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Chapter 1 : Process Philosophy (Stanford Encyclopedia of Philosophy)

Recent Examples on the Web. After being pushed out of office, Shulkin accused the White House of using the ethics issues as a pretext for replacing him with a VA boss who would be more amenable to outsourcing veterans' care to the private sector.

With its fifteen diverse agencies and its wide range of functional responsibilities, the Intelligence Community presents a very complicated set of organizational arrangements. Thinking of it in terms of traditional organizational analysis or systems engineering methods in an effort to explain its working does not suffice because it far more resembles a living ecology with a complex web of many interacting entities, dynamic relationships, non-linear feedback loops often only partially recognized , and specific functional niches that reflect momentarily successful adaptations to the environment. They were paradoxical becauseâ€”although it has been accused of not adapting to dramatically changed conditionsâ€”the community adapted all too well. And they were unfortunate because the pressures to which it did adapt flowed from misperceptions inside and outside the Intelligence Community engendered by the collapse of the Soviet Union: It is important not only to locate the level at which obvious symptoms occur, but also the level at which problems can be solved. However, these internal pressures outweighed the huge new challenges emerging in the external security environment. Responding to these would demand new expertise and a new knowledge base, along with appropriate methods, tools, and perspectivesâ€”all of which required more resources, focused leadership, and strong commitment, which was not there. As a result, the community fostered a series of processes that were increasingly maladapted to needs emerging in the new geostrategic environment. Analytic problems, however, actually take place not just at the level of the community as a whole, but at four distinct levels, as well as in the complex interrelationships, both vertical and horizontal, among them. In this way, the root causes of failure can be identified and appropriate and effective corrective measures taken. The National Security Community. Such failures flow downward and can easily percolate throughout the subordinate organizations. For the Intelligence Community, a particular problem at this level may involve its relationships with top-level users, especially managing their expectations. This level currently includes the fifteen component intelligence agencies. Failures at this level can include misdirected priorities and budgetary allocations within the Intelligence Community; lack of effective procedures and oversight of them among component agencies; poor communication and coordination among agencies; a lack of enforceable quality-control processes; toleration of substandard performance by individual agencies; poor communitywide technical standards and infrastructure that hinder information sharing; and poor management and oversight of security procedures that impede effective performance. Errors at this level also encompass failures by groups or individuals to make critical decisions, to exercise appropriate authority, or to take responsibility for gross errors that should be worthy of sanction or dismissal. This is probably the most important level for creating consistently high-quality analysis because of its impact on the analytic environment, on the selection of methods and processes, and on the work life of individual analysts. Errors at this level are perhaps the most pernicious, however, and they have been widespread and persistent. Failures at this level can include poor performance due to lack of ability, lack of domain knowledge, lack of process expertise, poor social network contacts, or ineffective training; pressures to favor product over knowledge; lack of time; being too busy and too focused to maintain peripheral vision and curiosity, even on high priority work; failure to cooperate and collaborate with others; lack of suitable tools and support; misguided incentives and rewards; and an organizational culture and work practices that tolerate second-rate analysis. To illustrate the impact of this multi-level hierarchy and underscore the importance of correctly identifying the locations of causative factors in analytic errors, for example, consider the case of an analyst who fails to interpret correctly the evidence pertinent to a task and draws a wrong conclusion. At first glance, the obvious approach should be to focus corrective actions on the analyst: Simple incompetence, a rush to complete the assignment, a lack of domain knowledge needed

to recognize critical linkages, or a failure to employ appropriate methods could all be causative factors. At this level, the obvious remedies to these problems are better screening, training, and mentoring. It could be, however, that the problem lies with the analytic unit, its work processes, and its management: The problem could reside even farther up the hierarchy, among the agencies of the Intelligence Community: Finally, the failure could actually reside at the topmost level, with community management: Why was an analyst not fully knowledgeable in the domain working that account? She was covering for the lead analyst, who is away on temporary duty TDY. Why did the analytic manager assign that analyst to the task? She was the only one available. Why was the analyst not fully knowledgeable on her backup account? She is an apprentice analyst with only a short time on the account and inadequate mentoring. Her training had been postponed due to scheduling. It is his personal collection of tentative hypotheses and uncorrelated data kept as a personal Word file and is not in an accessible database. The shoebox is actually a pile of paper put in temporary storage when the lead analyst went on TDY. Why is the lead analyst unwilling to share his shoebox? Why is there no accessible collaborative system for sharing shoeboxes? The questions would continue through as many rounds as the questioner needed to satisfy himself that he had found the root cause. Although the previously cited reports on intelligence failures usually point to organizational stove-piping and technical shortcomings as the most important contributors to failures in collaboration, the sources of such failure are actually more widespread and complexâ€”and more frequently reflect shortcomings in work practices and processes, organizational culture, and social networks. As Stephen Marrin, among others, has noted: Structure and process must work together in a complementary fashion, and structural changes alone without corresponding changes to existing processes would simplify the workings of the Intelligence Community in some ways, but cause greater complexity in others. The really difficult task will be to redesign the processes, so that they are consistent and complementary to the structural changes that are being made. The Analysis Phase-Space Incorrect diagnoses of the causes of analytic failures probably arise from not recognizing the variety and complexity of the roles, missions, and tasks that confront analysts. At a basic level, incorrect diagnoses of the causes of analytic failures probably arise from not recognizing the variety and complexity of the roles, missions, and tasks that confront analysts. This diversity results in a complex phase-space, illustrated below, that contains a significant number of discrete analytic regions. These certainly cannot be treated as though their perspectives and needs were homogeneous or even similar. Therefore, because intelligence collection and analysis are not based either on a suite of all-purpose tools or on fungible human expertise that can be instantly swiveled to focus effectively on a different set of problems, this phase-space also implies the need for a similar diversity of analytic processes, methods, knowledge bases, and expertise. Differentiating Intelligence Roles Moreover, given this diverse phase-space, conflating three distinct roles played by all-source intelligence adds to the underlying confusion over intelligence missions and functions, the priorities among them, their requirements, and the capabilities needed to make each effective. The traditional assumption that there were only two sets of intelligence consumers, each with distinct mission needs, often led to contraposing support to military operations, which was assumed to be tactical in focus, and national user support, which was assumed to demand deep analysis. In reality, meeting the disparate needs of the users intelligence must serve requires recognizing three distinct roles for all-source intelligence. Although SMO and SPO issues are of interest to both national and departmental users, the third role, Warning and Estimative Intelligence WEI , largely emphasizes issues that are almost exclusively the province of national users and usually take place over longer time horizons. Intelligence has now become an integral element of both the policy and military operational processes; and the success or failure of its judgments can have the most significant consequences in both domains. As a result, it is important that intelligence appreciate not only the centrality of its role, but also the increased obligations and responsibilities that such a role brings. This traditional intelligence role has usually focused on assisting current military operations. Much of this information concerns current numbers, locations, and activities of hostile units, and other information addresses significant elements of the physical environment in which military forces are operating. To prosecute these missions successfully, the military now

also needs far more cultural awareness and timely accurate information on adversary thinking, motivations, and intentions. SPO provides policymakers and senior officials importantly including senior civilian defense officials, combatant commanders, and other military officers with indispensable situational awareness, including important background information, to assist them in executing and overseeing ongoing policy activities and in planning and framing policy initiatives. As it is as intensely focused on providing actionable information, it is as heavily oriented as SMO to current intelligence and reporting. However, SPO differs from SMO somewhat in content and priorities in that it has always included a greater proportion of less quantifiable, softer information, such as political and economic trends in major countries and groups and assessments of foreign leaders and their intentions. According to that ten-member panel of highly respected intelligence and policy veterans, providing policymakers with persuasive and timely intelligence warning is the most important service the Intelligence Community can perform for the security of the United States. One type of warning is concerned with monitoring activities previously recognized as potentially dangerous, such as a hostile missile launch, and cueing appropriate responses. The second type is a discovery function that assists decisionmakers in identifying those situations and activities whose consequences could have significant and usually adverse effectsâ€”and which may not necessarily be obvious. When performed effectively, a warning process provides decisionmakers with an anticipatory sensitization that allows them to think through, in a disciplined way, the responses they might someday be obliged to make in haste. Assessments and estimates, on the other hand, also are usually forward looking, but they are designed to be informative rather than part of a process closely tied to triggering contingent responses. Further complicating the matter is that both types of warning also operate over three different horizons. Strategic warning has always been understood as looking out toward the distant future; it is intended to recognize that a possible threat may be loomingâ€”even if it is not imminentâ€”and to provide time to take appropriate preparatory actions, including policies and actions that might prevent the threat from eventuating. From this detailed understanding of enemy intentions, capabilities, and concepts, operational warning also serves to identify indicators that an attack is in preparation. Finally, tactical warning is the immediate alerting function that a specific with respect to time, place, or character hostile activity has begun or is about to begin. An important but often overlooked element of warning over all three horizons is the key role played by negative evidence, which can help confirm that potentially threatening activities are not occurring and prevent costly and potentially consequential responses from being taken or scarce resources from being squandered. The preparation of assessments and estimates, as well as development of warning indicators, has more to do with analysis and judgment than with reporting; it demands deep expertise as well as an ability to place knowledge of the subject in broad context. These important functions serve the entire national security community. During the Cold War, recognizing that we were engaged in a long-term competition, we were prepared to adjust our intelligence priorities so that analysts could provide assessments of future capabilities and indications of intentions, even though the day-to-day threats were most grave. As was the case in facing the Soviet Union, there may well be tensions today in choosing between serving SMO and SPO, on the one hand, and assuring adequate resources for WEI, on the other hand, as continued access to information needed for an understanding of enemy intentions and capabilities could be sacrificed by meeting the needs for immediately actionable intelligence. Although warning and estimative intelligence may be seen as the core missions of strategic intelligence, they are also less tied to the details of ongoing operations in which the formal relationships between policymakers and intelligence provide a unique advantage and leverage for intelligence insights. Moreover, as one senior intelligence official noted, policymakers see themselves and their staffs as substantively knowledgeable on issues of interest as the Intelligence Community and capable of serving as their own intelligence analysts. The sources of information now available to the policy-level consumerâ€¦are far, far greater than a quarter century ago. What truly distinguishes these intelligence roles is their perspective and emphasisâ€”a significant distinction that has been lost in recent arguments over intelligence reform. To begin with a particularly important point, a tactical or a strategic focus does not necessarily distinguish military from civilian users.

