An American Indicator System – Representative Democracy As A Continual, Hoped For, Improvement Process – The STEEP Course

Learning And Outcomes – From Event To Measure And Beyond

3/12/2025

Cliff C. Tussey III
steepusa@yahoo.com

Summary: This ebook begins by presenting an important difference between the price system and representative democracy. Next, a brief history of American expectation and obligation is recounted. Then, representative democracy is represented as a continual, hoped for, improvement process of communication integrated by repetitive measurement. A conversation about the investment and work in America for better information about the nation and its states follows. A measure heritage, beacon and guide for the journey to a better tomorrow, is discussed after that.

Next, the external design of a working prototype of an American national indicator system is presented, in support of the practice of representative democracy, specifically, an informed American people, influencing the tone and conduct of civil discourse, building trust in the partnership of government, and the opportunity to assess the progress of our nation, states, and effort situations. The future a representative democracy is working toward, the current state of the entity represented by measure-based models or profiles of best understanding, that the entity is investing and working in to improve, and the difference between the states of the measures representing the quality, choice situations of interest to a government, measured before and after a period of investment and work to improve, is depicted as the instrumental and highly underdeveloped message of the informed voting and governing transformations of the hoped for, improvement process of the partnership of representative government. 'The STEEP Course' information system is presented as a candidate to contribute to this message space. Finally, an information system like 'The STEEP Course', an American indicator system, is discussed as an opportunity and its potential usefulness, benefits, and primary challenges are considered.

Key Words And Phrases : America, partnership, representative democracy, e-government, national indicator system, future/state/difference message, common basis of fact, informed people, civil discourse, building trust in government, assessing the progress of out nation, learning, results/outcomes, hoped for improvement, a better tommorrow

Acknowledgement: The specification for the design of 'The STEEP Course' information system was guided by the Kentucky result/outcome measure pattern and references sited in this paper.

Table of Contents

Different Purpose 4

Brief History of American Expectation 4

Continual, Hoped For, Improvement Cycle of Results 8

A Conversation 11

Heritage of Measurement 16

The STEEP Presentation 19

- Effort Situation 23
- Measure 29
- Measure Breakouts 31
- State 35
- National/Regional 40

Content Development 46

- Initial Application Entry 48
- Measure 50
- Effort Situation 58
- Manage 61
- Communicate With 63
- Optional Visualizations 65
- Customization 74

An Opportunity 77

References 85

Appendix 88

Different Purpose

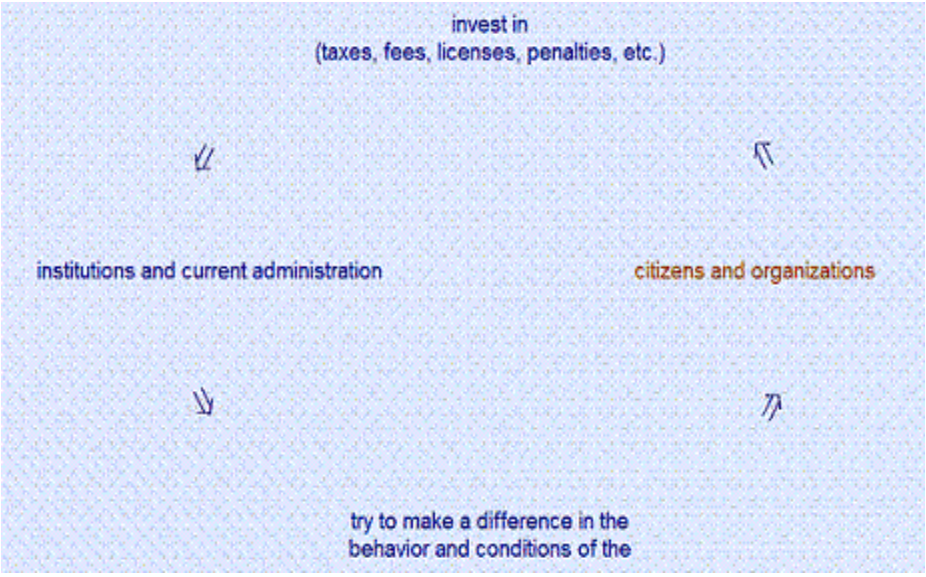
Hayek (1989:37), discussing the extended order of the price system and the framework of government, suggested that some of the rules of conduct that support the formation of extensive spontaneous orders may facilitate deliberate organizations. Representative democracy is an important case of a deliberate organization. He went on to explain that although representative democracy emerged from the spontaneous order of prices, is founded on the moral traditions of this order, will adapt to this structure of activities, and may be expected to increase in size relative to the growth of the market order, self-interest is the motive for participation in the price system Hayek (1989:71). The purpose and obligation of a representative democracy is different, yet very complimentary.

Representative democracy is a partnership between the citizens and organizations, and institutions and current administration of the government. Current behaviors and conditions are the legacy of partnerships past. The citizens and organizations of a representative democracy invest in government. The offices of government use this investment to try to improve the behavior of the partners and conditions of the governed jurisdiction.

Brief History of American Expectation

The partnership of representative government is a fundamental reciprocity between the people and organizations, and institutions and current administration (Figure 1). An important part of this relation is that the people and organizations agree, through elected representation, to taxation and the levy of fees and licenses. This agreement sanctions the offices of government to attempt to understand, protect, maintain, change, and generally try to improve the behaviors and conditions of the partners within the bounds of propriety and jurisdiction of the government, with the expectation of making a difference. This reciprocity between the partners of government in our representative democracy has evolved throughout American history with increasing levels of commitment required on the part of citizens and organizations, and expectations demanded of institutions and the current administration.

Figure 1: Partnership of a Representative Democracy



The Mayflower Compact of 1620 (Eliot, 1910:59), concerning the first colony in Northern Virginia, contained a commitment to

> '. . . combine ourselves together into a civil body politick, for our better ordering and furtherance of the ends aforesaid; and by virtue hereof to enact, constitute, and frame such just and equal laws, ordinances, acts, constitutions, and offices from time to time, as shall be thought most meete and convenient for the general good'.

