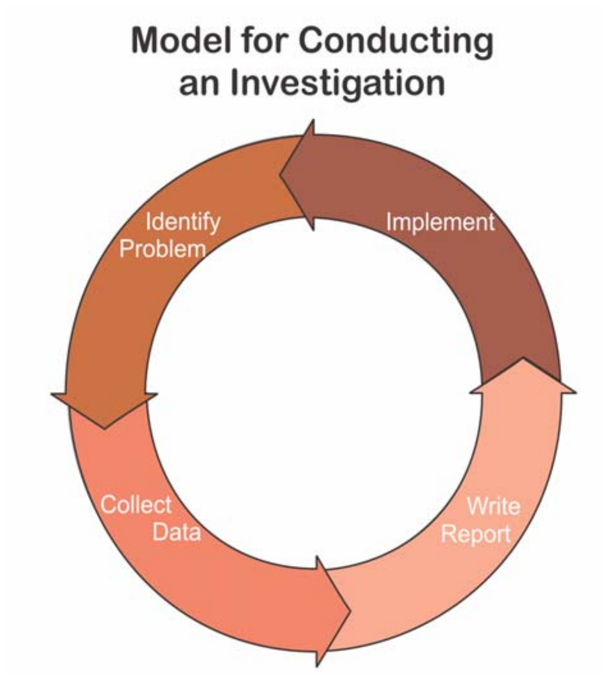

Figure 5.4: Model for Conducting an Investigation. Source: Author, adapted from Jackson, et. al (2004).

Assessment Model (Figure 5.5). The assessment model shows a modified circular model. Circular models are usually used to describe the assessment process. The issue is to prove that what you say you are doing is what you are actually doing. In education, this means that learning has occurred. Then it is a matter of incorporating the assessment results back into the curriculum to enhance learning. The accrediting bodies have changed their standards to emphasize assessment. This has required university programs to extensively over hall their systems.

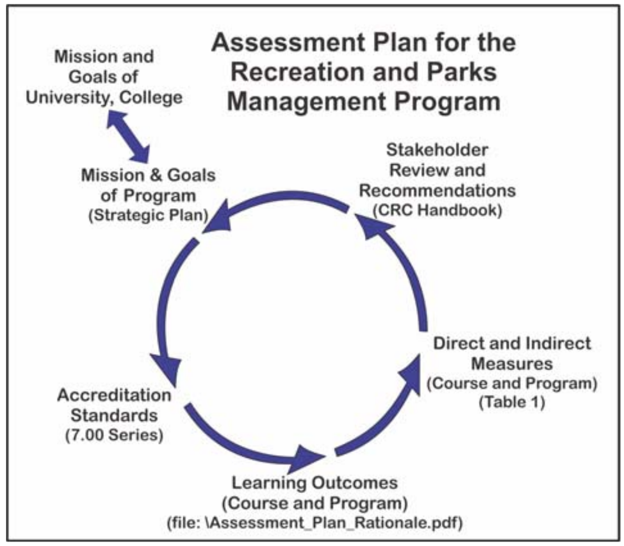

Figure 5.5: Assessment Plan for the Recreation and Parks Management Program. Source: Author.

The model in Figure 5.5 represents the assessment plan developed for recreation and parks management academic program. It needs to be consistent with those of the university. The mission of the university and its strategic plan form the external framework for the program and its place in the university.

The approach of the model is fairly straightforward. There are four COAPRT Program standards (Council on Accreditation of Park, Recreation and Tourism). The standards are easily converted into learning objectives for the courses and program. The standards and corresponding learning objectives are not course related. Next, there are direct and indirect measures that the program is doing what it said it was doing. Direct measures are where students demonstrate actual proficiency. If the standards say that they need to demonstrate proficiency in design, conducting, and evaluating a program, students need to demonstrate these skills. Indirect measures include measures like graduate placement statistics or feedback surveys from graduates. The information gained from direct and indirect measures results in recommendations and an alternatives package presented to the faculty and advisory board (i.e. stakeholders) to make recommendations that improve the program. These recommendations need to be consistent with the university's mission and strategic plan. Then the process begins all over again.

This model demonstrates a modified circular flow chart, which is a continuous assessment loop. It is a modified circular flow chart because of the external influence on the university's mission and strategic plan. Regardless, it is still sequential. It is not hierarchal, nor is it spatial.

Kachess Effect (Figure 5.6). The Kachess Effect is a continuous circular model without an ending. What starts out as wilderness evolves into development. Therein is the problem. In the preface of their monograph, Clark and Stankey describe this process in what became identified with the model as the Kachess Effect (Kauffman, 2018).

Clark and Stankey (1979, preface), noted the transformation of two alpine lakes in the Cascade Range in Washington State, the Little and Big Kachess. In the 1890s, the area was only accessible by game trails. Few people visited the area and there was little degradation of the resource. In the early 1900s the U.S. Bureau of Reclamation built a dam and impoundment that stretched 11 miles in length. It became a recreation attractant. Logging roads were improved. By the 1940's, several informal camping areas were established by users. Rustic tables and outhouses were installed. “The area, now much more developed, appealed to people looking for some of the conveniences of modern living. Most were apparently happy with what they found.” (Clark and Stankey 1979, preface)

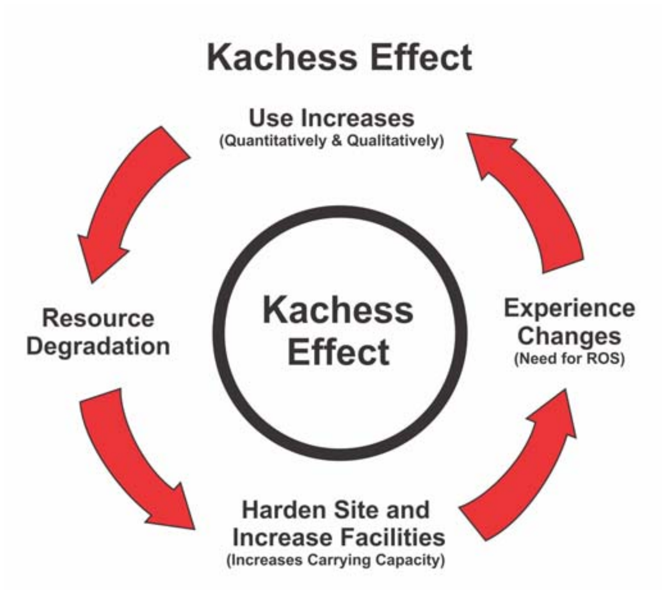

Figure 5.6: Kachess Effect. Source: Author.

In the 1960, the roads were paved. Campgrounds were developed that could accommodate cars with travel trailers. A 100-acre recreation complex was developed. Campers had paved roads, modern toilets, and running water. “Most resemblance to a primitive area had disappeared by this time” (Clark and Stankey 1979, preface). What was once a primitive area in character was irreversibly transformed into an urban environment. The description of what occurred can be applied to the transformation that has occurred to countless other primitive locations.

Applying the model in Figure 5.6, the Kachess was a primitive area accessible by game trails. With the construction of the dam, the area received more use. Use changed both quantitatively and qualitatively. Quantitatively, more users used the area. Qualitative change refers to changes in user types and how they impact the resource. People seeking wilderness were displaced and went elsewhere as the area became more developed. To prevent resource degradation or simply to accommodate the new user groups, sites were hardened. This increased their carrying capacity. Logging roads were improved and eventually paved. They became modern thoroughfares. Site hardening, building facilities, and increasing the carrying capacity changed the experience provided by the resource. Travel trailers need developed facilities. Completing the cycle, the resource improvements attracted more and new user groups to the resource. As illustrated in the Kachess, the Flume in the White Mountains, and many other resource areas, the nature of the recreational opportunities provided by the resource can easily progress toward more development.

The purpose of the Kachess Effect model is to show that, without a limiting factor, unfettered development can result in changing the experience provided. It is a design issue and the ROS model can provide that limiting factor.

In terms of model building needs, the stages and the steps are a flow chart clearly leading to the next step. They are sequential. The model is not hierarchal and there is no additional meaning associated with the spatially oriented arrangement of the arrows.

Decision Symbol Flow Charts

The key component of decision symbol flow charts is the use of the decision diamond. The decision symbol differentiates it from the other process oriented models as well as the other model types.

A quick review of the internet reveals a plethora of symbols that are unique to the specific discipline. Computer oriented templates may still have punch card or magnetic tape symbols (Figure 5.7). Regardless, the symbols used in this section have their origin with the information systems. The two most important are the process (i.e. rectangle) and decision labels (i.e. diamond). Add to the list of symbols in Figure 5.7 as needed.

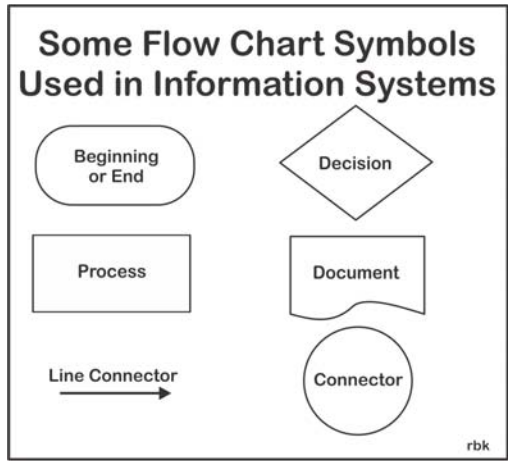

Figure 5.7: Some Flow Chart Symbols Used in Information Systems. Source: Author.

General Principles for Decision Symbol Flow Charts:

1) **Model Characteristics**. There is a beginning and there is an end. Consistent with process oriented models, there are arrows which guide people through the process. In addition, there is the decision symbol (i.e. diamond) which differentiates it from other model types.

2) **Decision Symbol**. One of the key elements differentiating traditional flow charts from systems analysis in the previous chapter and fault, positive, and tree analysis in this chapter is the decision symbol. Diamond shaped, the decision symbol splits the process into two courses of action. Depending on the process being described, the divergent courses of action may reunite. Often, this is a feedback loop.

Figure 5.8 is a flowchart that helps designers to decide the type of flowchart that they should use when designing flowcharts. In addition, the basic flowchart components form the structure of the chapters as well.