Such information is inherently more judgmental and inferentialâ€”and, therefore, less preciseâ€”than analysis of physical or technical characteristics in orders-of-battle OOBs and tables of organization and equipment TOEs. It is less amenable to counting or to the gathering of external physical signatures by technical collection systems; it is more dependent on language skills, deep expertise on the region and cultures, and knowledge of the personalities. However, both SMO and SPO are, by nature, mission- or task-oriented and tightly focused on the problem at hand; and this narrowed focus has significant time and perceptual implications for analysts and the intelligence sources supporting them. Peripheral vision is very sensitive to cues of dynamic change, which trigger anticipatory responses. Although warning is concerned with activating the response cycle, and estimative intelligence is intended to create a frame of reference for the decisionmaker, both are intended, through preconditioning and anticipatory consideration, to enable a more appropriately and contextually sensitized response on the part of users. In recent years, the tasks of intelligence, and its successes and failures, have focused on providing immediately actionable in this sense, tactical intelligence to usersâ€”information that can provide a rapid or near-instantaneous advantage, whether for interdicting hostile military forces, preventing terrorist incidents, or supporting diplomatic initiatives. There is yet another important distinction between these roles. In addition, as we better appreciate the implications of emergence and the emergent behaviors of complex adaptive systems, we need to place greater emphasis on anticipation while recognizing that precise prediction or forecasting is even harder than previously understood. Appreciating the differences in perspective created by these roles is very important because failing to make clear distinctions between them may aggravate a major problem before the Intelligence Community: Staying close to the evidence assists the analyst in walking this line. At the same time, the author of this monograph noted a clear consensus among senior intelligence officers at a recent non-attribution conference that analysts can best serve policymakers by offering them thoughtful and thought-provoking views that challenge their assumptions. As the policymakers demand judgments on actions and consequences farther in the future moving the intelligence role from SPO to WEI , not only will the intrinsic uncertainties increase, but also the potential for tensions between policymaker and analyst over the objectivity and validity of the judgments and the conflicts among differing judgments. Almost by definition, with anticipatory intelligence, policymakers will be unable to tell the community where to look. Unfortunately, although the Intelligence Community must recognize that attempting to divine requirements for warning and other anticipatory intelligence from the users is not likely to be fruitful, it also must appreciate that it alone will bear the blame for failing to warn against the inevitable surprises arising from outside the fields-of-view of users. This demands, in turn, that the Intelligence Community have some discretion and flexibility to allocate resources in areas not currently considered to be priority targets: It is absolutely essential that the Intelligence Community and those who depend on it understand the principal distinctions between these two functions. When one tries to assess the adequacy of Intelligence Community performance across these domains, identify shortfalls, or prescribe changesâ€”whether in business practices, tools, or organizational arrangementsâ€”the appropriate answers will almost certainly differ greatly from one role to the other. A non-linear loop is one that creates non-proportional responses to stimuli. Senge, The Fifth Discipline: These might have improved effectiveness, but they would also have provoked bureaucratic and congressional battles over power and jurisdiction. See Appendix A for a summary.

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Chapter 2 : Preparing to Measure Process Work with a Time Study

For example, the vexed problem of alcohol abuse is argued by some to be amenable to outside intervention. This may be in part because it is a younger art, and one more amenable to modern sensibilities.

Behavior Behavior refers to the movement of some part of an organism that changes some aspect of the environment. Operant conditioning Operant behavior is the so-called "voluntary" behavior that is sensitive to, or controlled by its consequences. Specifically, operant conditioning refers to the three-term contingency that uses stimulus control , in particular an antecedent contingency called the discriminative stimulus SD that influences the strengthening or weakening of behavior through such consequences as reinforcement or punishment. Respondent classical conditioning[edit] Main article: Classical conditioning Respondent classical conditioning is based on innate stimulus-response relationships called reflexes. In his famous experiments with dogs, Pavlov usually used the salivary reflex, namely salivation unconditioned response following the taste of food unconditioned stimulus. Pairing a neutral stimulus, for example a bell conditioned stimulus with food caused the bell to elicit salivation conditioned response. Thus, in classical conditioning, the conditioned stimulus becomes a signal for a biologically significant consequence. Note that in respondent conditioning, unlike operant conditioning, the response does not produce a reinforcer or punisher e. Environment[edit] The environment is the entire constellation of stimuli in which an organism exists. A stimulus is an "energy change that affects an organism through its receptor cells". Topographically by its physical features. Temporally by when it occurs. Functionally by its effect on behavior. Reinforcement Reinforcement is the key element in operant conditioning [41] and in most behavior change programs. If a behavior is followed closely in time by a stimulus and this results in an increase in the future frequency of that behavior, then the stimulus is a positive reinforcer. If the removal of an event serves as a reinforcer, this is termed negative reinforcement. Punishment psychology Punishment is a process by which a consequence immediately follows a behavior which decreases the future frequency of that behavior. As with reinforcement, a stimulus can be added positive punishment or removed negative punishment. Broadly, there are three types of punishment: Extinction procedures are often preferred over punishment procedures, as many punishment procedures are deemed unethical and in many states prohibited. Nonetheless, extinction procedures must be implemented with utmost care by professionals, as they are generally associated with extinction bursts. These novel behaviors are a core component of shaping procedures. Discriminated operant and three-term contingency[edit] In addition to a relation being made between behavior and its consequences, operant conditioning also establishes relations between antecedent conditions and behaviors. In other words, the relation between a behavior B and its context A is because of consequences C , more specifically, this relationship between AB because of C indicates that the relationship is established by prior consequences that have occurred in similar contexts. A behavior which occurs more frequently in the presence of an antecedent condition than in its absence is called a discriminated operant. The antecedent stimulus is called a discriminative stimulus SD. The fact that the discriminated operant occurs only in the presence of the discriminative stimulus is an illustration of stimulus control. These conditions have been referred to variously as "Setting Event", "Establishing Operations", and "Motivating Operations" by various researchers in their publications. Tact psychology â€” a verbal response evoked by a non-verbal antecedent and maintained by generalized conditioned reinforcement. Mand psychology â€” behavior under control of motivating operations maintained by a characteristic reinforcer. Intraverbals â€” verbal behavior for which the relevant antecedent stimulus was other verbal behavior, but which does not share the response topography of that prior verbal stimulus e. Autoclitic â€” secondary verbal behavior which alters the effect of primary verbal behavior on the listener. Examples involve quantification, grammar, and qualifying statements e. In applied behavior analysis, the quantifiable measures are a derivative of the dimensions. These dimensions are repeatability, temporal extent, and temporal locus. Count is the number of occurrences in behavior. Celeration is the measure of how

the rate changes over time. Temporal extent[edit] This dimension indicates that each instance of behavior occupies some amount of timeâ€”i. Duration is the amount of time in which the behavior occurs. Temporal locus[edit] Each instance of behavior occurs at a specific point in timeâ€”i. Response latency is the measure of elapsed time between the onset of a stimulus and the initiation of the response. Interresponse time is the amount of time that occurs between two consecutive instances of a response class. Derivative measures are unrelated to specific dimensions: Percentage is the ratio formed by combining the same dimensional quantities. Trials-to-criterion are the number of response opportunities needed to achieve a predetermined level of performance. Analyzing behavior change[edit] In applied behavior analysis, all experiments should include the following: Functional analysis psychology History of functional analysis[edit] Prior to the seminal article on functional analytic methodology for aberrant behaviors, behaviorists used the behavioral technology available to them at the time. Instead of treating the function of the disruptive behavior, behavioral psychologists would instead pre-assume consequences to alter disruptive behaviors. For example, in the past to decrease self-injurious behavior in an individual, behaviorists may have delivered an aversive stimulus contingent on the response, or assume a reinforcer without identifying the reinforcer that would be most motivating to the client Iwata, This type of intervention was successful to the individual, but it was not uncommon to see other variations of aberrant behavior begin to appear. When applied behavior analysts let clients choose from a wide array of reinforcers often determined through data collection and reinforcement assessments in the mids, reinforcement was shown to be more effective than punishment contingencies. In general, applied behavior analysis as a field favors reinforcement based interventions over aversive contingencies, but at the time the behavioral technology was not advanced enough and the individuals needing intervention had a right to an effective treatment Van Houten et al. Nevertheless, not all behavioral therapies involved the use of aversives prior to the mids. Some behaviorists for instance, B. Skinner always preferred reinforcement and extinction contingencies over punishment even during that time. In , Edward Carr published a paper on potential hypotheses for the occurrence and maintenance of self-injurious behaviors. This paper laid out the initial groundwork for a functional analysis of aberrant behaviors. In the paper, Carr described five potential causes for self-injurious behaviors that included 1 positive social reinforcement contingent on the response, 2 negative reinforcement in the form of removal of an aversive stimulus contingent on the response, 3 the response produced stimuli possessed reinforcing qualities automatic reinforcement , 4 the behavior was a byproduct of an underlying psychological condition, and 5 psychodynamic hypothesis in which the behavior was an attempt to reduce guilt. Throughout the paper, Carr cited recent research to support the first three hypotheses, and disprove the latter two hypotheses, but no formal experiment was conducted to determine the controlling variables of the problem behavior. In , Iwata and colleagues conducted the first experimental analysis of the maintaining variables for self-injurious behavior. In the paper, the researchers alternated between specific conditions to examine whether or not the behavior occurred under specific environmental conditions. Through direct manipulation of the environment, the researchers could accurately identify the controlling variables of the aberrant behavior, and provide interventions that targeted the functional relationship between the behavior and the environment. Since this seminal article was published, a wide range of research has been published in the area of functional analyses of aberrant behaviors. The methodology has since become the gold standard in assessment and treatment of aberrant behaviors. Functional behavior assessment FBA [edit] Functional assessment of behavior provides hypotheses about the relationships between specific environmental events and behaviors. Decades of research have established that both desirable and undesirable behaviors are learned and maintained through interactions with the social and physical environment. Functional behavior assessments are used to identify controlling variables for challenging behaviors as the basis for intervention efforts designed to decrease the occurrence of these behaviors. Functions of behavior[edit] Behavior serves two major functions for an individual: Put another way, individuals engage in behavior to get something or to get out of something. When trying to identify the function of a behavior, it is often helpful to think, "What purpose is this behavior serving the individual?