This statement includes the intent to form a government, a faith in the possibility of improvement, a sketch of a process of the union, and an initial statement of the difference to be made – the purpose of the civil body. The instrumental portion of the meaning of this agreement to 'combine ourselves together' was further defined as the third right of the Declaration of Rights written in 1765 (Eliot, 1910:147) by representatives of the original nine colonies. It stated 'that it is inseparably essential to the freedom of the people that no taxes be imposed on them but with their own consent, given personally, or by their representatives'. This agreement to be taxed with consent finances government by facilitating the formation of pools of capital for use by

the offices of American democracy. This tribute is augmented substantially today by government investments, fiat capital financial instruments, and federal contributions to state and local levels of government, but taxes are still the primary source of revenue (Tax Policy Center, 2019). Revenue sources, budgets, and expenditures at all levels of American government are well documented and available to the public.

The Declaration of Independence of 1776 (Eliot, 1910:157) expanded the earlier statement of the difference of 'our better ordering and . . . the general good'. The reason for government were self-evident truths

> 'that all people are created equal, . . . endowed by their Creator with certain inalienable Rights, that among these are Life, Liberty, and the pursuit of Happiness. That to secure these rights, governments are instituted among people, deriving their just powers from the consent of the governed, …, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness'.

Government again was seen as a progressive process of hope 'to secure these (inalienable) rights' of people and 'effect their safety and happiness'. Adam Smith, writing on the wealth of nations in 1776, devoted Book V (Smith, 1911) to the expenses of the Commonwealth, sources of public revenue, and public debt. These expenses included defense, justice, public works such as roads, bridges, and navigable canals, protection of the routes and centers of commerce, and youth and continuing adult education. In the preamble of the Constitution of the United States (Eliot, 1910:180), adopted in 1789, was stated that the reasons for enactment of the constitution were

> 'to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common Defense, promote the general Welfare, and secure the blessings for ourselves and our Posterity'.

A belief in the possibility of incremental improvement again was the expectation of the efforts of government. Within 170 years of establishment of the first colony, the initial statement of purpose for the union for 'our better ordering and . . . the general good' had developed to include life, a common defense, liberty for ourselves and our children, the pursuit of happiness, establishment of justice, public works, domestic tranquility, safety, youth and adult education, and promotion of the general welfare, and the partnership of representative government was typically represented as a process for improvement in these ways.

In 1863, Lincoln, in his Gettysburg Address (Eliot, 1910:415), stated this reciprocity simply as he hoped for the survival of the union and spoke of the 'birth of freedom and that government of the people, by the people, for the people'. This statement about a government of, by, and for the people includes: the support, sanction, and behavior of citizens and organizations including the selection of representation through informed voting; the behavior and effort of government working to make a difference in the conditions and behaviors of government partners; and the hope for improvement, purpose, expectation, and results of the efforts of the partnership of American representative democracy.

These trends of increasing expectation and obligation have accelerated into the modern era. Today, federal, state, and local levels of American government are massive organizations with combined, annual expenditures in excess of 13 trillion dollars (Chantrill, 2023) and efforts affecting many aspects of life. The citizens and organizations of a representative democracy invest in the offices of government. The offices of government use this investment to try to improve the state of situations by making a difference in the behavior of the partners and conditions of the governed jurisdiction. Even though there is an amazing amount of dynamic, internal structure in government, the primary concern and expectation of citizens and organizations is the state of effort situations and the difference being made in those situations. But there is no rich, easily accessible, future/state/difference message. This message represents the results of generations of work by

the partnership of a representative democracy, is the basis for considering the effectiveness of and making adjustments to governing efforts, and is seminal to the activities of planning, management, monitoring, evaluation, informed voting, and civic discourse. The investment part of this reciprocity is public record, but the state of the situations the partnership is investing and working in to improve and the difference government is making in those situations is a highly under-developed message and opportunity.

The continual, hoped for, improvement cycle of representative democracy, integrated through repetitive measurement, and the role of the partnership of government as difference maker are now examined.

Continual, Hoped For, Improvement Cycle of Results

Galbraith (1996:51) suggested that 'there are 3 broad categories of public expenditure: those which serve no current or visible future purpose, those which protect and enhance the current economic or other social conditions, and those which bring or allow an increase in future income, production, and general well-being'. It is these categories of efforts to improve that the future/state/difference message represents.

Issues emerge and are discussed, researched, and debated. Significant problem situations result in legislation that enables funding that becomes part of these categories of the business of government. Sources of information available to citizens on the results of this investment, the state of a representative democracy, and the difference the partnership is making, are the filter of political biases, the influence of family, friends, and others, presented accomplishments of the administration, media avenues including rigorous and important academic, legislative and other governmental and private work, investigative research, analysis, and reporting, existing and emerging specialized and more comprehensive indicator systems and factual presentations, advertisement, and a variety of fake, fragmented, divisive, mis-, dis-, and mal-information.

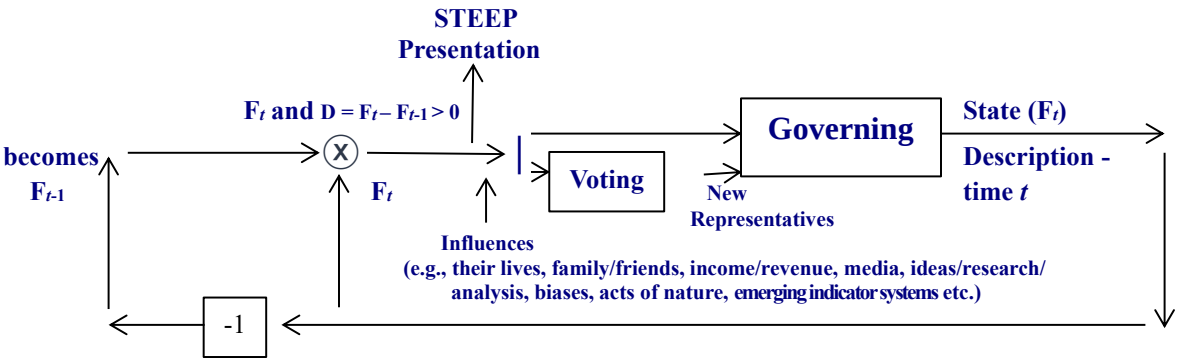
Consider government as a 'grey box' transformation in a process of continual improvement - a period of action followed by a moment of