The flow chart in Figure 5.8 does not delineate all processes. Chapter subheadings in this chapter suggest additional flowchart processes. Most of the process labels describe multiple faceted processes. Separate flowcharts can be created for the processes described in the single process label. For example, if a center focus design is emphasized, the flow chart suggests selecting the center focused designed described in Chapter 2. Chapter 2 includes three different model types and a flowchart can delineate the selection of the most appropriate model. Although Figure 5.8 does not number the processes, each symbol could be numbered using a format described in systems analysis (e.g. 1.0, 1.1, 1.2, 1.3, etc.).

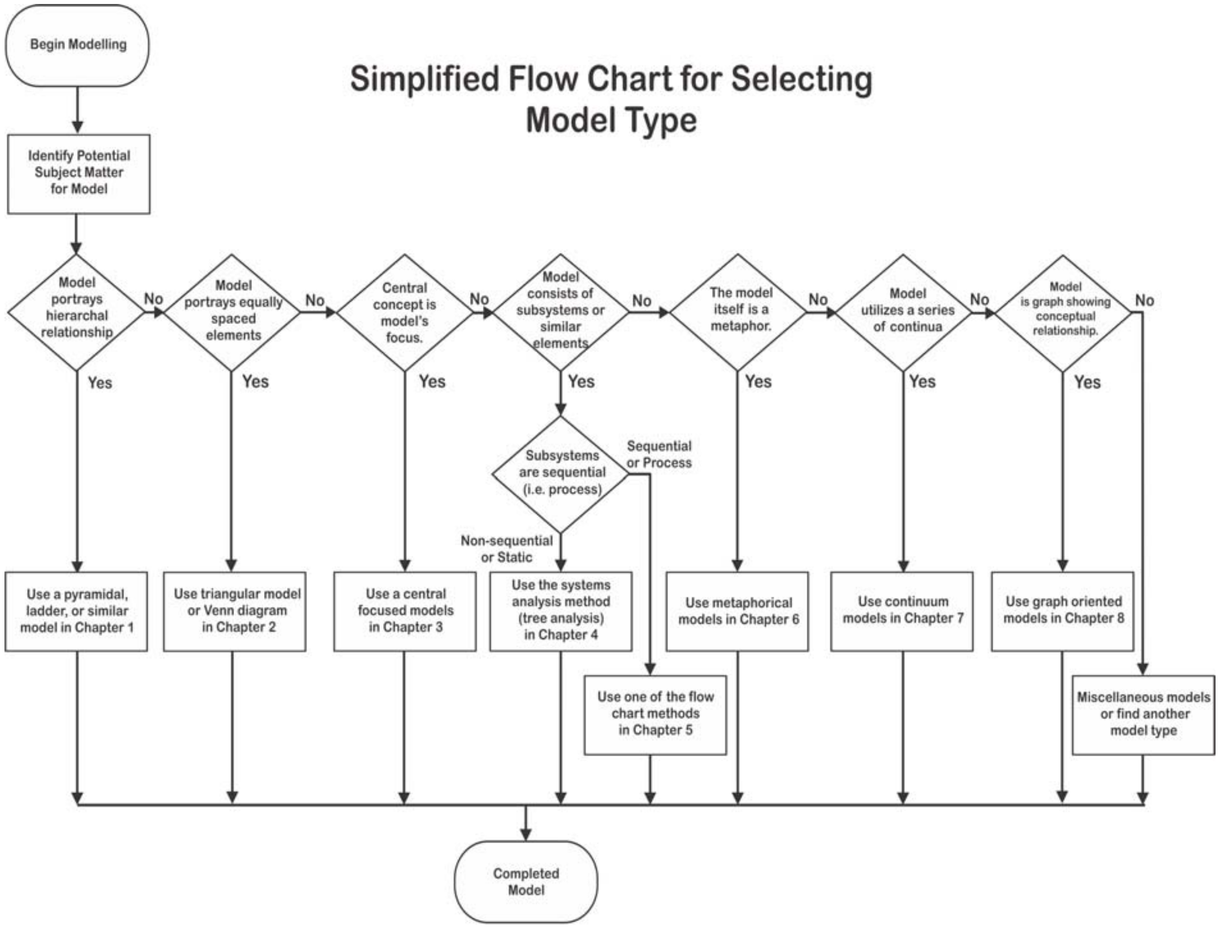

Figure 5.8: Simplified Flow Chart for Selecting Modeling Types. Source: Author.

Fault, Positive, and Analytic Tree Analyses

Fault, positive, and analytic tree analysis have two characteristics that differentiate this analysis from the systems analysis in the previous chapter. First, the tree analysis is a series of steps. It is a process analysis. Second, a key component of the analysis is that they use use "logic gates." In contrast, systems analysis is a static analysis which simply breaks

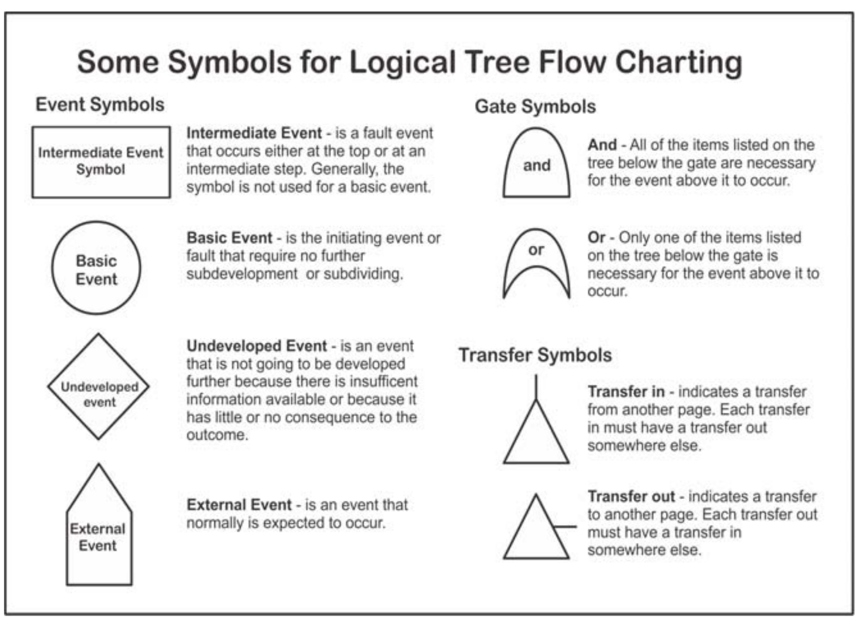

Figure 5.9: Some Symbols for Logical Tree Flow Charting. Source: Adapted from System Safety Society (1997) and Oakley (2003).

down a system into its subsystems.

Fault Tree Analysis. The purpose of fault tree analysis is to determine the causes of an accident. It accomplishes this by developing a series of intermediate steps to a basic event or conclusion.

General Principles for Fault and Positive Tree Analysis Models. Used primarily in accident investigations, fault tree analysis is used to determine causal factors of an accident (Figure 5.9). Positive tree analysis is useful in developing systems to prevent accidents prior to an accident occurring. Consider the following principles:

1) **Top to Bottom and General to Specific**. Starting at the top with a general event, the analysis moves to the bottom with specific events. The analysis involves mostly intermediate events and ends with basic events which need no further analysis.

2) **Intermediate and Basic Events**. The two primary types of events that are used are intermediate and basic events. An intermediate event requires additional analysis and processing and is represented by a triangle. A basic event requires no further analysis and is represented by a circle. Other primary events include conditioning, undeveloped, and external events.

3) **Logic Gates**. Each level of analysis is governed by an "and" or "or" logic gate. "And" means that all the following events must occur. "Or" means that only one or more of the following events needs to occur.

4) **Causal Factors**. In the fault tree analysis, the basic events are considered causal factors of the accident in the generic sense.

The video, Cold, Wet, and Alive, is useful for illustrating fault tree analysis (Figure 5.10). The video depicts a day's trip by a group of canoeists where David gets hypothermia and loses his boat. A trip summary is provided below. Within the summary, most of the basic causes listed on the fault chart in Figure 5.10 become evident. The intermediate events begin with the underlying factors of human, environmental, and equipment factors and uses its subsystems to analyze basic causes.

> David and a group of three other paddles took an early spring canoe trip. After running shuttle, the group put on the river at 11:00 a.m. Paddling a kayak, David came out of his boat several times and he swam in the cold water. At approximately 4:00 p.m. the group reached the lunch stop at the half-way point. Rather than ending the trip, the group made a conscious decision to continue with the trip. The trip degenerated. David swam and got hypothermia. The sun went behind the mountains. It rained. The water in the canyon rose. David took a nasty swim, lost his boat, and the group eventually hiked out, not finishing their trip. (Source: Author)

Analyzing the modeling attributes, fault tree analysis is a process resulting in a series of end products. It is an organic process. Being deductive, it is also hierarchal. It is starting with an incident and analyzing it in terms of the underlying factors to derive the end products. End products are not analyzed any further. The process is sequential. Fault tree analysis is not spatial. Individual trees can be rearranged without changing the meaning of the analysis.