Obtain socially mediated events[edit] Access to attention positive reinforcement: The individual engages in the behavior to obtain attention from another person. Common forms of attention include, but are not limited to, hugs, kisses, reprimands, frowns, smiles, etc. Access to tangibles positive reinforcement: The individual engages in the behavior to obtain a specific item or engage in a specific activity from another person. Common forms of tangible items include, but are not limited to, food, toys, movies, video games, etc. The individual engages in the behavior because the response-produced stimulation possesses reinforcing characteristics. In other words, engaging in the behavior produces reinforcing stimulation unique to the specific context. Another example includes a child spinning a bowl on a table to produce the specific auditory stimulation unique to that object. Common forms of automatic stimulation include, but are not limited to, auditory stimulation, visual stimulation, endorphin release, etc. The individual engages in the behavior to escape aversive socially mediated attention. Put another way, social situations that are aversive to the child are removed contingent on the behavior occurring. For example, a child hits the teacher to avoid talking in front of the class. Common forms of aversive social situations include, but are not limited to, smiles, hugs, frowns, corrections, group settings, etc. The individual engages in the behavior to escape aversive tasks or demands. For example, when a child is told to take a bath he begins to cry, and his mother tells him he no longer has to take a bath. The individual engages in the behavior because it produces a decrease in aversive stimulation. For example, a child bangs his head against the wall to decrease the pain experienced from a toothache. Another example includes a child scratching his arm to decrease the level of itchiness experienced from a bug bite. Common forms of aversive stimulation abated by engaging in specific behaviors include sinus pain, itching, hunger, etc. Function versus topography[edit] As previously stated function refers to the effect the behavior produces on the environment. The actual form of the behavior is referred to the topography. Different behaviors may serve the same function, thus describing one limitation of treating behaviors based on form alone. For example, a child may scream, hit, and cry to obtain attention from his mother. What the behavior looks like often reveals little useful information about the conditions that account for it. However, identifying the conditions that account for a behavior, suggests what conditions need to be altered to change the behavior. Therefore, assessment of function of a behavior can yield useful information with respect to intervention strategies that are likely to be effective. Method of identifying functions of behavior[edit] FBA methods can be classified into three types:

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Chapter 3 : SAP Standard Reports - ERP Operations - SCN Wiki

Cognitive Analytic Therapy (CAT) is an increasingly popular brief therapeutic approach for use with a variety of types of clinical problem. This paper outlines the key components of CAT and.

Preparing to Measure Process Work with a Time Study Preparing to Measure Process Work with a Time Study Larry Holpp 7 When first introduced in the 19th and early 20th centuries, time and motion studies established rules of motion that guaranteed optimal performance during a given time period and reduced the number of movements needed to get work accomplished. Over the years, time and motion studies have been done in many industries both to ascertain how long it takes to do a given job and to improve it through setting production goals and reducing unnecessary steps in a process. Today, time and motion studies are entirely focused on the time aspect of work, or how long it takes to do a job, and are critical in getting fundamental information on how a process is working. A time study can establish a baseline from which to drive improvement efforts, or set a standard to control performance. Without basic time study measures, it is impossible to know whether work has improved or whether there are differences in performance in a unit. Studying Work as a Process When practitioners conduct a time study, it is essential that they know what they want to study. Work is not strictly a set of disconnected tasks, it is a process. These processes have names, such as maintenance or transfers, and begin with inputs, move on to processes in which inputs are modified, and conclude with outputs. While engaged in these input, process, output IPO chains, other things may intrude: In addition, people have different work styles â€" some are fast and diligent; others take their time. There are many opportunities for variation in conducting a task. Time measurements are not precise, but estimates of how long a task takes. Over time, or by measuring the work of several people, it is possible to come to a general understanding of how long the work takes, which is good enough to get started. Plan Ahead to Save Costs Because time studies are costly in terms of both lost work time and the harnessing of employee trust and engagement, care must be taken in planning them. Follow eight simple steps in thinking through a time study to avoid potential potholes. This is important for setting goals and for communicating to employees. Without a strong rationale for doing the time study, it will be hard to answer employee concerns. The following exchanges may help practitioners prepare for some basic questions: Is there some concern that we are not doing our work? A time study measures how long things take, not how fast you do them. Our time study procedures allow for you to take breaks, ask questions, attend meetings and so forth. Remember, we are interested in how long transactions take, not how fast you are. What are you going to do with the results? We hope to use them, in part, to set standards to measure performance against. These standards are important because without them, overall performance cannot be evaluated fairly. Understand and Articulate the Different Types of Work to Measure In planning the time study, think through the kinds of work the job entails. What kinds of things constitute 80 percent of work on a given day? Seek examples, write them down and estimate the average time an employee spends processing each item. It is not definitive, but it will be interesting to compare estimates and assumptions about where the time goes to the actual measurement. Consider whether to record everything that goes on during the day, including breaks, meetings, project work and lunch, or just the work itself. Some work-related questions practitioners may want answered are: How often do employees ask supervisors or peers questions? How long is the wait time or hold time while data is pulled up or the computer is refreshed? What is the number of phone calls or inquiries from others? Decide what information to gather related to the actual work, such as sources of work; numbers of defects in the incoming work; workflow during varying times of the day, week or month; incomplete or inaccurate work; and so on. Fewer questions will lead to more stable and consistent feedback and greater participation. Measure Work Elements Down to a Level of Desired Complexity It is also important for the time study team to consider how detailed they want to get. Should they measure the time it takes to complete a spreadsheet of adjustments from a client, or should they break down each individual task on that spreadsheet by the type of transaction and measure every one?

For example, all maintenance transactions are individual units, the same with transfers and most transactions. They all take about the same amount of time and the only unique factors are their frequency relative to each other. If the team cannot determine the basic unit of work, they can review volumes for a few weeks and pick those areas which have the greatest and most consistent volume. Remember, the study is not intended to capture every employee interaction, just the top 70 percent to 90 percent, which will give a representative sample. Ensure the Study Takes Place During a Representative Time Period Most processes are subject to variations in volume, resulting from seasonal factors, and are predictable within limits. For example, consider tax preparers: They usually have an influx of work at the end of the year and again in March and April, and then work falls off over the summer. Decide in advance when to conduct the time study. If it is during a light season, people may have more time on their hands and thus show results that emphasize non-work time. If it is a high season, associates will be under pressure to get the work out, perhaps put in overtime and avoid backlogs. In general, work standard times go up during times of low volume and down during times of high volume. It may be best to conduct studies during both periods and average the results. It is important to look at these results and let associates know what they are missing. In time they will become proficient and the process will settle down. Use Good Sampling Procedures for Reliable Results There are two factors to consider when deciding how to handle the problem of a work sample: Sample size is determined by a formula based on the power of the sample or its ability to represent the population with a predictable margin of error. To reduce the margin of error, it is necessary to increase sample size. Margins of error of around 5 percent are common and only require a small sample proportionate to the size of the population. A more important aspect of sampling deals with the characteristics of the population. The sample must reflect the population proportionately and without bias. Sampling is both an art and a science. Practitioners must ensure that all conditions of work and associates are exposed to an equal chance of being represented during the study. Understand the Basic Measures of Central Tendency All the data collected in a time study can be displayed in the form of a distribution, often a histogram showing the frequency of various sets of scores and resembling a distribution curve of tall boxes. A normal or bell shaped distribution is common in processes free from bias. Over time, most distributions will look like the normal distribution, but when a short-term sample is taken, the distribution may be skewed to one end or the other. Such a distribution may prevent a team from settling on a fair time standard. Here is a good illustration of the problem of averages: Imagine collecting an estimate of the average income of a group of people in a homeless shelter. The average would probably be low. But what would happen to the average if Bill Gates for some reason appeared at the shelter? The average income would suddenly go into the hundreds of millions â€” truly a distorted picture. The best bet is to eliminate extreme highs and lows and go with the average of those times remaining. But sometimes extreme scores are legitimate. Suppose there are two different groups in the same team. One group is seasoned and well trained, while the other group is new to the process. Taking an average time standard might put the new people at a disadvantage because they cannot come up to the standard yet, and the seasoned people will already perform beyond it. A better measure is the median, or midpoint of a distribution, which divides the distribution in half. With extreme scores in the mix, the median provides a better view of performance. The third measure of central tendency is the mode. The mode is simply the most frequently recurring value. If the same number appears again and again in a distribution, the distribution will be essentially flat. If 70 percent or 80 percent of the population falls on or close to the mode, it probably represents the right time standard. It would then be appropriate to throw out non-modal times. One final note on distributions is about spread, or the shape of the distribution. If a distribution is long and spread out, it shows a lot of variability â€” many people recording many different times, both high and low, taken to complete a task. The more spread out a distribution is, the more difficult it will be to assign a time standard to the task. It may be that the team consists of a wide variety of skill levels and thus performance is varied. Or several different types of transactions may be being measured under one heading. Re-check what is being measured and the experience levels of the associates until the factors responsible for the variability are clear â€” reducing variability will improve the validity of