reflection. The partnership of government is the difference maker. The lives and behavior of citizens, commerce and activity of organizations, action and manner of institutions, performance and conduct of the judicial, executive, and legislative branches of the current administration, and the property and resources of the jurisdiction are the content of the governing transformation. After a period of action by the partnership applying its pools of capital and other substantial resources to attempt to improve, results of this transformation are sampled on some periodic basis as measurements of situations of choice government has an interest in improving. Each measure of these results of governing is then compared to the state of the corresponding measure at the beginning of the period of action. The *meaning* of this comparison represents the difference the partnership made during the action period in the situations represented by the measures.

Repetitive measurement is the essential event that organizes representative government as a continual, hoped for, improvement process, and is the most reliable way of knowing if improvement has occurred and the foundation of the future/state/difference message. In addition, measurement is the basis for discriminating between (and within) qualities (Nagel, 1952), is very expensive, and represents what has survived the discussion, research, debate, selection, and adjustments of generations of a government. The continual, hoped for, improvement process of representative democracy is depicted in the comparator diagram of Figure 2. Inputs/outputs are on lines, transformations are in boxes, and the ⓧ symbol represents a comparison. The partnership of government, at all levels of organization, is interested in improving many situations of choice. This process pursues these interests in a cycle of a period of action followed by a moment of reflection. The process is described following.

The governing transformation, G[], is the action of the partnership of the current political administration, institutions, organizations, and people of the governed entity seeking desired situational outcomes. The results/outcomes of this transformation (F_t) describe the state of the governed entity at time *t* and are represented by the result/outcome measures of quality, choice situations of interest to the government.

Figure 2: Governing Cycle of Continual, Hoped For, Improvement



Let $F_t = G[\ D, NR, I\ ]$

= governing results/outcomes at time *t* - state description of a footprint (F) of choice situation measures

Where G = governing transformation by the partnership of a government

$D = F_t - F_{t-1} > 0$

= difference between governing results/outcomes at time *t* and *t*-1 with the intention of continual improvement

$NR = V[\ D, I\ ]$

= newly elected representatives

V = informed voting transformation

I = other influences (e.g., family/friends, income/revenue, media, ideas, biases, acts of nature, etc.)

This state of the governed entity at time *t,* represented by a comprehensive footprint of measures of Socio-cultural, Technological, Economic, Environmental, and Political (STEEP) situations of choice the governed entity is trying to improve, is then compared (ⓧ) to the state of the entity at time *t - l.* The results/outcomes of the actions of partnerships past, current behaviors of the people and conditions of the jurisdiction, are the legacy of the current partnership. This difference (D) is an essential part of the content of the moment of reflection. The future/state/difference is the substantive basis for the adjustment of plans and actions of the governing partnership and informed voting, and a measure of contemporary progress of the entity governed and the effectiveness of the partnership.

This moment of reflection occurs periodically throughout American government on a more or less formal basis. A manager may simply sit down with key employees and discuss the outcomes of their work, or a formal presentation on a specific date to a select audience may be required by the legislation that enabled the funding that supports an action. Although some parts of the future/state/difference message are better developed than others, these moments of reflection are distributed in the time and space of a very substantial process of governing behavior and gathering a representative semblance of the outcomes of the governing process is a challenge in form and effort.

The voting transformation, V[], is the means by which a representative democracy selects elected political leadership. This selection process adjusts the composition and variety of political representation and intention. New representatives (NR) become participants in and effect the governing transformation, completing the cycle of hoped for improvement.

A Conversation

Spanning the last four centuries, a conversation has developed in America, and many other places throughout the world, about the need for better information, what that means, and the importance of informing the nation as an essential component of a healthy democracy (GAO, 2004:1). There has been a long history of successes and failures in attempts to create ever more advanced ways to inform our public dialogues and

generate a context for civic choices and representative democratic governance (GAO, 2004:1).

A first marker of this American awareness, taken prior to the Constitution's ratification, was the early 17th century census taken in Virginia, counting people in almost all of the British colonies that became the United States (Wikipedia, 2023). In 1790, the first official census, primarily about the population and the economy, took place, required by Article 1, Section 2 of the Constitution, which states that an actual enumeration of the population must take place every ten years (Council on Foreign Relations, 2021).

The content of the decennial census changed as the country grew. In 1810, the first inquiry into manufactures, quantity and value of products occurred; in 1840, inquiries on fisheries were added; and in 1850, the census included inquiries on social issues, such as taxation, churches, pauperism, and crime (Wikipedia, 2023). Lincoln began to frame the narrative of this conversation with his House Divided speech in 1858 (Abraham Lincoln Online, 2018). He said 'If we could first know where we are, and whither we are tending, we could better judge what to do, and how to do it' (GAO, 2004:175 and Hoenig, 2011:1).

In 1913, the U.S. Department of Labor published 'The Handbook of Federal Statistics of Children'. The handbook attempted to bring together information on the welfare of children in an early effort to develop indicators for consistent monitoring of children and their health (GAO, 2003:22).

National Income (1930s) and Product (1940s) Accounts were initially formulated by the U.S Commerce Department (USCD) to account for the millions of economic transactions that occurred in the nation each day in the flow of commodities and services during World War II and are used to produce indicators today like Personal Income and Gross National Product (GAO, 2003:22). Business Cycle Indicators, created in the 1930s by the National Bureau of Economic Research in the Commerce Department, included indicators such as

stock prices, employment, and change in consumer prices for services (GAO, 2003:22). The Employment Act of 1946 committed the federal government to the goals of full employment and economic stability, and created the Council of Economic Advisors that, in 1947, released the first Economic Report to the President (GAO, 2003:22).