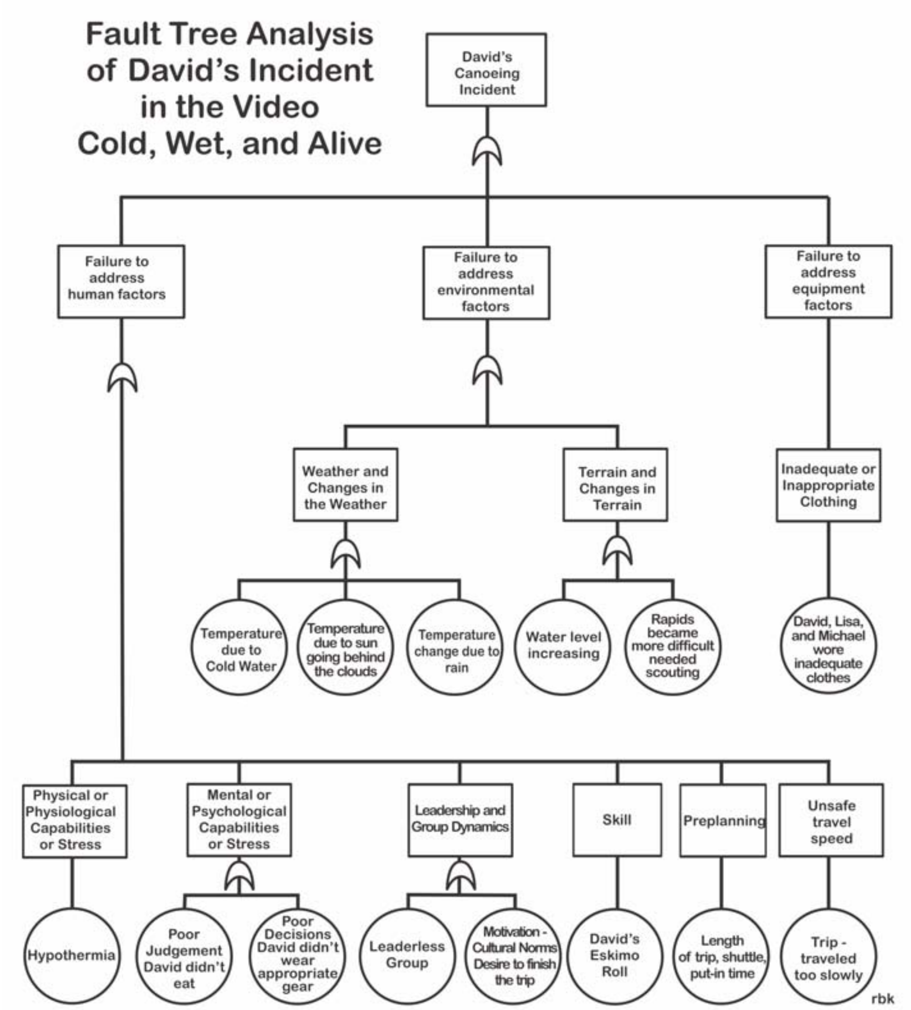

Figure 5.10: Fault Tree Analysis of David's Incident in the Video Cold, Wet, and Alive.
Source: Author, Kauffman and Moiseichik (2013).

<u>Positive Tree Analysis</u> (Figure 5.11). The same basic fault tree rules apply to positive tree analysis. Where fault tree analysis is deductive, positive tree analysis is inductive. It still moves from general to specific. Figure 5.11 depicts a positive tree analysis to create general beach safety. The end product or basic events which don't need further analysis are the specific recommendations needed for beach safety to occur. The basic events can easily become the topic headings within a manual. Also, note that the positive tree analysis uses an abundance of "and" logical connectors, whereas the fault tree analysis tends to use the "or" logical connector.

The modeling criteria for positive tree analysis are the same as for the fault tree analysis. It is a process producing a series of end products. It is not spatially oriented.

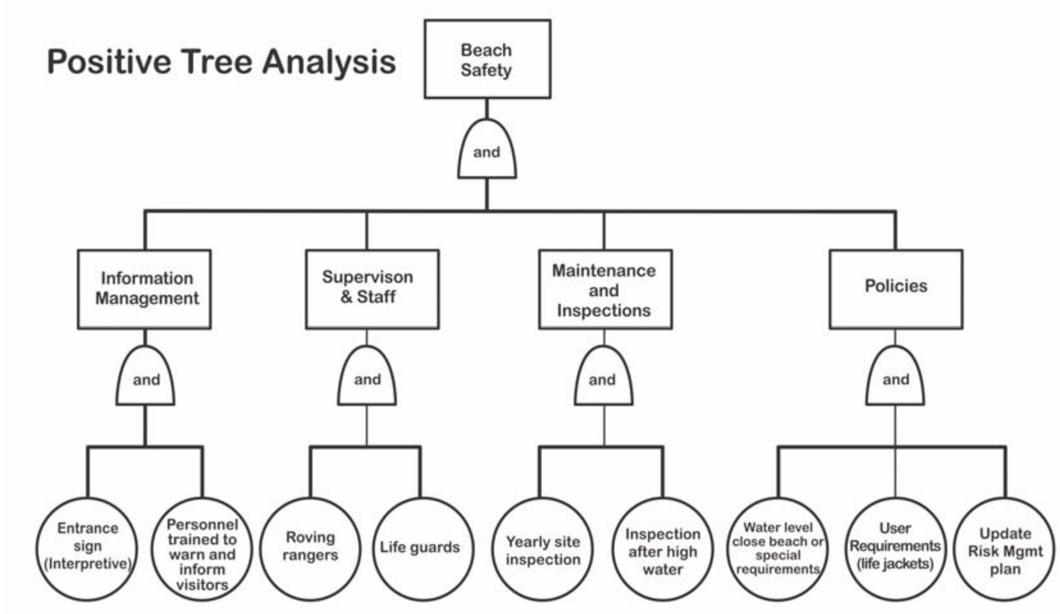

Figure 5.11: Positive Tree Analysis. Source: Author, Kauffman and Moiseichik (2013).

<u>Analytic Tree Analysis</u> (Figure 5.12). The analytic tree approach uses the same approach and symbols as the fault tree and positive tree analyses. It asks questions without finding fault or developing safety factors. The MORT analysis is a good example of this approach. The primary differences between this approach and the systems analysis approach in the previous chapter are the use of logic gates and the tree analysis is designed to ask a series of questions.

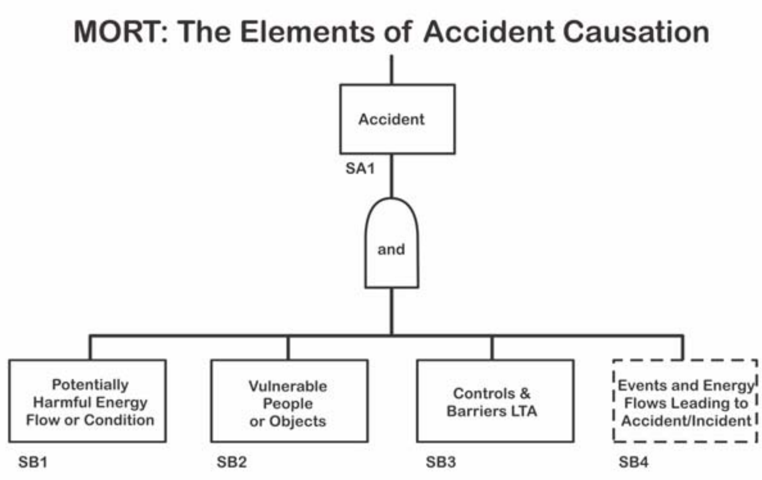

Figure 5.12: MORT: The Elements of Accident Causation. Source: Kingston, et. al (2009).

The MORT analysis shown in Figure 5.12 is a small portion of the total MORT tree (i.e. Management Oversight and Risk Tree). This portion of the tree analysis forms the basis of barrier analysis. Suggesting causality (i.e. necessary and sufficient), the "and" logic gate defines accidents as needing all components. This portion of the model has spurned other models These include the accident triangle in Chapter 1 (see Figure 2.4), the metaphorical models of the wall (see Figure 6.2), and its successor, the Swiss Cheese version of the model (see Figure 6.3).

The labeling of the tree is as follows. It shows an alternative to the previously discussed numbering approach. It is a less common version. The MORT risk management tree is subdivided into two major trees: “Management System LTA?” and “Specific Control Factors LTA” (Johnson, 1973, p.149). The “S” in the label stands for the “S” in “Specific Control Factors LTA.” The second element, “A,” indicates the first level. A “B” indicates the second level. The numbers indicate the items on the same level, in this case, the second level.

The MORT tree is hierarchal. Tree analysis is used to ask a series of questions. Items are not spatially oriented. Modeling criteria are similar to fault tree and positive tree analyses. The accident portion of the MORT diagram is part of a much larger decision-making diagram. It may hide the process aspects of the model, which may not be readily evident. The model is hierarchal, and it is not spatially oriented.

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6

Metaphorical Models

A metaphor is an object or action that represents something else. Most of the models presented so far have metaphorical qualities. In contrast to these models, the models in this group liken the concept being portrayed as an actual object or action. The model is the metaphor itself. Barriers are like slices of Swiss Cheese placed between the target and the source of the unwanted energy flow. Accidents are like a series of falling dominos. Also, many of the metaphorical models embody other models.

General Principles for Metaphorical Models:

1) **Choose the Metaphor Carefully**. Choose a metaphor that accurately complements the concept being portrayed. Later in this chapter, there is a discussion of a wall or Swiss factors, as barriers in barrier analysis. Using Swiss Cheese may be a better metaphor for barriers than using a wall.

2) **Consider Connotations**. Be careful that the metaphor doesn't denote an unwanted connotation. In the accident process, the use of falling dominos or a risk meter suggest a balancing of safety and hazard factors, where safety factors are needed to offset the hazard factors. Accidents may result from only one hazard factor.

3) **Keep the Metaphor Simple**. As complexity increases, the metaphor can easily become confusing. Property rights as a bundle of sticks is a fairly straightforward metaphor. In contrast, the Input/Output Model may border on becoming a little too complex (see Figure 6.5).

<u>**Property Rights as a Bundle of Sticks**</u>. Metaphorically, property rights as a bundle of sticks is a simple model (Figure 6.1). Its metaphor embodies the totality of the bundle of sticks concept.

Takings law actually refers to the bundle of sticks metaphor. Duerksen and Roddewig (1994, p.17) note that "First year law students learn that owning real estate is like owning a bundle of sticks. The "sticks" in the bundle are the various rights that accompany property ownership." Their booklet focuses on what constitutes a takings. To be considered a taking, the courts have ruled that even if a governmental regulation destroys one or more of the sticks in

Figure 6.1: A Simple Straightforward Metaphorical Model. Source: Author.

the bundle, if there are remaining sticks that give value to the remaining bundle, the loss is not considered a taking. The pivotal legal case was the 1968 Penn Central case where the Supreme Court declared that the train station which was a National Historic Landmark had value as a historic landmark (i.e. a stick) and couldn't be razed to build a skyscraper.

As graphically portrayed in Figure 6.1, treating property rights as a bundle of sticks is an excellent metaphor. Quickly and graphically it makes its point. It is not hierarchal, nor is it sequential or process oriented. This model is not spatial. The sticks can be rearranged without changing the meaning of the model.