the time standard. Learn Some Common Terms Before an organization can manage productivity based on standard times, it is critical is to understand the interplay between demand, capacity and utilization, and to know how to pull the various levers to ensure that demand is anticipated, capacity managed and utilization driven to the highest levels. Demand refers to inputs such as customer requirements and numbers of transactions. Without a time standard, it is difficult or impossible to quantify demand. Capacity refers to the amount of work a team can do in a given amount of time. Utilization is the efficiency with which capacity is applied based on demand. It is one measure of productivity. An organization is percent utilized when everyone in the team is working to capacity. But, for example, if the team is capable of processing 1, transactions per week and is actually processing transactions, utilization will be. Demand management is the ability to use measures of capacity to adjust the workforce to changing demand. This can be done only with an understanding of the capacity of the team. Assigning work based on transaction types rather than time standards can result in capacity imbalances. Using time standards allows an organization to balance its capacity.

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Chapter 4 : Applied behavior analysis - Wikipedia

Part 3: Introduction to ARIMA models for forecasting. In this part, we will use plots and graphs to forecast tractor sales for PowerHorse tractors through ARIMA. We will use ARIMA modeling concepts learned in the previous article for our case study example.

Rivet is a powerful and flexible system, providing analysts with a single tool that can be learned once and applied to a wide range of problems. The underlying approach in the development of Rivet is to understand and analyze the visualization process itself: Users can then develop sophisticated visualizations by writing scripts that create and connect these basic building blocks. This approach, and the resulting modular architecture, provides several significant advantages: Developers can add their own components to Rivet by implementing them as subclasses of the desired base class. Because the components themselves are relatively simple and express a single aspect of a visualization, the components can frquently be re-used from one visualization to the next. Developers can easily create coordinated multiple-view visualizations through the sharing of components. Rivet includes a general data import mechanism, enabling the visualization of data from a variety of sources; in addition, it can directly connect to SQL Server and display data in existing relational databases. Rivet also provides an extensible data transform interface for manipulating and deriving new data, which effectively integrates visualization into the analysis process. For more information about Rivet, see our paper in Computer Graphics 34 1. Computer systems visualization Computer systems are becoming increasingly complex due to both the growing number of users and their growing demand for functionality. Processors are more elaborate, memory systems are larger, operating systems provide more functionality, and networks are faster. This increasing complexity magnifies the already difficult task developers face in designing and using the new technology. In an attempt to cope with this complexity, system designers have developed new tools which are capable of capturing the behavior of these systems in great amounts of detail with minimal intrusiveness. Information visualization is a compelling technique for the exploration and analysis of the large, complex data sets generated by these tools. Visualization takes advantage of the immense power, bandwidth, and pattern recognition capabilities of the human visual system. It enables analysts to see large amounts of data in a single display, and to discover patterns, trends, and outliers within the data. More importantly, an interactive visualization system enables analysts to retain the data provided by these rich data collection tools and navigate it in a manageable way. Beginning with a high-level summary of the data, analysts can progressively focus on smaller subsets of the data to be displayed in more detail, drilling down to the individual low-level data of interest. Overview, zoom and filter, details-on-demand. Mobile network usage analysis Studying mobile network usage patterns is important given the increasing number of people using wireless networked devices. Current research in mobile networking relies heavily on simulation; therefore, researchers need models of user movement based on actual observation. To gain insight on user access patterns, we performed a detailed analysis of a seven-week trace of the Metricom metropolitan-area packet radio wireless network. To assist in the analysis, we integrated several data mining algorithms into Rivet and created an interactive visualization for configuring and displaying the results of these algorithms; they enabled us to categorize user mobility patterns and usage patterns over time. In addition, we created a geographic visualization showing overall network statistics by location. However, the performance of the memory systems the transfer data into and out of the processors has been improving at a much slower rate. Consequently, memory system performance has a large and growing impact on application performance; in fact, for many applications, it is the primary performance bottleneck. The Thor visualization presents detailed memory system utilization data collected by FlashPoint, a firmware memory profiler running on the FLASH multiprocessor. The primary benefit of this visualization is its support for interactive data exploration through the use of filtering, aggregation, and sorting; the visuals themselves, while unspectacular, succeed in presenting the data in a familiar format and enabling users to extract interesting and meaningful

information from the data. Superscalar processor analysis While memory system behavior is an important component of computer systems performance, to run at peak throughput, applications must also be able to take full advantage of the tremendous processing resources provided by modern multiprocessors. PipeCleaner is a visualization of application performance on superscalar processors, the dominant processor style on the market today. The visualization is composed of three linked displays: These views combine to provide an overview-plus-detail representation of the pipeline, enabling the effective analysis of applications. PipeCleaner visualizations have been used for application performance analysis, understanding hardware design tradeoffs, and debugging of detailed processor pipeline simulators. Real-time system monitoring The Visible Computer visualization, designed for real-time monitoring of computers and clusters, presents a unified interface for exploring the behavior of the system as a whole. It leverages the hierarchical structure of the hardware to organize the display, providing an overview of the entire system and enabling users to drill down into specific subsystems and individual components. The resulting focus-plus-context display enables analysts to explore interesting phenomena in detail while alerting them when events of interest occur elsewhere in the system. Interactive parallelization An important area of compiler research is the field of parallelizing compilers, which enable standard sequential applications to run on multiprocessors. With larger-scale machines becoming more widely available, the potential benefits of parallelization is growing rapidly; however, so is the challenge of generating code that realizes this potential. Three range sliders enable the user to interactively filter and highlight interesting sections of code. Lines are color-coded according to the dynamic execution analysis results, emphasizing sections of code would most benefit from user analysis. Ad hoc analysis and visualization Because of the complexity of computer systems, the analysis process is a highly unpredictable and iterative one: In many cases, a series of several data collection and analysis sessions are required to locate the problem and focus in on its underlying causes. In such an environment, analysis and visualization tools must be broadly applicable to a range of problems, as the demands placed on them can vary greatly not only from task to task, but also from iteration to iteration within a single task. Rivet provides a single, cohesive visualization environment that is well-suited for this iterative process: This detailed case study shows how we used Rivet together with SimOS to improve the performance and scalability of the Argus parallel graphics rendering library. The analysis of Argus required a sequence of several simulation and visualization sessions, with each visual analysis suggesting changes to either the data collection in SimOS or to the Argus application itself.

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Chapter 5 : Job analysis - Wikipedia

Many disciplines (for example, business process, organizational management, human performance technology, program evaluation, systems engineering, and instructional systems design) employ specific methods to analyze the effectiveness of products, programs, or policy implementation.

Historical contributions The history of process philosophy extends far into antiquity, both in Eastern and Western thought. In the Western tradition it is the Greek theoretician Heraclitus of Ephesus born ca. To be sure, the fragments contain an unambiguous commitment to ubiquitous dynamicity: Whatever exists is a transformation of this cosmic fire, turning into apparently stable forms of matter such as sea and earth Fr. Cosmic fire is the source of change of all observable cosmological and natural processes. Plato, Aristotle, Melissus, and Theophrastus. While fire is postulated as an underlying pervasive cosmic factor that is creative and self-moving, the changes produced by fire happen in a regulated, measured way. In short, Heraclitus articulated three fundamental insights that became seminal in the history of Western process philosophy, despite the somewhat tendentious portrait of his thought in Greek antiquity. First, Heraclitus assigned to process or dynamicity the role of an explanatory feature, not only of a feature of nature to be explained. Second, he suggested that processes form organizational units and occur in a quantitatively measurable and ordered fashion. Aristotle complained that the source of motion for these collisions remained unexplained and developed a philosophy of nature that includes a coherent account of the source of motion in natural occurrences, allowing also for explanations in terms of self-realizing and self-maintaining structural or formal factors. If Aristotle indeed took these active elemental tendencies as fundamental and allowed for elemental transformations as changes per se without an underlying substratum or prime matter as argued in Gill , he can be counted as a process philosopher. But monads are not static: Schelling, and Georg W. Hegel provided the most comprehensive and detailed elaboration of this basic idea. From the perspective of contemporary process ontology, the development of German Idealism between and in the debate between Fichte, Hegel, and Schelling displays in instructive ways the limitations of a process metaphysics that puts the occurrence type of productions center-stage and, in particular, understands cognition as a production: As pictures are the products of paintings, mental representations thoughts, concepts were taken to be the quasi-objects that result from the productive developmental occurrences of perceiving and thinking. When we conceive of an occurrence as a production, we separate conceptually between the product and the process generating the product. Hegel assumed that the process of reality follows certain principles that can be fathomed by philosophical inquiry. This thesis is the hallmark of speculative process metaphysics, which has a number of adherents also among later process philosophers but has been championed most explicitly by Alfred N. Other proponents of speculative process metaphysics between and , such as Charles S. Peirce, Samuel Alexander, C. Lloyd Morgan, and Andrew Paul Ushenko, contributed two new motives for process thought, namely, the philosophical explanation of evolutionary processes and the philosophical explanation of emergence and self-organization. However, they also created an image of process metaphysics that in the eyes of their contemporaries appeared methodologically problematic. The first step of these process-philosophical enterprises seemed legitimate businessâ€”surely it was important to identify the limitations of mechanistic explanations in science. But it was the second step, the endeavor of drafting purely speculative explanations for the direction and the origin of emergent evolution, that went against the positivist temper of the time. As they rejected any empirical claims that would go beyond what was scientifically proven, and assigned to philosophy the more mundane task of analyzing conceptual contents as well as linguistic and social practices, and phenomenal experiences , they increased the intersubjective verifiability of philosophical claims. But in the course of this important methodological revision the ontological categories of process metaphysics were mostly thrown out wholesale with the bathwater of the speculative explanations these categories were embedded in. Nevertheless, twentieth century speculative process metaphysics is paralleled by an