The War on Poverty legislation enacted during the 1960s significantly expanded the program planning and evaluation activities conducted by federal agencies (Koshel, 1997:2). The major legislative initiatives included the Economic Opportunity and Food Stamp Acts of 1964 and the Elementary and Secondary Education and Social Security Acts of 1965. These legislative initiatives resulted in funding, better understanding, and programs focused on helping preschool children from low-income families and disadvantaged and at-risk youth, addressing food insecurity in America, improving teacher development, educational resources, and parental involvement in K1-12 education, and providing a health care, safety net for the poor and seniors. In 1967, the Full Opportunity and Social Accounting Act was introduced and never passed, but helped focus a national dialogue on social indicators. In 1969, the Department of Health, Education and Welfare published a report on social indicators called *Toward a Social Report* seeking 'ways to improve the nation's ability to chart its social progress' (GAO, 2003:22).

In the seventies, the environment and environmental protection were in the spotlight. Significant environmental legislation passed including the National Environmental Policy (NEPA) and the Clean Air Act in 1970, the same year the Environmental Protection Agency was created, the Endangered Species Act of 1973, and the Clean Water Act of 1977 (GAO, 2003:22). These acts required federal agencies to assess environmental impacts of major federal actions and the Council on Environmental Quality to annually report to the president on the state of the environment, set air and water quality standards, and to identify and protect critically endangered species and habitat. In addition, in 1973 the federal statistical agencies published a report on social indicators, and subsequent reports on social indicators were published in 1976 and

1980 (GAO, 2003:22). The Comprehensive Employment and Training Act (Wikipedia, 2024) was also passed in 1973, consolidating federal employment and training programs and placing more responsibility on states. The intent was to impart a marketable skill that would allow participants to move to an unsubsidized job. Nine years later, CETA was replaced by the Job Training Partnership Act. The Office of Technology Assessment became operational in 1974, created to assess scientific and technological challenges and issues facing America, and was defunded in 1995.

The 1980s witnessed strong public sentiment for lower taxes and smaller increases in the growth of budgets at all levels of government, a sentiment that has continued into the 1990s (Koshel, 1997:5) and beyond. The devolution and reinvention movements of the decade of the nineties shifted program/project authority from higher levels of government to levels closer to the problems purportedly being addressed and public sector management from a focus on inputs, process, and outputs, or what organizations and programs do, to a focus on outcomes, or what organizations and programs accomplish (Koshel, 1997:iii). The combination of tightening budgets, devolving authority and the focus on outputs, and the cost of rigorous program/project evaluation heightened interest in indicators for program/project planning, management and monitoring, and evaluation. The Government Performance and Results Act of 1993 required virtually all federal agencies to develop performance indicators as part of their responsibilities (Koshel, 1997:25). Performance indicators can consist of administrative, capacity, process, and/or outcome indicators, and are designed to reveal the amount of progress made by a given organization in realizing agreed-upon objectives within a specific time period (Koshel, 1997:7). In 1994, seven agencies joined together to create the Federal Interagency Forum on Child and Family Statistics to develop priorities for collecting enhanced data on children and youth, improve the reporting and dissemination of information on the status of children to the policy community and the general public, and produce more complete data on children at the state and local levels (GAO, 2003:27).

These markers in this long conversation about better information and the improvement of or country, and many others, have resulted today in the existence of a variety of comprehensive and topical indicator systems across all levels of government and those supported by private sources or a combination of public and private funding. Koshel (1997:17-22) reviewed 3 example indicator systems at the national, state, and local levels including the Department of Health and Human Services Healthy People 2000 initiative, the Oregon Indicator System developed by the Oregon Progress Board, and Clackamas County Oregon Benchmarks prepared by the Clackamas County Commission on Children and Families. The US Government Accounting Office has compiled a substantial bibliography of select comprehensive and specialized indicator systems (GAO, 2003:Appendix III) and a list of websites on indicator systems (GAO, 2003:Appendix IV). The GAO, in cooperation with the National Academy of Sciences, convened a forum in 2003 to discuss whether and how to create a key national indicator system for the U.S. with efforts continuing over the next several years under leadership of the National Academy (Steinhardt, 2016:9). In 2004, the GAO reviewed 5 topical indicator systems (GAO, 2004:Appendix I) and 29 more comprehensive indicator systems (GAO, 2004:Appendix III). These indicator systems showed evidence of common types of positive effects, such as improved decision making, enhanced collaboration on issues, and increasing the availability of knowledge (GAO, 2004:131) and represented a logical next step in the evolution from indicator systems for enterprises to performance measurement systems for governmental institutions to indicator systems for entire jurisdictions (GAO, 2004:145).

In 2007, the International Organization of Supreme Audit Institutions (INTOSAI) agreed that a national indicator system could be an important tool to align government programs and policies with results that citizens care about (Steinhardt, 2016:18). In that same year, The State of the USA, an independent non-profit organization, was created with the mission of helping all Americans assess the nation's progress for themselves, at all levels, with the best quality measures and data on the most important issues facing the country (The State Of The USA,

2022:Mission). A national indicator system will not replace state, effort situation databases, the variety of topical and comprehensive indicator systems, the many federal sources of statistical information, or academic, legislative and other governmental, investigative research/analysis and reporting, and other information resources, like the Wikipedia. These information resources will be a very important part of the foundation of a national indicator system. A key national indicator system will seek to address relevant issues, but not set goals. It will assemble information, not collect it. It will display and explain data, but avoid interpreting the information. It will not have any political agenda or commercial interest. It will identify gaps in knowledge. And it will concentrate on presenting quantitative information, with enough qualitative explanation and context to make the data easy to use and understand. (after The State Of The USA, 2022:Mission and Hoenig, 2011:Limits, Openness, Checks and Balances) In March 2010, the Patient Protection and Affordable Care Act of 2010 (p. 111-148) included a provision mandating the National Academy to establish a U.S. key national indicator system through its own institutional capability or in partnership with an independent, private, nonprofit organization, and creation of a bipartisan Commission on Key National Indicators composed of eight members, appointed by congressional leadership, to provide oversight, among other responsibilities (Steinhardt, 2016:12).