Barrier Analysis – Barriers as a Wall or Swiss Cheese. This example demonstrates the impact of choosing a metaphor on the model and how it is portrayed. The example is the evolution between two metaphors used in the creation of a model. It relates to the first principle of selecting an appropriate metaphor and to the second principle where a metaphor may have an undesirable connotation. The use of the Swiss Cheese may be a better metaphor.

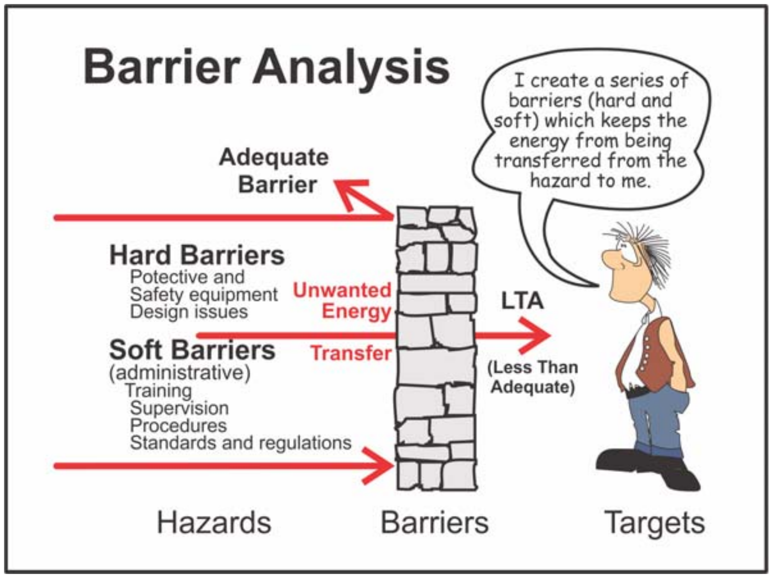

Figure 6.2: The Wall or Swiss Cheese? This was the initial metaphor for barriers. Which is better, the wall or Swiss Cheese. Source: Author.

Barrier analysis is an accident process model derived from MORT (Management Oversight and Risk Tree). It has its origins with the Department of Energy and has been used by the Department of Energy, Army Corps of Engineers, and Department of Defense. In the MORT analysis, there are four elements. There is a potential unwanted energy transfer from a source that transfers to a target (i.e. person or object) and causes injury, damage, or loss. Barriers, which are less-than-adequate (LTA), can prevent the energy transfer from the source to the target. Barrier analysis is considered causal. Its elements are considered necessary, and if an energy transfer occurs, an incident or accident will occur (i.e. sufficient).

In depicting the original model used a wall to depict the barriers (Figure 6.2). Walls are designed to protect the contents located behind them. The issue was whether a wall was the best metaphor. The first issue was depicting how the wall was less than adequate. Since a solid stone wall is not very porous, depicting the wall as less-than-adequate (LTA) became problematic. In addition, there can easily be multiple barriers. One wall is used to depict what is usually multiple barriers.

For these reasons, the Swiss Cheese metaphor used by Reason (1990) was borrowed (Figure 6.3). The holes in the Swiss Cheese represent LTA barriers in that they can allow unwanted energy to pass through the barrier and potentially transfer to the target. Multiple slices represent multiple barriers. The idea is to create barriers where the holes do not line up with each other and where one hole is protected by a complementing barrier. Hence the Swiss cheese metaphor portrays the accident process concept better.

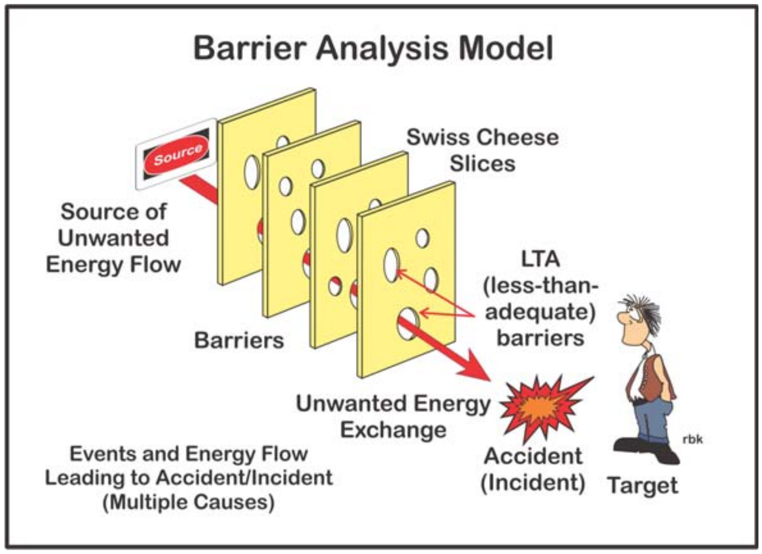

Figure 6.3: The Wall or Swiss Cheese? The metaphor for barriers was updated to this model. Do you prefer this model? Source: Author.

A second difference between the author's model and Reason's model is that a "source" of the energy transfer was substituted for "hazard." It may seem to be minor, but in terms of the model, it is significant. The life process is about energy transfers. Sources of wanted energy transfers (e.g. stove to boiling water for coffee) can also result in unwanted energy transfers (e.g. spilling the boiling water and burning the cook) that result in injury, damage, or loss. Unwanted energy sources can originate from wanted energy sources equally well as from hazards. It is not just hazards that create unwanted energy flows.

When creating a model using a metaphor, choosing an appropriate metaphor is important. Choosing a wall is okay, but the Swiss Cheese slices are better. The choice of the metaphor can significantly affect the meaning of the model as well.

The wall or Swiss Cheese models in this section are metaphorical representations of the models presented in MORT (see Figure 5.12), and the Accident Triangle (see Figure 2.4). Included in Chapter 5, the accident process included in the MORT tree, is an example of a decision-making process. The accident triangle is an example of a triangular model where the elements are spatially equal distance from themselves. As with the other models, the wall or Swiss Cheese models are not hierarchal, nor are they spatial.

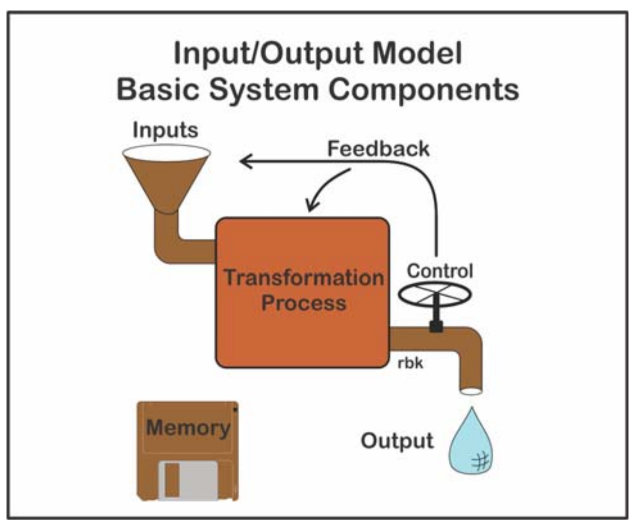

Figure 6.4: Input/Output Model. Source: Author.

<u>Baking a Cake with the Input/Output Model</u>. The input/output model is an amorphous model. Although it doesn't directly relate to a specific object or action like slices of Swiss Cheese, it contains known objects, including a funnel, faucet, and floppy disk as components within the model. The model could equally be placed in the process section. It is included here because of its uniqueness. The model shows that many of the models overlap with other model types.

Using the systems approach model, the input/output model is a model that takes inputs, converts them with a transformation process to create a product or outcome (Figure 6.4). In the model, the inputs enter at the funnel. The transformation process is a box. A feedback cycle is represented by a faucet with a valve (i.e. control point) that provides feedback to the inputs and transformation process. In addition, there is a memory component that stores the information, including directions. It is represented by the now antiquated 3.5" floppy disk.

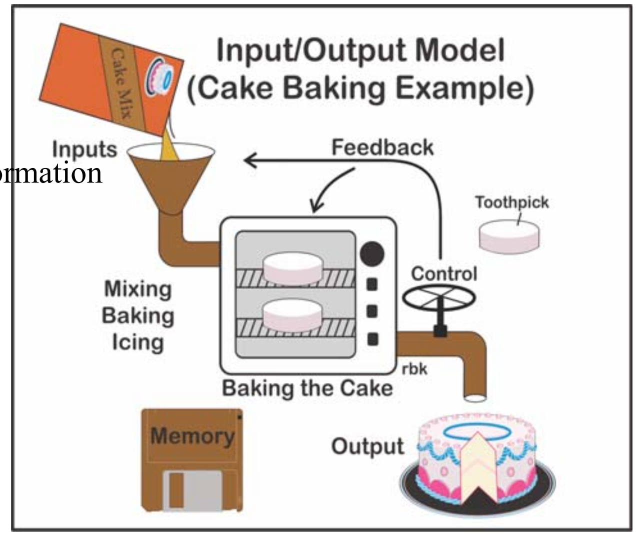

Figure 6.5: Input/Output Model with Metaphor Examples. The example is how to make a cake. Source: Author.

The input/output model can be extremely complex or as simple as baking a cake. Baking a cake was used to illustrate the concept because of its simplicity (Figure 6.5). Inputs included the cake mix, eggs, water, a kitchen with an oven, and whatever else is need to bake a cake. The transformation process is easily broken down into additional subsystems, including the processes of mixing, baking, and icing. It is not coincidental that these processes end with "ing." Controls can occur on any part of the process. Although the best ingredients can be used, they often have little to do with the quality of the cake finally created. The thickness of the batter in the mixing process provides feedback regarding the consistency of the cake batter. The toothpick stuck into the baking cake helps to determine if the cake is done. Tasting the icing determines whether the icing is right. Once the cake is baked, covered with icing, and presented to those who will eat it, the last test is how the cake tastes.

The input/output model is both a process and metaphorical model. It takes inputs and transfers them into outputs. This model could equally have been depicted as a process oriented model. Also, it is not hierarchal, nor is it spatial.

Accidents Are Like Falling Dominos. An early domino model by this author utilizes the metaphor that accidents are like falling dominos (Figure 6.6). It exemplifies the third principle that it is simple, intuitive, and easily understood. However, a better model based on stronger theories was developed. In addition, the domino model had some connotative weaknesses, where intuitively, accidents are viewed as a balancing act between unsafe acts (domino added) and safe measures taken (domino removed).