analytic-interpretive strand in contemporary process thought. This variety of process thought also proceeds from the theoretical intuition that processuality, in its various modes, is the primary starting point for a philosophical description of the world or of reality, but does not speculate about how reality develops. Often contributions to analytic-interpretive processism are also placed somewhere in the middle between the poles of analytic versus continental methods in contemporary philosophy. The following examples will illustrate this methodological openness of non-speculative contemporary process philosophy. Dewey holds that all existents are events whose characters we determine by giving them meaning in our interaction. For Dewey meanings are not abstract or psychic objects but aspects of human cooperative behaviorâ€"in our interactions with the world we create significances and thus determine what kind of situation occurs. Working from studies of social interaction, George Herbert Mead added to process-based pragmatism the thesis that mind emerges from social communicative actions. But while Dewey and other pragmatists put the process-character of being partly into the hand of human agents and their practical and theoretical interpretations of an ongoing situation, Bergson argued that the process-character of being is precisely out of our cognitive reach, at least in so far as we try to conceptualize what we experience. As long as we understand conscious experience as a subject-object relation, Bergson pointed out, we merely follow the theoretical habits in which we have been conditioned by the substance-metaphysical tradition. However, when we carefully attend to what we take in during conscious experience, especially our self-experience, without forcing a conceptualization of that experiential content or the act of experience, we find not a relation and ready-made relata but an interactivityâ€"an ongoing interfacing out of which world and self arise in our conceptualizations. While many twentieth century American process thinkers were influenced by Whitehead, some turned elsewhere or went their own ways. Sheldon championed a largely dialectical view of the dynamic nature of reality with process as a principle of conflict resolution. Wilfrid Sellars, one of the great figures in post-war analytical philosophy, worked out what appears to be the first consistently nominalist and naturalist system ever developed in the history of Western philosophy; this is often overlooked, however, since the system relies on a process ontology that Sellars only briefly sketched but never elaborated. Naturalism implies a nominalist account of properties, Sellars argued, which in turn can only succeed if we take qualia to be aspects of processesâ€"by categorizing blue as sensing-blue-ly, we can make better sense of how physical processes engender sensory contents Sellars Any kind of content, Sellars argued, from the lowliest sensory content in bacteria to the norm-governed contents of conceptual experience to the contents of scientific theories, is nothing else but a way of functioning. Recently American process metaphysics gained another important voice in Nicholas Rescher who, like Sellars, consistently pursued a systematic approach in philosophy. In the mids, however, Rescher developed a process metaphysical embedding for his system, using familiar philosophical terminology, and thus presented the first systematic overview of the explanatory potential of a non-Whiteheadian process metaphysics that forfeits technical expenditure and operates with a notion of process that is much closer to our common-sense understanding of developments. Generally speaking, current Western process philosophy has abandoned all speculative aspirations and develops the descriptive, analytic-interpretive strand of process thought the exception might be the use of process metaphysics in areas of philosophy of physics where physics itself is speculative, see footnote While interest in processism most recently has increased in analytic philosophy of science, of mind, and of action, process thought is currently also used to highlight productive affinities between the continental and analytical trajectories of twentieth century metaphilosophical criticism of traditional metaphysics. Such analytic-continental cross-overs enabled by attention to process can also be observed in philosophy of cognition and philosophy of technology. Another more encompassing exploration across borders, a detailed historical and systematic comparison between Western and Eastern process philosophy e. Three tasks of process philosophy As may have become clear from the brief review of historical contributions to Western process philosophy in section 1, process philosophy is a complex and highly diversified field that is not tied to any school, method, position, or even paradigmatic notion of process. Some process philosophers e. Whitehead took organismic processes as their central model

for a concept of occurrences that generate the internal and external coherence of an entity. James chose as their canonical illustrations individual psychological processes, or e. Alexander took evolutionary development as paradigmatic. Whitehead and Morgan articulated their approach in the form of an axiomatic theory and in close relation to science, while others e. Bergson worked from an almost mystical sort of sympathetic apprehension of reality and insisted that process metaphysics could, if at all, only be expressed by means of a highly metaphorical use of language. The historical overview in the preceding section also displays that the tools of process philosophy are not tied to any specific method of philosophical inquiry, giving present-day process philosophers a broad spectrum of approaches with which to build their theories: Similarly, while compatibility with recent results of science is for many process philosophers a privileged methodological constraint, others take science to be merely an aspect of the more comprehensive philosophical datum of cultural praxis. In short, process philosophy is best understood as a paradigm of philosophy characterized by a set of fundamental assumptions. For example, process philosophers assume that the only primary or basic ontological categories should be terms for occurring entities, and that certain formal theoriesâ€"for example, set theoryâ€"are ill-suited of themselves, without modifications, to express the dynamic relationships among occurrences. What unifies contemporary process-philosophical research more than any other aspect, however, is its metaphilosophical aim to revise long-standing theoretical habits. Given its current role as a rival to the dominant substance-geared paradigm of Western metaphysics, process philosophy has the overarching task of establishing the following three claims: Claim 2 Process-based theories perform just as well or better than substance-based theories in application to the familiar philosophical topics identified within the substance paradigm. Claim 3 There are other important philosophical topics that can only be addressed within a process metaphysics. Contributions to current process-philosophical research typically focus on aspects of only one of these three components of a theory revision. Process philosophy currently presents itself as an internally diversified, geographically and disciplinarily distributed phenomenon of innovative thought in Western philosophy. Accordingly, there are significant differences in how process philosophers approach claims 1 â€" 3. In the following the focus will be on arguments for claims 1 â€" 3 within contemporary analytical process philosophy. The reader should thus keep in mind that the pointers set in the following sections are partially representative at best and need to be supplemented by introductions to, e. In addition, pointers to process-philosophical contributions to the philosophy of religion are all but omitted, since extensive and in-depth treatments are provided in the entries on Charles Hartshorne and process theism. In order to support Claim 1 , two strategies have been pursued. The first strategy is to argue that the core assumptions of the substance paradigmâ€"especially the focus on discrete, countable, static individuals and the neglect of dynamic aspectsâ€"simply reflect the cognitive dispositions that are typical for the speakers of the languages in which Western metaphysics were mainly developed, such as Ancient Greek, Latin, German, and English. For example, consider Peter F. For objective and identifiable concrete entities to be knowable, they must be i distinguishable from other co-existents, and ii reidentifiable for one or more members in a community of speakers and knowers. Only one category of entities possesses these required features: If this line of reasoning were correct, the substance paradigm would be indispensable, and Claim 1 above would be false. For it is clear that any viable metaphysical theory must have room for identifiable individuals that can be located in space and time. The initial plausibility of step 4 may also derive from a core assumption of the substance paradigm, namely, the thesis that all processes can be ontologically understood as modifications of substances. But the fact that these processes involve certain things and persons is merely one of the aspects that an ontological interpretation of processes should capture, and not a decisive one, since many processes e. It is simply not the case that material things are the indispensable basis for a framework of knowable, uniquely located, re-identifiable items. Physical processes of a suitable sort can accomplish this task as well. Moreover, even if material things were the only candidates for epistemically reidentifiable items, it still would be an open question how we should interpret things ontologically. For process philosophy, as for any attempt at theory revision, the proof of the pudding is in the eating. Vendler and Kenny argued that actions can be sorted into

various types according to certain logical and linguistic features of verbs denoting these actions. Taking up this clue, analytical process ontologists have offered various criteria sets for the classification of occurrences and their relationships to other categories,[6] although there is so far no consensus about the details of these classificatory set-ups, and there are disagreements as well about which formal theory, if any, should be employed to formulate the relevant logical distinctions, and which dynamic category or categories should be basic and which derived. Furthermore, while processists agree that processes combine and that they exhibit common features, there is disagreement on how to articulate such process combinations e. Despite all differences in constructive detail, however, Whiteheadian and non-Whiteheadian process philosophy both recommend themselves as gateways to renovating philosophical discourse. Here are just a few of the topics where processists promise philosophical advance. Helen Steward , criticizes the standard conception of perception and agency as a causal sequence of states, some of which are physical and some mental; in order to make room for agentive freedom within the natural world Steward proposes that we view agency as a special form of downward causation, taking our bearings from the hierarchical systems of functioning in biological organisms Others have pointed out that our common sense teleological explanations of actions commit us to ongoing occurrences Stout or that we can best make sense of the unity of our experience if we take processes to be the objects of our experiences rather than states or things Soteriou Some natural processes realize a certain form of low-degree normativity. In some process organizations e. Processes that are modifications of other processes are both immanent in the sense that they affect by constraining and enabling how the modified processes occur, but are transcendent in the sense that they are multiply realizable, that is, they are not themselves dependent on the particular spatio-temporal occurrences of the processes that realize them. Offering detailed reconstructions of the procedures of knowledge production, Rescher argues that rational inquiry, including science, is the process of creating coherent theories that systematize what we have established as data with increasing complexity Rescher That this method of inquiry can yield temporary truths is justified by its practical success, but the method is essentially a interminable and b progressive, since: For claims a2 and b Rescher supplies process-metaphysical underpinnings, endorsing a view of nature as continuously evolving and a view of evolution as directed towards increasing complexity Rescher , ch. Perhaps the clearest example for the progress that a processist approach can bring to longstanding tasks of philosophy is in the theory of selfhood and personhood. What we find ourselves to be doing and undergoing we understand as belonging to a space of possible occurrences. We notice patterns in what might possibly be going on with us, and some of these patterns we use to identify ourselves:

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Chapter 6 : Demographics & Lifestyle Analysis â€“ Downtown Market Analysis

A top Afghan presidential aide says Kabul is willing to accommodate key demands of the Taliban, if the group drops preconditions for planned direct talks. The statement by Qutbuddin Hilal, adviser.