Heritage of Measurement

The wellspring of the American dream is the belief that a better tomorrow is possible, and it came to be widely held that measurement was necessary to improve. Over generations, participants in the American partnership have identified factors in situations of partnership investment and work to improve that were deemed important enough to measure. Walker (2004:5, 2005:12, and 2008:24) said how a nation keeps score, matters, that facing facts is essential. America has been keeping score. Today, in the digital age, there is an amazing mosaic of virtual **n**etworks of procedures that map events into data and data into measures, resulting in the creation of what are or are approaching whole situation, 'profiles of best understanding' in **e**ffort situations of partnership investment and work to improve, in every American state.

To illustrate this development, Koshal (1997:4) sites a RAND paper stating that 'Until the mid-1960s, Federal oversight of American education consisted of little more than collecting data on enrollments and the number of diplomas and degrees awarded annually'. Consider the Kentucky (American state) K 1-12 measure pattern of Figure 3. This pattern is only an example, composed of Kentucky measures, of what must exist in the Kentucky measure landscape. The real profile would be composed by the state K 1-12 expert layer and certainly be more representative. For example, notice that the special needs segment of K 1-12 in Kentucky is not very well represented in Figure 3. The Kentucky K 1-12 education system has 171 school districts, 280 superintendents, more than 42,000 teachers, greater than 55,000 supporting staff, over 630,000 students, and 1477 public schools (Kentucky Department of Education, 2022). The mapping of the events (behaviors and conditions) of the measures from the Kentucky K 1-12 education system into a measure pattern, like Figure 3, is an important achievement. Reconsider Mr. Lincoln's statement, with an addition, in relation to the measure pattern of Figure 3. If we could first know where we want to go, where we are, and whither we are tending, we could better judge what to do, and how to do it (Walker, 2004:5-6 and Gurria, 2008:21).

Note that the measures of this example profile all have recognized, agreed upon, preferred behavioral (increase, decrease, or seek a goal) outcomes. The set of preferred behaviors of the measures of a whole situation, profile of best understanding representing an effort situation, like health or K 1-12 education, is a measure based forecast of the future that the effort is working toward. It is *where the effort wants to go* and how the effort situation should behave, or the behavioral policy of the situation. The meaning of the set of preferred behaviors of the measure profile are the ways an effort in a situation to improve is trying to improve.

Consider the state (s) and change in state (c) of the measure data line of each measure of Figure 3. The state and change in state are two meta-measures computed for each measure using the rate data of the measure

Figure 3: Kentucky Education - K1 to 12

Effort / Ideal: *Every Person Shall Receive A Safe, Quality High School Or Equivalent Education, Graduate In At Least Fair Physical Condition, And Make An Acceptable Transition After High School* x/x/x

	yr	v	r	s	c	i	d

Equity
- **educational funding equity**
- **eligible children who participate –**
  - **early childhood education/school meals/after school programs**

Facilities
- **percent of facilities with a 4 or 5 rating**
- **class size**
- **equipment adequacy**
- **school supplies availability**
- **learning obstacle equipped**
- **accidents**

Parents
- **parents who read to their children every day (age ≤ 8)**
- **ensure homework is done daily**
- **attend parent/teacher conferences**
- **attends school activities**
- **volunteered for school-related activities/last year**

Teacher Preparation/Conduct
- **teacher hours of continuing education**
- **teachers with specialty certification(s)**
- **teachers with advanced degrees**
- **disciplinary actions**

Academics
- **KIRIS / CATS (all level averages distinguished)**
- **SAT / ACT**

Student Conduct
- **attendance**
- **student substance abuse**
- **student sexual activity**
- **teen mothers**
- **disciplinary actions**
- **suspension/expulsions – substance abuse / violence related**
- **juvenile crime**

Physical Conditioning/Lifestyle
- **BMI**
- **cardio-vascular**
- **muscular**
- **flexibility**

- **with good diet**
- **exercises regularly**
- **don't smoke**
- **don't abuse substances**
- **use seatbelts**

Retention
- **retention - 9th graders completing high school**
- **dropouts**
- **did not complete high school / mothers**
- **less than 9th grade education / mothers**

Transition
- **successful transition after high school**
- **completed high school or higher**

Remediation
- **illiteracy**
- **adult E / L population / enrolled**

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

based on the preferred behavior of the measure, minimum and maximum bounds of the measure, the measure range, and the goal if the preferred behavior is seeking a goal, described by the expert layer of an effort situation of investment and work to improve. The state is a percent indicator of *where the measure is currently* in relation to the best measure case. The change in state is the percent change in the state of a measure or the difference between the current state (time t) of the measure and the previous state (time t-1) of the measure, or *where the measure is tending*. Each effort situation in the STEEP presentation would be represented by a profile of best understanding like the K 1-12 example of Figure 3. Many more examples are included in the Appendix. Notice the weakness of Disabilities and absence of a Bad Habits group in the Health profile.

The STEEP Presentation

'The STEEP Course' information system is an open source, working prototype of an American indicator system. The STEEP Course name is both an acronym and metaphor for the difficulty of continual, hoped for, improvement. The acronym is an abbreviation for Socio-cultural, Technological, Economic, Environmental, and Political ways a partnership of representative government tries to improve. The information system has 9 levels of presentation - national, regional, state, effort situation, measure, and measure breakouts including significant segments/subgroups and a 3 level geographic facility (districts, county, and urban areas in Kentucky). All significant segment/subgroup organizations are supported. The intermediate level (districts in Kentucky) of the geographical facility supports many work organizations (e.g., health, K 1-12 education, transportation, etc.), the 1st base level (county in Kentucky) supports 1 organization, and the 2nd base level (urban areas) supports many organizations. Also, geography is a variable in this information system. The same information system can be used to craft a presentation for a union of nations, a nation (done here), a state, a county, or a city. Districts could be called authorities or counties could be called parishes. And the color scheme of the information system is a variable. For example, each American state could have a unique color scheme. An additional customization feature allows the positioning of 'learn more' links (the question mark in the box on Figure 23, p. 41) in select national, state,

and effort situation, measure, and measure breakout visuals without interfering with software updates. The entire presentation may be enlarged by browser zooming.