The model identified human, environment, and equipment errors. The three areas are consistent with the factors identified in the safety management literature. Each of the multiple human, environmental, and equipment accident factors represents a domino. Unsafe practices in these three areas place dominos standing upright on the table. Safe practices remove dominos. When an incident occurs, the dominos topple. If there are sufficient safety measures and dominos removed, injury, damage, or loss may be averted. Some, but not all the dominos topple. This is a near miss. If there are insufficient safety measure, all the dominos will fall and injury, damage, or loss will occur.

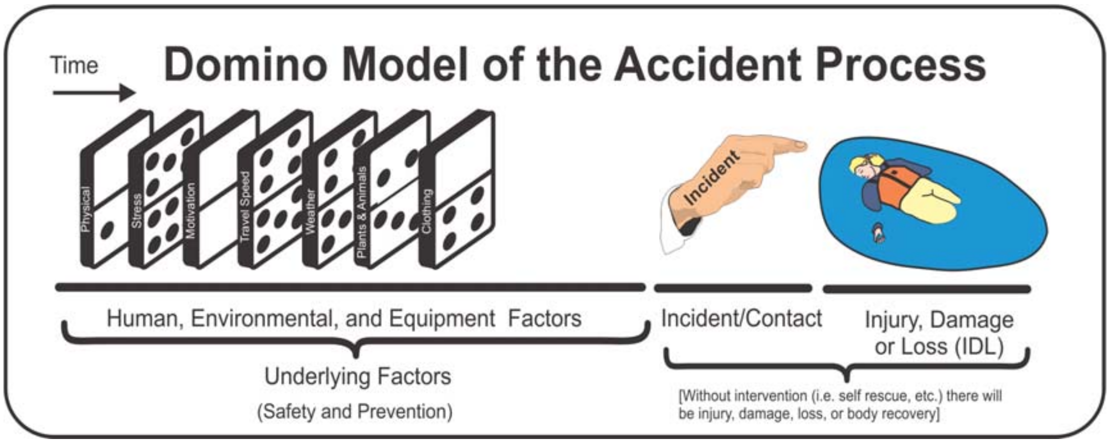

Figure 6.6: Accidents Are Like Falling Dominos. Source: Author.

Although the metaphor of falling dominos is intuitive, there may be some conceptual issues with the model. The model suggests accidents are offset by multiple safety factors. An accident can occur from the presence of only one unsafe act. Also, the model implies a balancing between safe and unsafe practices, which is not always the case. A strength of the model that is often not included in other models is the inclusion of safety measures. Regardless, the model was abandoned in favor of barrier analysis, which is conceptually a better model built on a better theory.

Evaluating the model in terms of the modeling criteria, the model is not hierarchal. Placing dominos on a table loosely describes a process leading to an accident. The model is not spatial.

<u>**Using a Meter to Measure Safe and Unsafe Risks**</u> (Table 6.7). The risk meter uses a meter as a metaphor to represent risks. The meter assesses the amount of safe acts versus unsafe acts. More unsafe acts lead to disaster or an accident. More safe acts can lead to boredom. The risk meter is intuitive and easy to use. This author has scratched the meter in the sand on a beach and had a risk management discussion with students regarding where the group was in terms of their safe and unsafe acts.

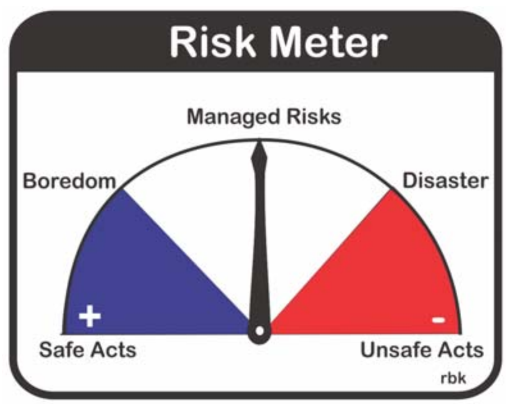

Figure 6.7: Risk Meter. Source: Kauffman and Moiseichik (2013).

Upon first glance, the risk meter seems fairly simple. However, some theory is reflected within the model. Boredom is associated with the flow model. Few challenges or risks can lead to boredom. Although there may be some theoretical differences between challenges and risks, the risk meter is still a useful tool in non-critical discussions with students. Also implied in the model is that "managed risks" are a balance between safe and unsafe acts. As previously noted, accidents with injury, damage, or loss can occur with just one unsafe act.

In terms of the modeling criteria, the model is not hierarchal. Nor is it sequential, a process, or spatial.

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7

Continuum Models

Continuum models are composed to two or more continua. Each continuum is a continuous scale composed of two opposing concepts. Based on the assessment of the individual continua, the model creates an overall classification. An advantage of continuum models is that they can encompass a wide range of variables. A problem with continuum models is creating decision rules to reconcile differences and outliers, which often result from using a wide range of variables. Two examples of continuum models are provided. The first is the ROS model and the second is a leisure model developed by this author.

General Principles for Continuum Models:

1) **Identify the Overriding Classification**. Define or describe the overall classification scheme that will be defined by the criteria. The purpose of the ROS model is to classify the recreation opportunities of the land into one of five classifications (e.g. primitive, semi-primitive, roaded natural, rural, developed).

2) **Identify the Continua**. Like subsystems, identify the continua that will measure the overall concept. These continua can be further subdivided. Each of the continua should relate to or define its supra-system, the overall concept. In the ROS model, these continua are primitive, semi-primitive, roaded natural, rural, and developed.

3) **Align the Continua**. In defining the overall concept, align the direction of the continua so that the direction of their measurement aligns with each other.

4) **Continua Need to be Measurable**. The continua should be measurable (e.g. primitive areas over 5,000 acres, over 2,500 acres, and less than 2,500 acres).

5) **Decision Rules**. When assessing the continua, not all of the continua will align with the other continua in the classification scheme. There are often outliers. Outliers need a decision rule to be reconciled. For example, how many outliers are necessary to change the classification? What is the affect of an outlier that is one or more classification away from the other continua?

ROS Model. In resource management, the ROS (Recreation Opportunity Spectrum) has evolved into a premier management tool used by the land management agencies of the government. It illustrates a continuum model. The model used in Figure 7.1 is the original version of the model presented in the original monograph explaining the model by Clark and Stankey (1979, p.18). As a footnote, readers will notice that the model presented differs somewhat from the model used today. Today, there are six distinct settings: urban, rural, roaded natural, semi-primitive motorized, semi-primitive non-motorized, and primitive. They are defined using specific physical, social, and managerial criteria. Although the original model has evolved, it has remained true to the original concept. It is a widely used model, and it has historical significance.

In their original model, Clark and Stankey (1979) created four classifications: modern, semi-modern, semi-primitive and primitive. The categories are symmetrical and ordered. Intuitively, the classifications could easily be applied to the continua. In their model, they included six continua (Figure 7.1). Several of these continua were further subdivided. Access was subdivided by difficulty, access system (i.e. roads or trails), and mode of conveyance (e.g. motorized or non-motorized). Criteria for each of the sub-continuum (e.g. access) were determined as well.

The following example shows the use of the ROS model in making management decisions. In Figure 7.1, access was depicted as an outlier. Assume that single-lane roads or similar paved roads were present, allowing motorized access. From a management perspective, there are two choices. These are to change the classification to reflect the road access. With four of the other assessments as primitive, this is unlikely. Or, management can modify the resource to bring it into conformity with the desired classification. Entrances to roads can be barracked. Paving can be removed. Roads can be converted to trails, naturalized, or removed altogether. Again, this will depend on the decision rules and any overriding management rules. Regardless, the example shows the basic management process using the ROS model.

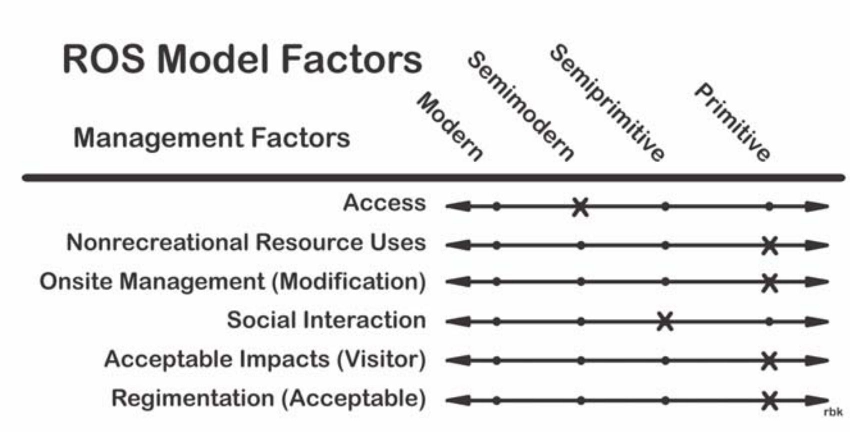

Figure 7.1: Original ROS Model and Continua. Source: Adapted slightly from Clark and Stankey (1979, p.18).

<u>Leisure Experience Continuum (LEC)</u> (Figure 7.2). The Leisure Experience Continuum (LEC) was developed by this author. However, it was later discontinued. Regardless, it is included because it illustrates the continuum model.

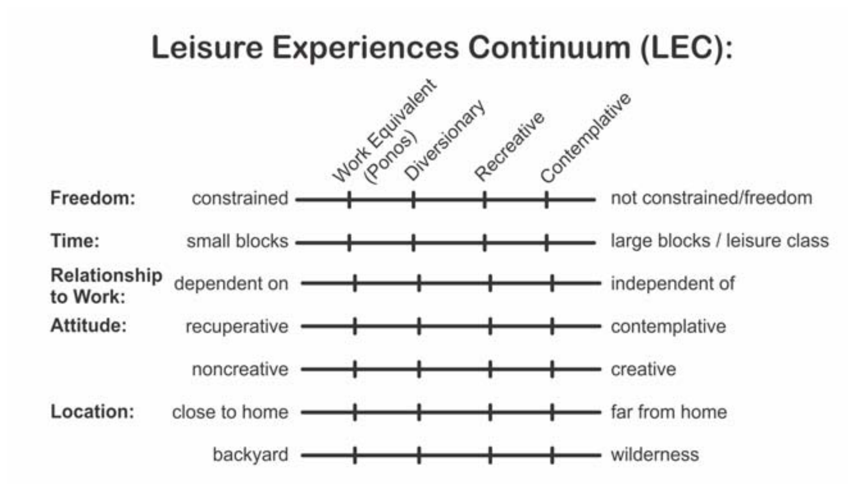

Figure 7.2: Leisure Experiences Continuum (LEC). Source: Author.