An Example The Louisiana State Department of Education LSDE was recently contacted by local school boards and state legislators from five parishes in the northwest region of the state, a section in which the mining of extensive lignite coal resources will begin in the near future. Local school officials were concerned about what demographic or socioeconomic trends in their area they might expect since these would, of course, affect the validity of their enrollment projections and facilities planning for the next ten to fifteen years. However, the planner can do monitoring and forecasting for the local school board and can aid the board in goal-setting and policy implementation by coordinating local efforts with regional and state activities. This coordinating role with regard to goal-setting and policy implementation is particularly important in an area such as the northwest region of Louisiana, where the needs of five parishes must be taken into consideration. In the following sections, the role of the state education planner as the doer of the monitoring and forecasting stages and as the facilitator for the goal-setting and policy implementation stages will be delineated using the northwest Louisiana example. It should be noted at the outset that this project is in the planning stages, and that none of the proposed activities by the LSDE has yet been accomplished. It is hoped that working through the application of the policy impact analysis model to this problem area in advance will aid the LSDE if the project is undertaken. Monitoring The three components of monitoring are: For the state education planner in Louisiana, the identification of an appropriate area of study could come from several sources: In the case of the northwest Louisiana project, requests for technical assistance were received from local school boards and from state legislators. These requests reflect growing concern about orderly growth and development in the lignite impacted area. During , ten corporations requested permits from the State of Louisiana for the exploration, mining, and use of lignite in the area. It is estimated that over one billion tons of recoverable lignite exists in Louisiana, comprising One result of this debate was the realization that more detailed information was needed on the real impact that lignite coal development would have on governmental services in the area. Once an area of study has been identified, the next step is to select appropriate variables for study. The sequence of events that might lead to an increased need for school facilities in the region is as follows: Variables of interest may be broken down into the following broad categories: Once the variables have been selected, the next stage in monitoring is to develop a database. This involves locating the appropriate sources for the data and determining the number of years of data that one needs. Renfro proposed that the planner have as many years of historical data as the time horizon of the study. Since the impact of the lignite coal resource development will be felt most severely in the next ten years, ten years of historical data will be required for most of the variables. Data more than ten years old will have marginal utility for the study. Sources of data for the industrial indices include: Additional information on the industries that have applied for permits for lignite exploration may be obtained through the Department of Natural Resources Geological Survey team. This information was gathered as part of Federal reporting requirements for Section of the Powerplant and Industrial Fuel Use Act of mentioned above. These data include estimates of the number of construction, operations and secondary employees currently in the area plus projections of the number of employees that will enter the area over the next fifteen years. Population data from the United States Census is available through the Louisiana State Planning Office; and annual estimates of the population for each year from to are available on the parish and municipality level from Louisiana Tech University. These estimates will provide the most accurate picture of annual population growth in the region for the past ten to fifteen years. School enrollment figures, by parish, are available through the Bureau of Research at the LSDE for the past fifteen years. The data for the past three years are available on computer tape; and the data for previous years could easily be computerized. The current number of students and classroom teachers for all schools in the five

parishes will be available through Principal Summary Session Reports, sent annually to the Bureau of Research. This part of the annual report has been expanded for the school year, such that data for that year will be the most thorough ever collected by the LSDE. Plans for expansion of existing facilities can be obtained by a special survey of the school board in each parish. Extensive information about the indebtedness and fiscal condition of each school district is available through Part II-A of the Annual Report. Four years of this data is on computer tape; the variables of interest could be easily computerized for previous years. Thus, the information required for the monitoring stage of the project can be easily obtained and entered into a computerized database. The state education planner can collect and organize this data on a regional basis for the local school boards and state legislators more thoroughly and accurately than they could themselves. This database will then be extensively used in the second stage of the policy impact analysis-, model-forecasting. Forecasting It is possible to categorize forecasting techniques as exploratory or normative. Exploratory techniques are used in Stage 2 to analyze trends and cycles to determine the most likely future developments. Normative techniques are used in Stage 3 goal setting to define the most desirable future developments and help identify a course of action that should lead to them. In the northwest Louisiana example, the purpose of the forecasting stage is to make the most accurate projections of school enrollment for each of the five parishes over a ten year period say, These enrollment projections would then be used in the goal setting stage to help define the most desirable future for each parish with regard to additional school facilities development. Both quantitative and qualitative techniques will be used in Stage 2 to define the expected future most accurately. Quantitative techniques employ mathematical models to predict the future, while qualitative techniques use judgments by experts to predict the future. Various quantitative mathematical models, each with a different set of assumptions, may be used to project enrollment figures. It will be necessary to check these projections, however, against expert opinion before proceeding to the goal-setting stage. It may be that the assumptions of the underlying mathematical models do not conform to the actual situation in each parish. For example, a mathematical model using a linear projection technique may be appropriate for Nathcitoches Parish, but inappropriate for Red River Parish, where extensive construction operations will have an immediate impact on school enrollment that radically alters the linear pattern. Expert opinion regarding the likelihood and impact of extraordinary events can be used to alter the mechanical projections made by quantitative techniques. The quantitative techniques that may be used to project school enrollments in northwest Louisiana may be either pattern-based models time-series models or casual models. Pattern-based models vary in complexity from simple averaging and ratio methods to cohort survival, Markov-chain, and various curve fitting formulas. Causal models develop projections on the basis of the numerical values of indicator variables which have been demonstrated through multiple regression to have a strong relationship to enrollment levels. In the northwest Louisiana example, these variables would most probably be measures of industrial growth attributable to lignite coal resource development in the area. Unfortunately, indicators of industrial growth associated with this lignite development are tentative at this time, primarily because no coal will be mined until Some indicators of industrial growth have appeared in the area, but preliminary examination of the relationship between these indicators and enrollment levels indicate that the relationship is not strong enough at this time to warrant the development of detailed causal models. Instead, it seems more appropriate to examine pattern-based models as they are presently being employed in Louisiana to project school enrollments and to determine how these models may be improved. The Board of Regents and the Louisiana State University Division of Institutional Research currently use cohort survival techniques to project elementary and secondary enrollments. These projections are then used to project numbers of freshmen entering colleges and universities in the state. This method is adequate for projecting the size of incoming freshmen classes, but does not accurately project elementary and secondary enrollments, particularly in areas where extensive in- or out-migration occurs. For example, previous projections of school enrollment by the Board of Regents in some of the parishes in the lignite-impacted area have indicated enrollment decreases, whereas enrollments have actually increased. This model projects the number of new students entering the

area directly as a result of construction, operation, and support services for the coal mines. Under Section reporting requirements, DNR gathered aggregate estimates of the number of employees that will be needed by the mines in either construction, operation, or support capacities. DNR then calculated how many of these employees would migrate into the area during a three year period Estimates of the age distribution of children for the in-migrating workers with families present were then made. These calculations allowed DNR to estimate the in-migrating school-aged population for this three year period. Unfortunately, these predictions have not proven to be very accurate, primarily because of delays in the schedules for constructing and operating the mines. To summarize, then, the cohort survival technique method of forecasting school enrollments is inadequate because it does not allow for the effect of in-migration, while the DNR technique has failed thus far because of faulty industrial-estimates of the number of in-migrating workers. However, several alternative pattern-based techniques are available to the state education planner. The planner must choose from among these techniques the one most appropriate for each parish. At present, the most attractive alternative may be double exponential smoothing Gardner, This time-series technique allows one to selectively weight historical data points on the basis of the assumed relative importance of more recent information. For example, the enrollment figures in Red River Parish could be collected for the last twelve years since A formula could then be derived to predict enrollment for the next three years based on the twelve-year trend with heavier weights given to the enrollment figures for the last years of the historical data. As more in-migrating students enter schools and elevate recent enrollment figures, projections for the future will increase at a greater rate using this technique. Once a quantitative model has been used to project enrollments for a given period of time, the projections should be checked against qualitative forecasts generated by experts from each parish. The delphi technique could be used to develop a combined forecast of enrollment for each parish based on the opinions of a group of experts within those parishes. Thus, the double exponential smoothing technique could be utilized and then separately checked in each parish using the delphi technique. If there are discrepancies between the quantitative and qualitative estimates, then a set of alternative enrollment projections high, medium, low based on alternative assumptions could be developed for the policy makers to utilize when setting their goals. Goal Setting In the goal-setting stage of the policy-impact analysis model, likely futures derived from exploratory forecasting are converted into desirable futures through normative forecasting. For example, let us suppose that the state education planner forecast an increase of students in De Soto Parish for the period and also knew that the current school facilities in De Soto were at maximum capacity. The likely future is that the schools would be severely overcrowded by ; the desirable future might be that a new K school be constructed by If this were the desirable future, the specific goals could be set up for the following two years to accomplish the desired future by Normative forecasting techniques are, by necessity, decision-making procedures. The decision to construct a new school must be made by the local school board and superintendent with input from others concerned-such as state representatives and local citizens. In the monitoring and forecasting stages, the state education planner organized data and developed likely forecasts to meet information requests from local school boards and legislators. As noted above, the planner is the doer during these stages. In the northwest Louisiana example, the state education planner would first report back to the school boards and legislators who had requested information. The planner would present to each parish the likely future for that parish and for other parishes in the region. During these separate meetings, the local school boards might see the need for a coordinated approach to education planning and budgeting. They might then ask the planner to coordinate a meeting of all affected authorities, including members of the school board from each parish, the school superintendents of each parish and local state legislators. It is incumbent upon the local school boards to request the state education planner to assume this facilitating role; the planner should not assume the role without the request of the local authorities. In the first joint meeting of these local school representatives, the state education planner should provide matrices of likely futures for the region. This matrix would thus have ten cells that could be collapsed into five high enrollment futures or five low enrollment futures, which in turn could be further