The methodology that produced the initial information system design was based on the organization of result/outcome measures (result measure with a clear, agreed upon, preferred behavioral outcome) gathered over a 2 year period via unofficial visits to parts of Kentucky state government. Many measures were certainly missed. The organizational approach consisted of 3 steps of associative consideration and a final structuring step. The initial 'glob' of measures divided into 3 'piles' about individuals, organizations, and the environment in the 1st step. The 2nd step divided each pile into 5 pile 'heaps' referred to as sociocultural, technological, economic, environmental, and political measures. The 3rd step resulted in 29 heap 'chunks' of measures representing factors considered important to improve particular effort situations of investment and work to improve. Names were given to each effort situation chunk like health, education k1-12, and pollution (see Figure 16, p. 35). Each chunk was then structured by dividing the chunk into groups of measures, ordering measures within each group, and ordering groups within the chunk, forming a measure-based model of the effort situation. The ultimate outcome of each effort situation was then articulated. 'Profiles of best understanding', like what emerged from this exercise (Appendix, p. 88), represent effort situations in this information system and would be defined by the expert layer of each effort situation. Some profiles are much better developed than others. The measure-based profiles of best understanding that materialized from the forgoing were then checked by acquiring a listing of the agencies of Kentucky state government from the Finance Cabinet, considering the intent of each agency, and assigning agencies to effort situations on that basis. All agencies associated easily.

The assumptions of this information system are: that all measures entered, direct or indirect, are result/outcome measures, where a result/outcome measure is a result measure with a clear, agreed upon, preferred behavioral outcome; that there is a core of key measures that are common to all states and that those measures will be part of the profile of best understanding of the appropriate effort situation (e.g., K 1-12 measures would be part of the K 1-12 profile of best understanding) in each state and that each core key indicator would have the same definition in all states except for the areas of concern/issues, data reference, and measure contacts; that each state, as a key part of the national indicator system, will craft and manage their expert presentation independently, as they see it, with the exceptions of the skeleton of core key indicators

and a common host, cloud, operating environment of dedicated servers for each state and the nation; that existing, expert human resources in situations of investment and work to improve in each state, could be leveraged to populate the human resource structure that would build and maintain the STEEP presentation as a standard operating procedure, in a peer selected, voluntary, periodically rotating, distributed, independent organization requiring small but important additional work in any role; that there are 4 levels of application oversight including each state content developer, the state effort situation a content developer is working in (e.g., health), the state the application is being implemented in, and the national level, and the spirit of all oversight should be to provide assistance in the development of a more representative presentation in keeping with what a national indicator system should and should not do; that information input overload (Miller, 1978:chapter 4) is a key consideration in developing the presentation of this information system, especially in the use of optional visuals and in the interpretation of quantitative information; and that when a state is ready to integrate into the national presentation, the state will send their URL to the appropriate national contact.

The purpose of the information system is learning and the presentation of outcomes. The information system has been designed and tested for the desktop/laptop device class, 17" or greater monitors, and the HD screen resolutions at this time. The intended audience is anyone who is interested in the state of America and has access to the world-wide web. Content can come from anywhere deemed to be a credible source.

The meaning of a credible source has been expanded by several authors. (Koshel, 1997:7-8) stated that 'Indicators should meet certain scientific standards of validity and reliability before they are used to measure agency performance. Second, important practical considerations must be taken into account, including whether the indicators (a) are concrete and meaningful; (b) are capable of being measured on a regular and timely basis; (c) cover populations and subgroups of interest; and (d) include geographic areas of interest. Third, all indicators used to monitor agency performance should have widespread support among the staff, or compliance with data collection procedures and agency morale may suffer. An operational definition of indicator validity is how well it measures what it is intended to measure in any particular application.

Indicators must also be reliable, yielding the same results on repeated trials, thereby indicating low levels of random error in measurement. Perhaps the most important practical consideration for using a social or performance indicator is whether that indicator is clear and meaningful and understandable to the general public and to elected officials, and that process indicators used to measure performance be as closely tied to outcomes as possible in order to provide some evidence of desirable results'. The GAO (2003:28) observed that if the set of indicators of a national indicator system is to be credible and useful, the information must be both science-based and understandable, and targeted, trusted, and based on specific criteria, and that these criteria might include the significance, objectivity, accuracy, scope, timeliness, accessibility, clarity, efficiency, comparability, and contextual sophistication of a set of indicators. Criteria characteristic of 34 indicator systems reviewed by the GAO (2004:158) included being relevant to target audiences, aligned with the goals or key issues that the system wants to monitor, easily understood and meaningful to a variety of audiences, drawn from reliable sources, easily available from existing sources, not resource intensive to obtain, updated regularly, and comparable across various subgroups and geographic areas.

The information system, indicator selection criteria, guided by the above statements, include:

- being important to an effort situation, validly representative of the event(s) the indicator measures, and widely supported by the expert layer of an effort situation;
- having a clear, agreed upon, preferred behavioral outcome;
- having an established, independent, reliable source of recognized, quality data with a commitment to continue to measure, a documented, reproducible, production process into the information system with accuracy checking, being easily accessible from existing sources and efficient to obtain, being capable of being measured on a regular and timely basis, and, preferably, having available significant segment/subgroup and geographic data; and
- being easy to understand and meaningful to a variety of audiences.

Potential data sources include state effort situation databases, specialized and comprehensive indicator systems found throughout America, and the many federal statistical sources. Many of the considerations of the 3rd criteria above will have already been addressed in state efforts where data is already being harvested for a variety of uses. Small images used primarily as controls like favicons and icons selected by efforts and changeable icons that come with the application should be selected to be most suggestive of what the control leads to. In addition, changeable application icons should be the same across the national and state implementations to reduce user information processing costs.