The LEC model divides leisure into four classifications. These are the Work Equivalence (Ponos), Diversionary, Recreative, and Contemplative. For the Greeks who were leisure oriented, ponos was the total absence of leisure. It was toil without meaning. The four classifications are subdivided by seven continua or scales. There is some relationship of the continua to the overall concept. However, some of the continua are loosely related to the overall classification. Both the non-creative/creative and recuperative/contemplative continua work reasonably well. However, contemplation can occur in the backyard just as easily as in wilderness. It was for this reason the model was discontinued. Regardless, it illustrates some of the potential difficulties with constructing this type of model.

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8

Graph Oriented Models

A graph shows the relationship between two variables. Normally, the X-axis is independent variable, and the Y-axis is the dependent variable. The dependent variable changes with what is occurring with the independent variable. On many graphs there is no real difference between the two variables and this is okay. In contrast with a normal graph, a graph oriented model shows a conceptual relationship rather than simply presenting data points that comprise a normal graph.

There are two general categories of graph oriented models. The first category includes generic graph oriented models. A sub-category, the second category includes time-related graphs where the X-axis is time.

Generic Graph Oriented Models

In the flow model, the model displays a conceptual relationship. Complementing the flow model is the TR Service Model. In the debriefing model, it is an add on to a hypothetical graph between the two variables. In addition, From the Hunter/Forager to the Conceptual Age model is included.

General Principles for Graph Oriented Models. A graph oriented graphic integrates a conceptual relationship onto a traditional graph. Consider the following guidelines:

1) **Graph**. Start with a graph with two axises. The graph shows a conceptual relationship between the two variable rather than actual data points.
2) **Axises**. Normally, the X-axis (horizontal axis) is the independent variable and the Y-axis (vertical axis) is the dependent variable. The dependent variable varies with changes in the independent variable. Often the two variables vary concurrently or there is no real independent or dependent variable. This is okay. If one of the axises is time, place it on the X or horizontal axis.

Flow Model. The flow model was chosen because it shows a conceptual relationship without including the data points normally associated with graphs. In his classic work titled Beyond Boredom and Anxiety, Csikszentmihalyi (1975) advanced the flow theory. Over time a graph oriented model evolved from his work and is depicted in Figure 8.1.

The model relates the skills available to the person versus the challenges present. As a person's skills increase, they can handle additional challenges. In the graph, they move outwardly from the zero point on the graph. Flow can occur when the challenges match the skills. The operative word is "can." Flow doesn't have to occur, only, that it may occur. As noted, there is a range or a relative area where the challenges match the skills. This area describes a potential flow experience, optimum performance, or optimum productivity. In addition, the model shows four other situations related to the relationship between the challenges and skills. If the challenges far exceed the skill level, anxiety will most likely occur. If it only slightly exceeds skill level, worry most likely occurs. On the other side, if skills exceed the challenges, boredom or even anxiety will result.

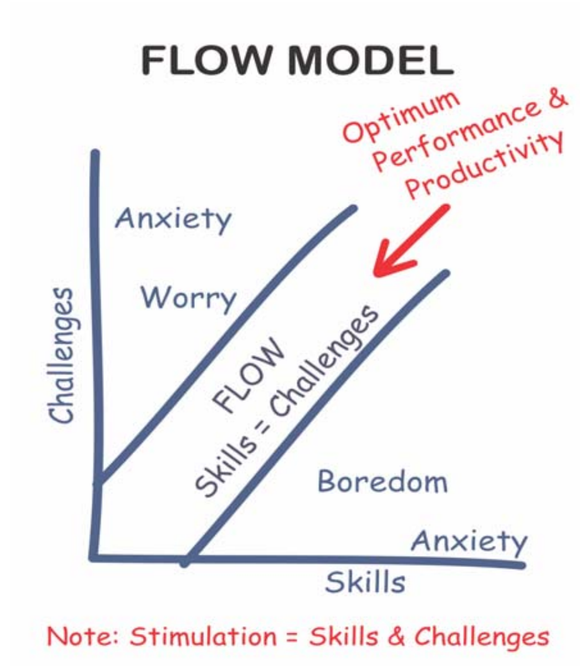

Figure 8.1: Flow Model. Source: Adapted by Author from Csikszentmihalyi (1975).

In terms of modeling, the flow model shows a conceptual relationship between two variables. It is not hierarchal, nor does it describe a process or flow chart. It is not spatially related in the traditional sense.

<u>**TR Service Model**</u> (Figure 8.2). The TR Service model is included because it shows a more complex model. It is based on the basic medical model and formed the basic service model for therapeutic recreation in its developmental years.

The model relates the needs of the client/patient versus the role of the therapist in treatment. Essentially, the less functioning the patient/client the more control the therapist has over the treatment. For convenience, the role of the therapist is divided into three categories: recreation, leisure, and therapy. Recreation offers the most freedom for the patient/client and therapy is the most obligatory. Consistent with the graph, the role of the therapist is to move the patient/client along the continuum from therapy to recreation.

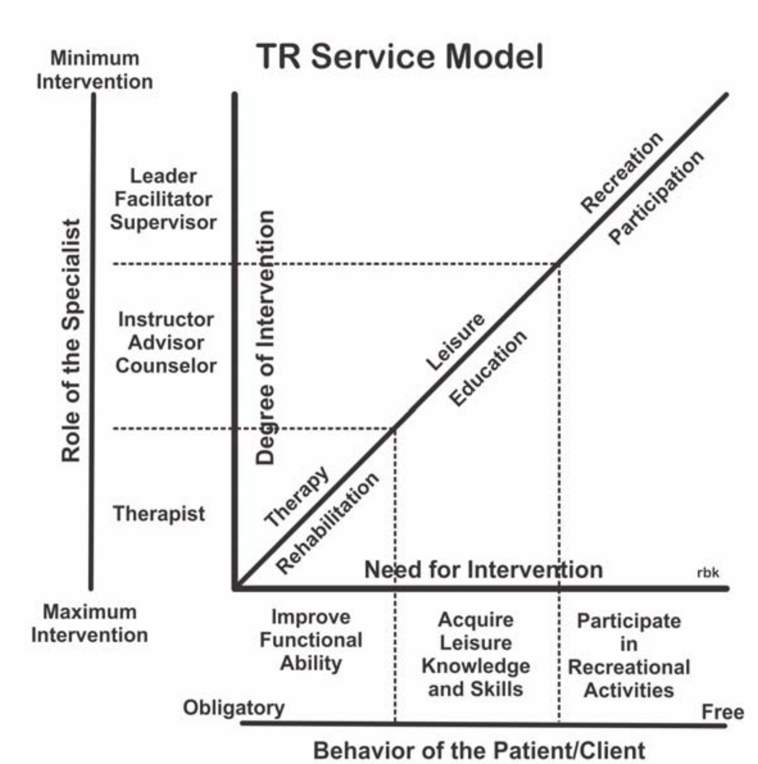

Figure 8.2: Therapeutic Recreation Service Model. Source: Peterson and Gunn (1984); Adapted by Author.

In terms of the model, there are two axises. The depicted concept is the relationship between the need for intervention based on the behavior of the client/patient and the degree of intervention by the therapist. The relationship is conceptual and there are no actual data points. The model is directional in that the therapist seeks to move the patient/client toward recreation. It is not hierarchal. Since there is movement between the three stages (i.e. therapy, education, and recreation), the model may be considered to be process oriented. It is not spatial.

Time-Related Graphs

In the time-related graph oriented models, time is placed on the X-axis. They are a sub-group of the graph oriented models. The general principles for their design are the same as for the generic models. Two models are discussed. These are the Three-Step Debriefing Process and From Hunter/Forager to Conceptual Age models.

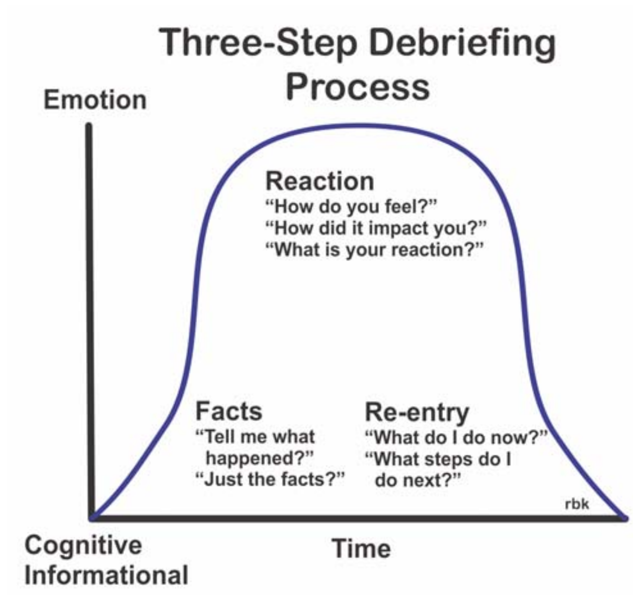

Figure 8.3: Three Step Debriefing Process. Source: Adapted by Author from Mitchell and Everly (2001, p.148).

<u>Debriefing Process</u> (Figure 8.3). The debriefing process was chosen because it shows the use of a hypothetical graph where the X-axis is time related. The debriefing process is used in any type of disaster where staff, participants, or EMS personnel need some type of debriefing from the emotional horrors resulting from the tragedy. In addition, the debriefing approach is useful by lay people in dealing with emotional situations involving a friend or colleague.

The debriefing model presented in Mitchell and Everly (2001, p.148) is a seven step process. This process was condensed into a three step process that is easy to understand (Figure 8.3). The X-axis is time. The Y-axis is a continuum ranging from cognitive/informational to emotional. The hypothetical graph depicts the relationship. The debriefing begins with facts and cognition. "What happened?" "Just give me the facts." From there the conversation moves to addressing the emotion associated with the event. "How did this affect you?" "How do you feel about what happened?" From there the debriefing moves back toward cognitive and information. "What concrete steps are you going to take now?"