collapsed into one high enrollment or one low enrollment future for the region as a whole. The state education planner would, therefore, provide the policy makers with exploratory forecasts and aid them in generating future scenarios. The representatives from each parish would, of course, come into the meeting with some general idea of a desirable future for their parish. These desirable futures could be combined and restated using delphi procedures. This process of normative forecasting will necessarily involve a great deal of discussion, debate, and several rounds of forecasting in a delphi-like process. During this process, the state planner will serve at the pleasure of the local representatives.

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Chapter 7 : Chapter Four â€" Central Intelligence Agency

The 21st century is a great time to be a practicing behavior analyst with practice issues currently dominating many professional conversations in the field (Friman, a).

These preferences relate directly to consumer demographic characteristics, such as household type, income, age, and ethnicity. For this reason, it is not only the amount of demand that truly matters to a local economy. The mix of consumers also has a major impact on a local economy, and therefore must be thoroughly examined in all trade area analyses. Unfortunately, far too much information often is included in these studies. An enormous amount of data is readily available from a variety of private and public sources, leaving the reader with tables and tables of demographic information overload. Relevant Data Categories Interpretation of demographic data is often missing in market analysis. What does the data say about how the market is changing and how consumers spend their time and money? Specifically, what does the data suggest about new business or real estate opportunities downtown? The following provides a starting point in your understanding and interpretation of demographic data in relative to retail spending. Population is defined as all persons living in a geographic area. Households consist of one or more persons who live together in the same housing unitâ€"regardless of their relationship to each other this includes all occupied housing units Households can be categorized by size, composition, or their stage in the family life cycle. Typically, demand is generated by the individual or the household as a group. Individual purchases, on the other hand, are personal to the consumer. Anticipated household or population growth may indicate future opportunities for a retailer. However, further analysis is necessary to identify retail preferences within a community. Household income positively correlates with retail expenditures in many product categories. Another common practice is to analyze the distribution of household incomes. Discount stores may avoid extremely high or low-income areas. A few store categories, such as auto parts, are more commonly found in areas with lower household incomes. See the following box for more details on household income. You need to consider all categories of demographic data when analyzing a market. Gearing a retail mix toward this segment may require a focus in luxury goods and services. High-end department and technology stores, as well as cultural amenities like museums and concert halls, are frequented by the most affluent households within a population. These households tend to be more frugal and selective in their buying behavior, shopping at discount outlets for groceries and other goods rather than high-end stores. Big box stores are particularly popular for middle and low-income households. Families at this income level are living in poverty and thus spend very little on goods and services across the board. Age is an important factor to consider because personal expenditures change as individuals grow older. Realizing and catering to the needs of an aging population can be beneficial to any retailer. Consumer spending on drug stores and assisted care services flourish in areas with a large elderly population. Accordingly, drug stores often do well in communities with a larger number of people over the age of In general, though, older populations tend to spend less on the majority of goods and services. Studies indicate that nightlife and entertainment spending restaurants, bars, and theaters by people over 65 is roughly half that spent by those under Older adults also spend considerably less on apparel than other age groups. On the other end of the spectrum, toy stores, day care centers, and stores with baby care items do well in areas with many children and infants. Some entertainment and recreational venues, such as movie theatres and golf courses, serve a broad section of the population. Others, such as water parks or arcades, target certain age groups. Education levels also figure into the socio-economic status of an area. Because income increases with advancing educational attainment, many retailers focus on income level rather than education. There are some exceptions to this, though. Bookstores are often cited by developers as a business whose success is directly correlated with the number of college educated individuals in the trade area. Similarly, computer and software stores are often located in areas with high levels of education. They also tend to visit cultural establishments like museums and theaters at a frequency over three times greater than those without a college degree. On the

other hand, less-educated populations generally have lower incomes and thus tend to prefer shopping at discount retail outlets and chain stores. This group also spends more money on car maintenance and tobacco products than those with a college degree. Specialty apparel stores thrive in middle to upper income areas and those with above-average white-collar employment levels. Second-hand clothing stores and used car dealerships are successful in areas with a higher concentration of blue-collar workers. Office supply stores and large music and video stores are especially sensitive to the occupational profile. These retailers target growth areas with a majority of white-collar workers. Ethnicity is another factor retailers consider when choosing merchandise to carry. Data show that ethnicity affects spending habits as much as other demographic characteristics, such as income and age. Retailers that use segmentation based on race and ethnic groups must make sure their efforts effectively measure the true preferences and behaviors of the community. Housing ownership and rate of housing turnover is an important factor for numerous retailers to consider. Home ownership directly correlates with expenditures for home furnishings and home equipment. Shopping centers and other retail properties: Investment, development, financing and management. Who benefits whom in the neighborhood? Demographics and retail product geography. National Bureau of Economic Research.. Comparing the Primary Trade Area with Other Areas Demographic statistics are especially useful if they are presented in comparison with other places. To see how your trade area differs from other places, it is useful to provide two comparison sets of data: Comparing your trade area with other communities and the state allows demographic baselines to be established. These baselines will help determine whether your trade area has low, median, or high values in each demographic category. For instance, after examining demographics for your trade area, it may appear that there is a high proportion of white-collar workers. However, this observation cannot be verified until you know what constitutes an average number of white-collar workers. Comparable communities can include five or six cities of similar size in the same region or state. The cities chosen should reflect similar distances from metropolitan statistical areas MSAs of the region. Depending on the geographic size of your primary trade area, you will need to select similar-sized trade areas. In addition to comparable communities, adding state or U. Demographic Data Sources Detailed local census data is readily available free via the Internet through the U. Bureau of Census at http: Census website includes a link to its user-friendly data-filled website called American FactFinder at http: Use American FactFinder to view, print, and download statistics about population, housing, industry, and business. Using FactFinder, you can also find U. Census Bureau products; create reference and thematic maps; and search for specific data. In addition to the Census Bureau, there are numerous, nationally recognized data firms that can provide demographic estimates for a particular trade area. Census and other public sources, they add value by providing annual updates. They also package the data in user-friendly comparative formats that make it easy to compare one geographic area with another. Furthermore, you are able to tap into the knowledge of skilled demographers who have designed data products centered on particular industry needs. These firms provide a way to order reports by simply calling a toll free number or downloading the data directly using their software. Prices charged by these firms have become more and more affordable as competition has increased. Following is an example of a demographic comparison report assembled for a sample community from a private data source. Sample Demographic Comparison Report Lifestyle Data Adding consumer lifestyle data takes the market analysis a step further. This data recognizes that the way people live lifestyle influences what they purchase as much as where they live geography or their age, income, or occupation demography. He concludes that retail is stimulated by large concentrations of populations of similar characteristics and tastes. As a result, a community can develop product mixes targeted to specific high-potential customer segments. Concentrations of lifestyle segments create demand for specific products or services. Neighbors also tend to participate in similar leisure, social, and cultural activities. The quality of a segmentation system is directly related to the data that goes into them. High quality and useful systems allow you to predict consumer behavior. In a retail business targeting tourists, for example, the systems allow the business to identify products and services that appeal to this market segment. The usefulness of a segmentation system depends on how well the data incorporates lifestyle

choices, media use, and purchase behavior into the basic demographic mix. This supplemental data comes from various sources, such as automobile registrations, magazine subscription lists, and consumer product-usage surveys. Lifestyle Data Sources Several private data firms offer lifestyle cluster systems. The firms use data from the U. Census and other sources to separate neighborhoods throughout the United States into distinct clusters. They utilize sophisticated statistical models to combine several primary and secondary data sources to create their own unique cluster profiles. Most models start with data from U. Census block groups that contain households. In rural areas, the data is more typically clustered by zip code.

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Chapter 8 : Developing Public Education Policy Through Policy Impact Analysis

1 Paper SAS The Architecture of the SASÂ® Cloud Analytic Services in SASÂ® Viyaâ„¢ Jerry Pendergrass, SAS Institute Inc. ABSTRACT SASÂ® Cloud Analytic Services (CAS) is the cloud-based run-time environment for data management and.