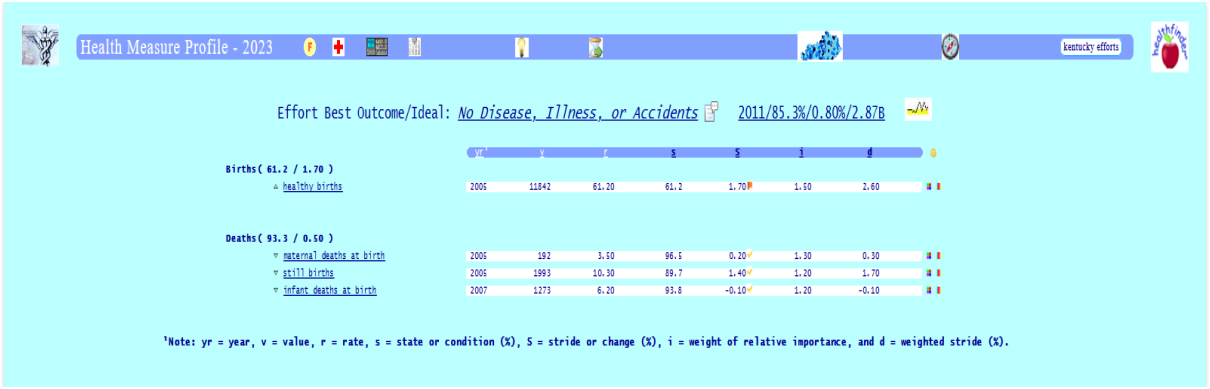
The information system has 2 main parts – the presentation and content development. The application demonstration will focus on the presentation, provide commentary about content development, and call attention to the use of the state and change in state indicators throughout the information system function presented. Although the demonstration looks somewhat realistic, *all content shown is constructed of limited test cases with no real measure data*, selected only to demonstrate function.

The presentation demonstration will begin with the effort situation level. The information system presents efforts in situations of investment and work to improve. One effort situation will be examined and 1 effort situation measure will be considered including the measure console and measure breakouts. The demonstration will then move out through the state level to the national and regional presentations. The optional function presented at all levels are communication tools to be used to enhance the presentation and will be preceded by ‘o-‘. Content development will be presented in the order of the Content Assistant (Figure 24, p. 46).

Effort Situation

The primary user interface (UI) for the presentation of an *effort situation,* like health or K 1-2 education, is shown in Figure 4. Notice the similarities between this UI and Figure 3. From left to right and top to bottom, on the banner line, the icons are links to:

Figure 4: effort situation UI

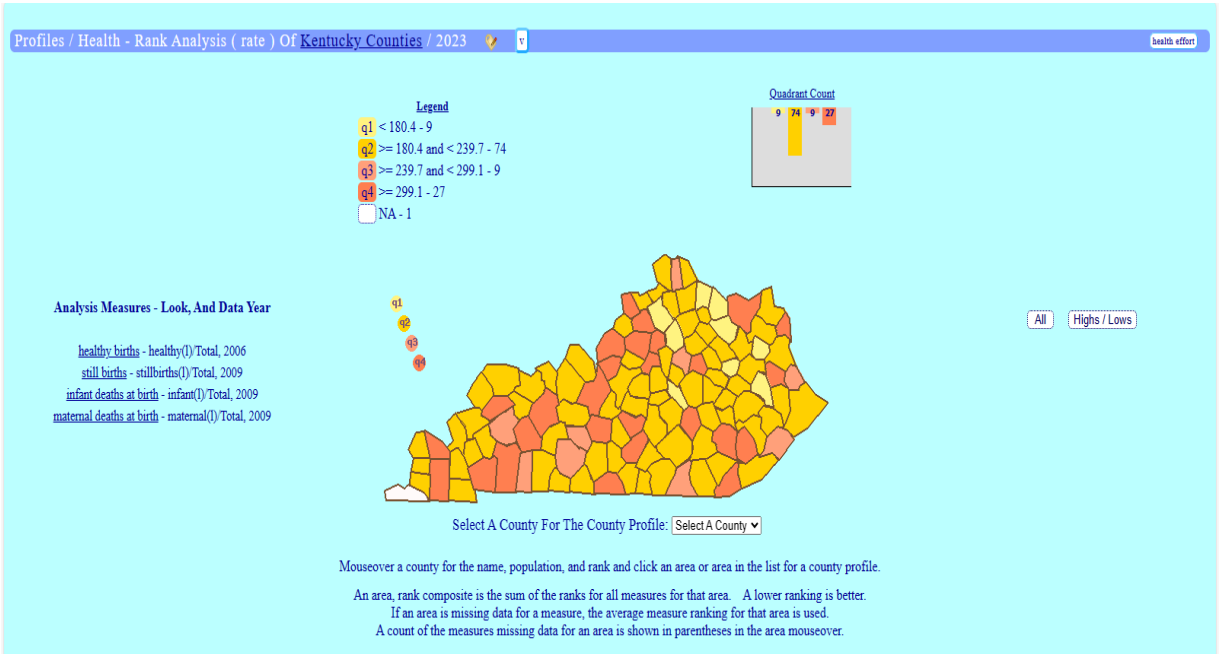


- the seat of the effort (e.g., health/Health Cabinet);
- o-facts about the effort or effort situation;
- effort/situation analysis (6 options are available – simple link, text only, tabbed links, ebook, and 2 'tabs with text and 1 link' styles off screen);
- o-key effort situation indicators, with value/rate/state/change in state (called stride in keeping with the journey metaphor) trends and mean key indicator state and stride, comprised of select measures considered important enough to draw attention to (2 options are available – list of ordered groups of ordered measures and quilt);
- o-timeline (2 options are available – event chronicle and annotated events with state or change in state trends);
- o-significant effort situation ideas;
- o-important effort situation history;
- o-county (for Kentucky) profiles with effort situation scope;
- effort vision, and, skipping past the 'breadcrumb' navigation control to the last icon to the right; and
- o-the effort library or information resource.