From a modeling approach, the model in Figure 8.3 shows the debriefing session moving from beginning to end (i.e. time) and from moving from the cognitive/informational to the emotional and back again to the cognitive/informational. The graph depicts this movement. The model is not hierarchal, nor is it spatial.

Since the X-axis is time, the model could be drawn as a process oriented model or a flowchart. If redrawn as a linear oriented flowchart, it would be important not to diminish the cognitive/informational and emotion continuum portion of the relationship. Figure 8.4 redraws the three-step debriefing model as a linear oriented flow chart similar to the Grant Proposal Diagram (see Figure 5.1). Although either figure works, it underlines the fact that different models can often be used to display the same information.

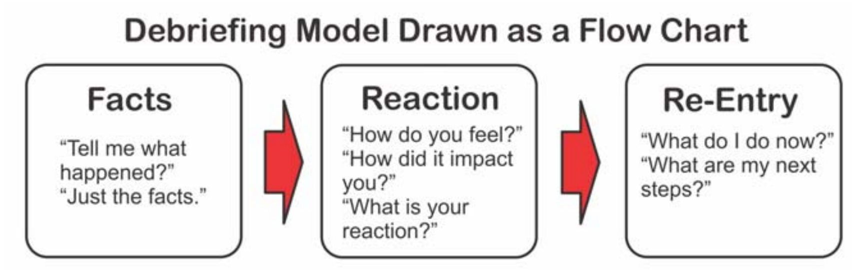

Figure 8.4: Debriefing Model Drawn as a Flow Chart. Source: Author.

<u>From Hunter/Forager to Conceptual Age</u> (Figure 8.5). The hunter/forager to conceptual age graph was included because it expressed time on the X-axis as centuries. The basic graph originates with two futurists, Alvin Toffler and Daniel Pink. In his book, The Third Wave, Toffler advanced the thesis that western society has moved through a series of waves or stages. These were the agriculture phase, industrial phase, and the information age. He describes the third wave but never officially labels it as the information age. Also, he acknowledges the hunter/forager as the initial state but doesn't label it as a phase. Otherwise, it would be four phases and the title would read The Fourth Wave.

Pink's thesis is that society is transforming into the conceptual age. The difference between the conceptual age and the information age is physiological. Where the information age is left brain oriented, the conceptual age is right brain oriented. It emphasizes creativity. Potentially, this physiological difference differentiates the two phases.

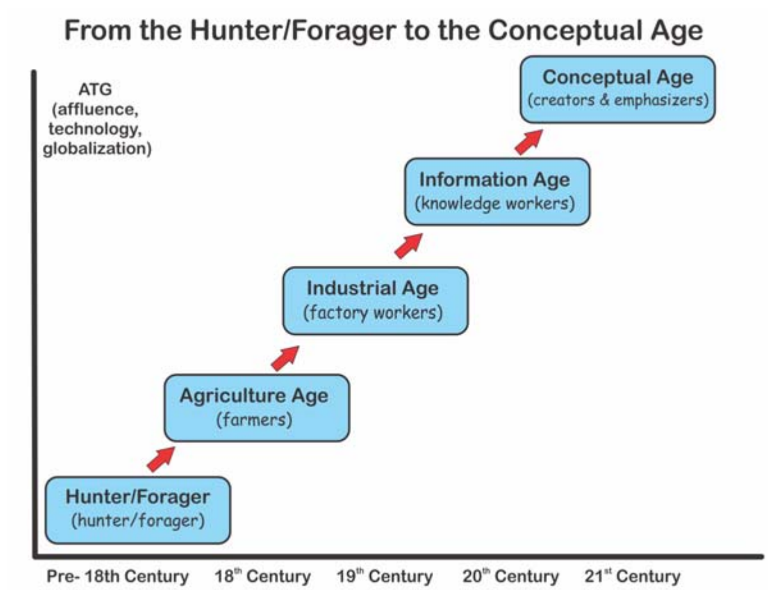

Figure 8.5: From Hunter/Forager to Conceptual Age. Source: Pink (2005); Author.

Figure 8.5 is adapted from a similar model in Pink's (2005) book. I added the hunter/forager stage to the graph. Pink's editor wanted him to downplay Toffler's third wave concept. Although he does not acknowledge Toffler's influence in the text or in the model, it is evident in the model and text.

Using a graph oriented model, Figure 8.5 simplifies complex history and societal transformations into five generalized stages. The X-axis displays time expressed in centuries. Pink labels the Y-axis as ATG (i.e. affluence, technology, and globalization). Over the centuries, each stage gave way to the next stage. ATG increased, resulting from the benefits generated with each stage. The graph portrays the stages and transformations.

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9

Evaluation

This chapter presents criteria with which to evaluate the effectiveness of the model created. If the modeling is part of a student activity, these criteria may be helpful in student evaluation.

Development

I reviewed the internet for model evaluations. Most of those reviewed were not applicable to what I was looking for. Eventually, I came across the OECD DAC Network on Development Evaluation (Figure 9.1). It seemed to be adaptable to my needs. The evaluation model defined six key word evaluation criteria: relevance, coherence, effectiveness, efficiency, impact, and sustainability. In addition, it had two principles for their use. Each of the criteria had a question associated with it.

The model positioned its six elements around a hexagon. It demonstrates an expansion of the equally weighted element models. Its hexagon design is a logical extension of the geometric form of the triangle.

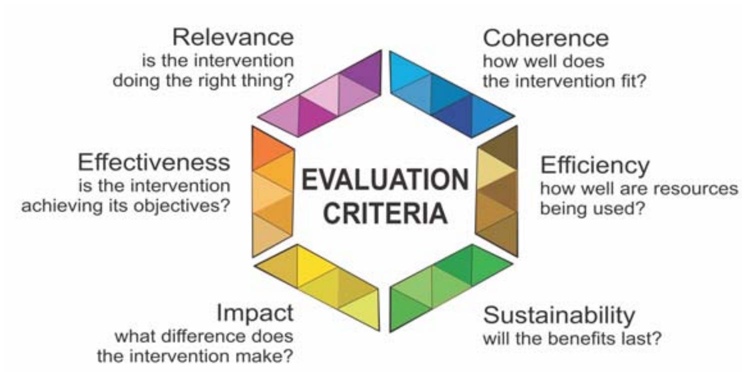

Figure 9.1: OECD Evaluation Criteria. Source OECD (2021).

Initially, I thought I could adapt the model and its criteria to my needs. I attempted to utilize the six key word criteria and adapt the associated questions to generic models. This proved unsatisfactory. Then I started substituting different keywords and their associate questions. Five of the components seemed to work, but the sixth component seemed problematic. Finally, I acquiesced. I utilized five components and transitioned from a hexagon to pentagon design. The model remains an equal weighted element model.

Evaluation Model Design

The evaluation model that evolved was an equal weighted element model (Figure 9.2). Its pentagon design includes five keywords and questions which address the five components of the evaluation model. The keywords represent components of the evaluation. There was an effort to include all the relevant components and an effort was made that the components of the model be reasonably mutually exclusive of each other.

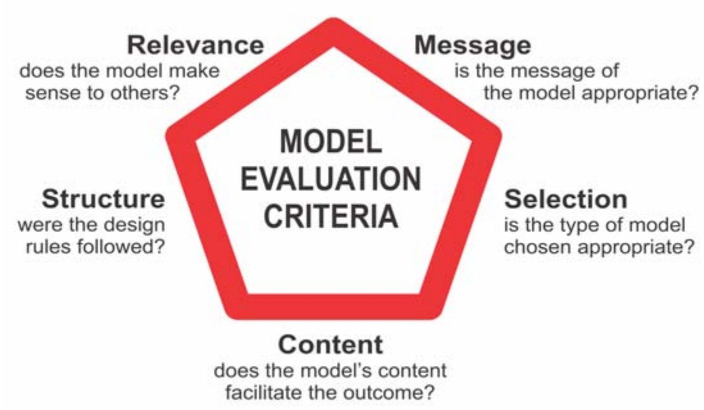

Figure 9.2: Model Evaluation Model. Source: Author.

There is an interactive effect of the elements used in the model's evaluation criteria. Relevance focuses on the external environment and the acceptance of the model by the public. It is influenced by the message of the model, the model type selected, the content of the model, and the structure of the model used. Each of the components impacts and influences the other components in the model. The model type selected determines, in part, the content and structure. The content and structure determine the message communicated, as well as its relevance.

The five components of the model are discussed in the following sections.

<u>**Relevance.**</u> *Does the model make sense to others?* One purpose of creating models is that they simplify things to make them more understandable. This is a communications issue. In order to be relevant, the model needs to be practical and usable to the user.

Second, the purpose of creating models is to communicate a relationship, process, or concept. This is determined by the message selection of the model type and its content.

A quick look at the Boating Safety and Enjoyment Model (see Figure 3.5) reveals the essence of the model. It is a simplification of the components in the manual and it conveys or communicates quickly the purpose of the manual. Knowing the content in the manual helps reduce the likelihood of accidents, which helps lead to having a safe and enjoyable boating experience.

The Simplified Flow Chart for Selecting Model Type (see Figure 5.8) simplifies the decision-making rules used to select the appropriate model. This makes the model usable. I should note that the model could be made much more complex by delineating the process within each category.

Sub-categories of relevance in the evaluation instrument focused on simplification, communications, and practicality.

<u>**Message.**</u> *Is the message of the model appropriate? What is the model's outcome?* Message is defined as the outcome of the model. The model's outcome is often stated within the model or in its title. The message reflects the model's content and affects its relevance.

The outcome of the center focus model titled Boating Safety and Enjoyment Model (see Figure 3.5) is boating safety and enjoyment. Both the title and the center focus circle communicate this message. Its message is clear and concise. Also, the title reflects the message of the model.

The outcome of the Simplified Flow Chart for Selecting Model Type (see Figure 5.8) has as its outcome the selection of the model type that should be used. Its title conveys its purpose and what the model does.