Purpose[edit] One of the main purposes of conducting job analysis is to prepare job descriptions and job specifications which in turn helps hire the right quality of workforce into an organization. The general purpose of job analysis is to document the requirements of a job and the work performed. Job and task analysis is performed as a basis for later improvements, including: When a job analysis is conducted for the purpose of valuing the job i. Why does the job exist? What physical and mental activities does the worker undertake? When is the job to be performed? Where is the job to be performed? Under What conditions it is to be performed? Procedures[edit] As stated before, the purpose of job analysis is to combine the task demands of a job with our knowledge of human attributes and produce a theory of behavior for the job in question. There are two ways to approach building that theory, meaning there are two different approaches to job analysis. The job analyst then develops task statements which clearly state the tasks that are performed with great detail. After creating task statements, job analysts rate the tasks on scales indicating importance, difficulty, frequency, and consequences of error. Based on these ratings, a greater sense of understanding of a job can be attained. For example, the job analysts may tour the job site and observe workers performing their jobs. During the tour the analyst may collect materials that directly or indirectly indicate required skills duty statements, instructions, safety manuals, quality charts, etc. Developed by Fine and Cronshaw in , work elements are scored in terms of relatedness to data 0â€”6 , people 0â€”8 , and things 0â€”6 , with lower scores representing greater complexity. Incumbents, considered subject matter experts SMEs , are relied upon, usually in a panel, to report elements of their work to the job analyst. Knowledge is the information people need in order to perform the job. Skills are the proficiencies needed to perform each task. Abilities are the attributes that are relatively stable over time. Other characteristics are all other attributes, usually personality factors. In a worker-oriented job analysis, the skills are inferred from tasks and the skills are rated directly in terms of importance of frequency. This often results in data that immediately imply the important KSAOs. However, it can be hard for SMEs to rate skills directly. Fleishman represents a worker-oriented approach. Fleishman factor-analyzed large data sets to discover a common, minimum set of KSAOs across different jobs. His system of 73 specific scales measure three broad areas: JobScan is a measurement instrument which defines the personality dynamics within a specific type of job. Although it does not evaluate the intellect or experience necessary to accomplish a task, it does deal with the personality of the type of work itself. Example[edit] For the job of a snow-cat operator at a ski slope, a work or task-oriented job analysis might include this statement: Operates Bombardier Sno-cat, usually at night, to smooth out snow rutted by skiers and snowboard riders and new snow that has fallen. On the other hand, a worker-oriented job analysis might include this statement: Evaluates terrain, snow depth, and snow condition and chooses the correct setting for the depth of the snow cat, as well as the number of passes necessary on a given ski slope. Since the end result of both approaches is a statement of KSAOs, neither can be considered the "correct" way to conduct job analysis. Because worker-oriented job analyses tend to provide more generalized human behavior and behavior patterns and are less tied to the technological parts of a job, they produce data more useful for developing training programs and giving feed back to employees in the form of performance appraisal information. Also, the volatility that exists in the typical workplace of today can make specific task statements less valuable in isolation. For these reasons, employers are significantly more likely to use worker-oriented approaches to job analysis today than they were in the past. Over the years, experts have presented several different systems and methods to accomplish job analysis. Many forms of systems are no longer in use, but those systems that still exist have become increasingly detailed over the decades with a greater concentration

on tasks and less concentration on human attributes. That trend, however, has reversed in recent years for the better. Newer methods and systems have brought I-O psychology back to an examination of the behavioral aspects of work. These traditional job analysis methods include: All of these methods can be used to gather information for job analysis. The DACUM process developed in the late s has been viewed as the fastest method used, but it can still can take two or three days to obtain a validated task list. This was the first method of job analysis used by I-O psychologists. The process involves simply watching incumbents perform their jobs and taking notes. Sometimes they ask questions while watching, and commonly they even perform job tasks themselves. He attempted to steer the submarine toward Bermuda. After multiple misses by over miles in one direction or another, one officer suggested that Viteles raise the periscope, look for clouds, and steer toward them since clouds tend to form above or near land masses. The vessel reached Bermuda shortly after that suggestion. It is essential to supplement observation by talking with incumbents. These interviews are most effective when structured with a specific set of questions based on observations, other analyses of the types of jobs in question, or prior discussions with human resources representatives, trainers, or managers knowledgeable about jobs. Critical incidents and work diaries: The critical incident technique asks subject matter experts to identify critical aspects of behavior or performance in a particular job that led to success or failure. For example, the supervisor of an electric utility repairman might report that in a very time-pressing project, the repairman failed to check a blueprint and as a result cut a line, causing a massive power loss. In fact, this is what happened in Los Angeles in September when half the city lost power over a period of 12 hours. They may be asked to simply write down what they were doing at 15 minutes after the hour for each hour of the work day. Or, they may list everything they have done up to a break. Expert incumbents or supervisors often respond to questionnaires or surveys as a part of job analysis. These questionnaires include task statements in the form of worker behaviors. Subject matter experts are asked to rate each statement form their experience on a number of different dimensions like importance to overall job success, frequency performance and whether the task must be performed on the first day of work or can be learned gradually on the job. Questionnaires also ask incumbents to rate the importance of KSAOs for performing tasks, and may ask the subject matter experts to rate work context. Unlike the results of observations and interviews, the questionnaire responses can be statistically analyzed to provide a more objective record of the components of the job. To a greater and greater extent, these questionnaires and surveys are being administered online to incumbents. Although it is labeled a questionnaire, the PAQ is actually designed to be completed by a trained job analyst who interviews the SMEs e. Job component validity is the relationship between test scores and skills required for good job performance. There are behavior-related statements in the PAQ divided into six major sections: Checklists are also used as a job analysis method, specifically with areas like the Air Force. In the checklist method, the incumbent checks the tasks he or she performs from a list of task statements that describe the job. The checklist is preceded by some sort of job analysis and is usually followed by the development of work activity compilations or job descriptions. The scope of task statements listed depends upon the judgment of the checklist constructor. Some data collection techniques such as interviewing the employee and asking what the job entails are good for writing job descriptions and selecting employees for the job. Other techniques like the position analysis questionnaire do not provide qualitative information for job descriptions. Rather, they provide numerical ratings for each job and can be used to compare jobs for compensation purposes. Organization charts show the organization-wide work division, how the job in question relates to other jobs, and where the job fits in the overall organization. The chart should show the title of each position and, through connecting lines, show reports to whom and with whom the job incumbent communicates. A process chart provides a more detailed picture of the work flow. In its simplest, most organic form, a process chart shows the flow of inputs to and outputs from the job being analyzed. Finally, the existing job description if there is one usually provides a starting point for building the revised job description. This is because there may be too many similar jobs to analyze. For example, it is usually unnecessary to analyze jobs of assembly workers when a sample of 10 jobs will be sufficient. Actually analyze the job by collecting data

on job activities, necessary employee behaviors and actions, working conditions, and human traits and abilities required to perform the job. For this step, one or more than one methods of job analysis may be needed Verify the job analysis information with the worker performing the job and with his or her immediate supervisor. This will help confirm that the information is factually correct and complete. Develop a job description and job specification. These are two tangible products of the job analysis process. The job description is a written statement that describes the activities and responsibilities of the job as well as its important features such as working conditions and safety hazards. The job specification summarizes the personal qualities, traits, skills, and background required for completing a certain job. These two may be completely separate or in the same document. Job analysis provides information about what the job entails and what human characteristics are required in order to perform these activities. This information, in the form of job descriptions and specifications, helps management officials decide what sort of people they need to recruit and hire and select. Job analysis information is crucial for estimating the value of each job and its appropriate compensation. Also, many employers group jobs into classes. Job analysis provides the information to determine the relative worth of each job and its appropriate class. The job description should show the activities and skills, and therefore training, that the job requires Discovering unassigned duties: Job Analysis can also help reveal unassigned duties. Missing, however, is any reference to managing raw material inventories. On further study, it is revealed that none of the other manufacturing employees are responsible for inventory management, either.

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Chapter 9 : Chapter One: Making Sense of the US Intelligence Community â€" Central Intelligence Agency

*Public Education Policy Through Policy Impact Analysis. The Role of the Educational Planner. *. by Charles Teddlie, E. Raymond Hackett, and James L. Morrison [Note: This is a re-formatted manuscript that was originally published in World Future Society Bulletin, , 16(6),*

Time series decomposition to decipher patterns and trends before forecasting Part 3: Michel de Nostredame a. Into a cage of iron will the great one be drawn, When the child of Germany observes nothing. Detractors of Nostradamus believe that his book is full of cryptic pros like the one above and his followers try to force fit events to his writing. Ok so of course nothing earth-shattering happened in that month of otherwise you would not be reading this article. However, Nostradamus will continue to be a topic of discussion because of the eternal human obsession to predict the future. However, you must keep in mind that these scientific techniques are also not immune to force fitting and human biases. On this note let us return to our manufacturing case study example. You may want to analyze this data to revalidate the analysis you will carry-out in the following sections. Plot tractor sales data as time series To begin with you have prepared a time series plot for the data. The following is the R code you have used to read the data in R and plot a time series chart. Difference data to make data stationary on mean remove trend The next thing to do is to make the series stationary as learned in the previous article. This to remove the upward trend through 1st order differencing the series using the following formula: We need to make the series stationary on variance to produce reliable forecasts through ARIMA models. We will go back to our original tractor sales series and log transform it to make it stationary on variance. The following equation represents the process of log transformation mathematically: Log of sales The following is the R code for the same with the output plot. Notice, this series is not stationary on mean since we are using the original data without differencing. This also gives us the clue that I or integrated part of our ARIMA model will be equal to 1 as 1st difference is making the series stationary. The idea is to identify presence of AR and MA components in the residuals. Also, there is a seasonal component available in the residuals at the lag 12 represented by spikes at lag This makes sense since we are analyzing monthly data that tends to have seasonality of 12 months because of patterns in tractor sales. The following is the code for the same.