Last, does the message have negative connotations associated with it? Does the model suggest something that it doesn't intend to convey? A quick look at Nash's model titled Man's Use of Leisure Time (see Figure 1.2), "Injury or Detriment to Self, and Acts Performed Against Society" form the base of the pyramidal model. It rectangular base, is out of proportion to the other elements in the model, and it conveys an incorrect message with a negative connotations. It suggests that acts against society form the foundation of positive leisure experiences.

In discussing barrier analysis, the use of the wall (see Figure 6.2) to represent barriers was concluded to have negative connotations and the use of Swiss Cheese slices (see Figure 6.3) communicated the message better.

Sub-categories of the message in the evaluation instrument include clear and concise message, the title reflects the content and negative connotations.

<u>Selection</u>. *Is the type of model chosen appropriate?* Selection is defined as the type of model chosen to help transform the content into the message. Since different model types convey different messages, it is important to choose the appropriate model that coveys the desired message or explains the relationship. Selection of the appropriate type of model helps determine relevance.

Often, the selection of model type is self-evident. If there are a series of steps and decisions being modeled, a flowchart form of the process-oriented model would be the most appropriate model to convey its message (e.g. see Figure 5.8). In contrast, a center focused model would most likely be ineffective.

Sometimes, the differences in model types may be subtle and not obvious. If the purpose is merely to divide systems into subsystems, the tree analysis may be most appropriate. However, if the subsystems are connected with logical gates (i.e. "and" or "or"), the analytic tree analysis may be more appropriate.

In some cases, different model types can be used to convey the same message. Three different model types depicted barrier analysis. The original MORT model was depicted as an analytic tree analysis (see Figure 5.12). The four components of an accident were connected by an "and" gate symbol, indicating that all four elements are required for an accident to occur. The second model is an equally weighted model by Stephenson (1991) (see Figure 2.4). It makes a similar statement, although the resulting accident is not mentioned in the actual model. The third model is a metaphorical model (see Figure 6.3). As noted, there are some issues of content or internal validity.

The purpose or use of the model may help determine its selection. Barrier analysis depicted using an analytic tree analysis or an equally weighted model may be viewed more academic or formal in their presentation. In contrast, the metaphorical model is more intuitive and lends itself to being easily understood by practitioners in the field.

In a second example, the debriefing process was portrayed both as a graph oriented model (see Figure 8.3) and as linear oriented flow chart (see Figure 8.4). Either model works. However, the graph oriented model emphasizes the changes in approach better from cognitive/information to emotion and back again to cognitive/information than the linear oriented flow chart version.

Sub-categories of selection in the evaluation instrument focus on whether the model chosen was appropriate and its relationship to the message and content.

Content. *Is the model internally consistent? Does the model's content facilitate the outcome or message? Do the sum of the parts equal the whole?* Content is defined as the internal components of the model. They represent what the model is attempting to depict. In a sense, it refers to internal validity where the model is accurate and precise in communicating the message. In addition, the type of model chosen influences the model's content.

In the Leisure Experiences Continuum (Figure 7.2), the reason for discontinuing its development was whether the component continua provided a good sampling of the overall concept and whether some of the individual continua were continuous. These are content issues regarding the model's criteria.

In the Simplified Flow Chart for Selecting Model Type (Figure 5.8), the content utilizes process and decision symbols. The content is the process and decision components that reflect model types presented in this publication. Stated another way, if the decision tree included information outside of this manual, the model is not doing what it is designed to do. It is doing something else. The content of the model may work very well, but it may be off target when supporting the desired message.

The Swiss Cheese slices in the Barrier Analysis Model (see Figure 6.3) imply that the barriers are placed between the source of unwanted energy flows and the target. However, barriers can be placed on the source of the unwanted energy flow or on the target. In addition, the barrier can be separated by time and space. Since the model depicts between but not the other barrier types, the error is one of content or internal validity. The model trades off some accuracy in content for creating an easily understood model. In addition, representing barriers with a wall or slices of Swiss Cheese is a content issue. The slices of Swiss Cheese were believed to be a better metaphor for the barriers.

In the Boating Safety and Enjoyment Model (e.g. Figure 3.5), the content of the manual helps prevent accidents (e.g. human considerations, environment and equipment factors) and result in both a safe and enjoyable boating experience. The content is the three accident process factors and the chapter topic titles. Also, there is good congruence between the content or workings of the model and its message.

Sub-categories of content in the evaluation instrument focus on missing components, overlapping or mutually exclusive categories, appropriateness, and support of the message.

<u>Structure</u>. *Were the design rules followed? Is the graphic chosen appropriate?* Structure is defined as the rules and parameters that determine the model's design and structure. In general, these rules and parameters help to convey the message. The structure for a model is noted under the general principles sections within the chapters. Most model types are provided with some general principles.

Flow charts move from left to right or top to bottom. Moving from right to left and bottom to top may be awkward to the reader. Normally, center focus models should have the center focus in the center. An inverted pyramid is unfamiliar unless, of course, there are fewer of what is being represented at the base and many of the same elements at the top. In a graph oriented model, the independent variable is normally on the X-axis and the dependent variable is on the Y-axis. If one variable is "time," it is normally on the X-axis.

In the Boating Safety and Enjoyment Model (see Figure 3.5), the theme of the manual, which is safety and enjoyment, is consistent with center focus models and is located in the center of the model. Consistent with the rules, the Simplified Flow Chart for Selecting Model Type (see Figure 5.8) flows from left to right and top to bottom.

In the Man's Use of Leisure Time Participation Broadly Interpreted model, the discussion of the rectangular base versus a pyramidal sub-zero or criminal behavior is an issue of structure (see Figure 1.2 and Figure 1.3). In the original model excesses, delinquency and crime appear to form the base or foundation of man's use of leisure time. This is obviously not the desired message.

Sub-categories of structure in the evaluation instrument focus on rules and guidelines and graphics or design of the model.

Evaluation Instrument

Using the evaluation model in Figure 9.2 as a starting point, an evaluation instrument was developed incorporating the five components in the Model Evaluation Model (Figure 9.3). In addition, the instrument incorporates generic evaluation criteria. Is the model clear and concise? Are there omissions or errors? Are the component parts of the model mutually exclusive of each other?

Most of the supplemental criteria are included as part of the content component in the evaluation. Are there missing components or should there be additional components added? Question 14 addresses omissions.

Several questions address possible errors. Most of the errors relate to possible errors between model components. In question five, a title that doesn't accurately reflect the content is considered an error. Negative connotations in question six can be considered an error. Or choosing the wrong model in questions seven, eight, or nine can be considered an error.

Mutually exclusive means that there is little overlap in the model's components. Two elements that have most of the same attributes or even partially have the same attributes are not mutually exclusive. Question 11 addresses the mutually exclusive issue.

In summary, the evaluation instrument can be used to assess the models you are constructing. Or, it can be used to assess student exercises emphasizing model construction by students or instructors. The evaluation instrument can be modified to meet the needs of the instructor as needed.

References

OECD (2021). Applying Evaluation Criteria Thoughtfully. March https://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm

Model Evaluation Instrument

This instrument is designed to be used with the Model Evaluation Criteria model and the description of its component in Chapter 9. The four point Likert scale can easily be consolidated into a two point scale of agree and disagree if desired.

Directions:

1. Complete the questions and the comments section for each of the five components.
2. Score SA=4, A=3, D=2, SD=1
3. Several questions need to be inverted. The scoring of Questions 6, 8, 9, 14 and 16 need to be reversed where SA=1, A=2, D=3, SD=4.
4. Total the score.

RELEVANCE – Does the model make sense to others?

	Circle the best response.	Strongly Agree	Agree	Disagree	Strongly Disagree
1.	One quick glance at the model and it made sense to me.	4	3	2	1
2.	The model does an excellent job of simplifying the concept, process, or relationship.	4	3	2	1
3.	The model makes the concept, process or relationship more understandable.	4	3	2	1
	Totals:	______	______	______	______

Comments or observations regarding the model's relevance.

MESSAGE – Is the message of the model appropriate?

Circle the best response.	Strongly Agree	Agree	Disagree	Strongly Disagree
4. One glance and I quickly understood the message of the model.	4	3	2	1
5. The model's title accurately reflects the components of the model.	4	3	2	1
6. The negative connotations of the model severely hinder its message.	1	2	3	4
Totals:	______	______	______	______

Comments or observations regarding the
model's message.

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SELECTION – Is the type of model chosen appropriate?

Circle the best response.	Strongly Agree	Agree	Disagree	Strongly Disagree
7. The type of model chosen is the most appropriate type of model that could be used.	4	3	2	1
8. Choosing a different type of model would better communicate the model's message.	1	2	3	4
9. Choosing a different type of model would better communicate the model's content.	1	2	3	4
Totals:	______	______	______	______

Comments or observations regarding the
type of model chosen. What model type would be best?

____

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CONTENT – Does the model's content facilitate the outcome?

Circle the best response.	Strongly Agree	Agree	Disagree	Strongly Disagree
10. The components of the model facilitates its message and relevance?	4	3	2	1
11. All the sub-components of the content relate to the message.	4	3	2	1
12. The sub-components of content are mutually exclusive of each other (i.e. no overlap of categories).	4	3	2	1
13. Each content sub-component is clearly defined.	4	3	2	1
14. There are missing components of the content.	1	2	3	4
Totals:	______	______	______	______

Comments or observations regarding the components which comprise the model.

STRUCTURE – Were the design rules followed?

Circle the best response.	Strongly Agree	Agree	Disagree	Strongly Disagree
15. All the design rules for the model type were followed.	4	3	2	1
16. I would make major changes in the graphic or design of the model.	1	2	3	4
Totals:	______	______	______	______

Comments or observations regarding the design rules and guidelines followed/not followed.

SUMMARY TABLE

	Enter the Scores from the Individual Tables.	Strongly Agree	Agree	Disagree	Strongly Disagree
1.	Relevance				
2.	Message				
3.	Model				
4.	Content				
5.	Structure				
	Totals:				
		Score: (Total the Totals)			

Probably the best use of the evaluation is to go back and review all those scales with a score of 1 or 2. Normally, there should be an accompanying comment which should include an area of improvement.

If you want an overall score for the model, it is the total of the totals. The maximum score is 60. Half of that score is 30 and indicates a general agree or disagree with the model.