Application navigation controls, like the breadcrumb on the banner of Figure 4, should always be used to move through the application, and not the browser Back/Forward controls (upper left browser corner).

As an example of one of the optional features, consider the ‘County Profiles’. The County Profiles function (Figure 5) begins with a rank

Figure 5: Rank Analysis / County profiles



analysis of the most recent year of the rate of the measures selected for the analysis in each county. All database measures are available for the analysis. A link to an explanation of the county organization, a link to a discussion of the rank analysis, and a value rank analysis, are available on the UI banner. Counties are divided into colored quartiles by composite rank. Links to the description of the measures of the rank analysis are provided on the left of the UI body. A county mouseover highlights the county and the tooltip provides the county population, composite rank, rank, and number of missing measures. A mouseover of the 4 diagonally arranged, quartile colored discs highlights the counties in that quartile. The ‘All’ control leads to a bar chart of counties by composite rank and the ‘Highs / Lows’ control presents a colormap of the 10 lowest and 10 highest counties by composite rank in Figure 6, where a lower composite rank is better. A click on a county or county choice from the ‘Select A County’ dropdown (Figure 5) leads to a profile of the rank analysis measures in the county selected (Figure 7).

Figure 6: Low and High Composite / Rank

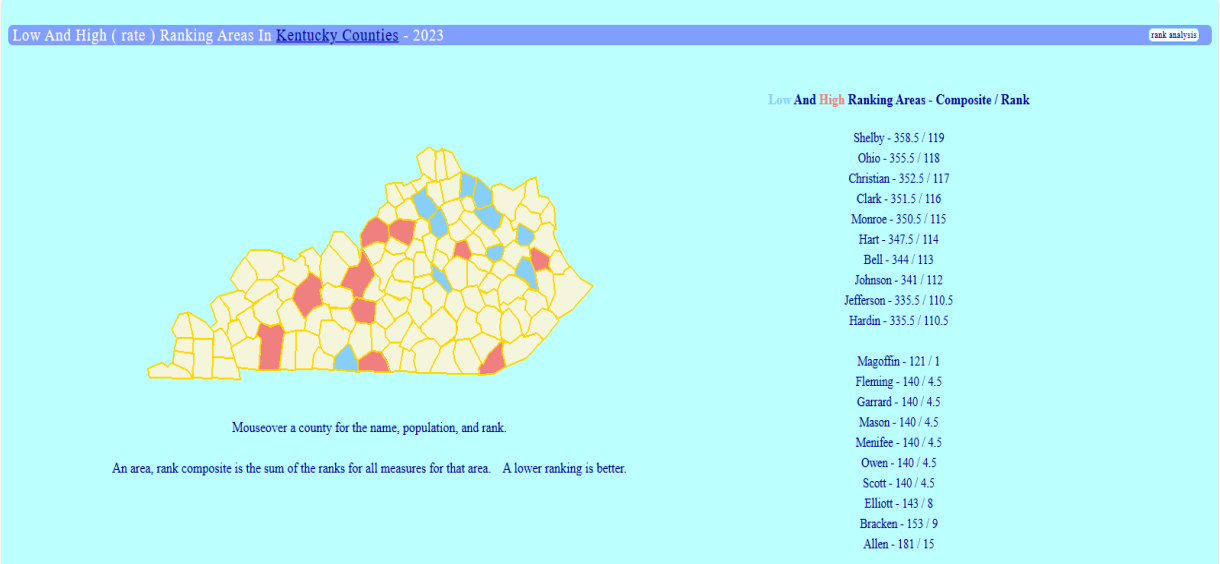
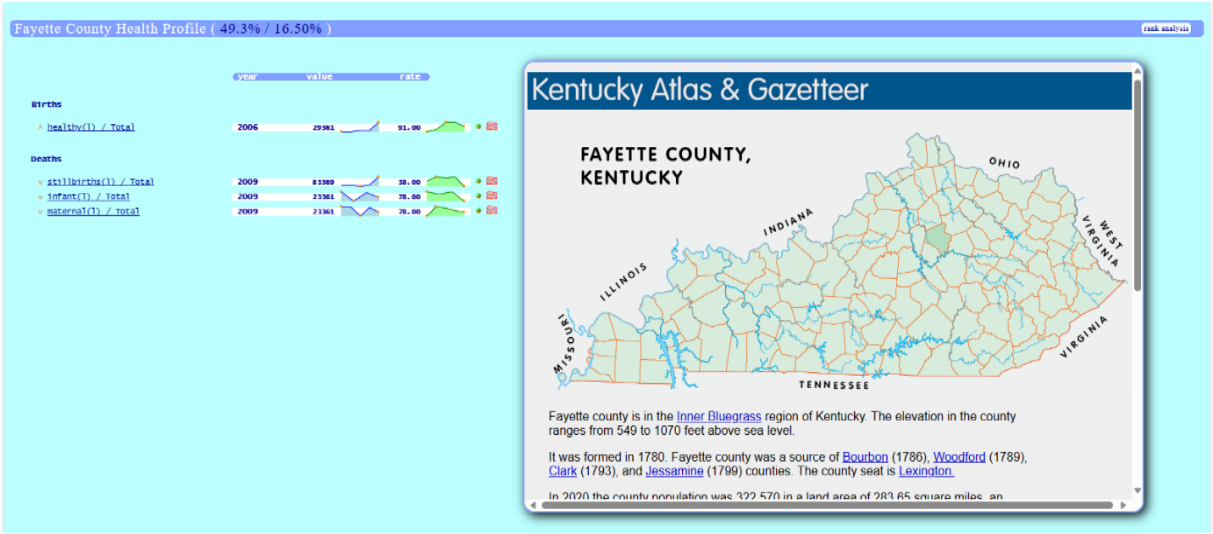


Figure 7: County Profiles of Rank Analysis Measures

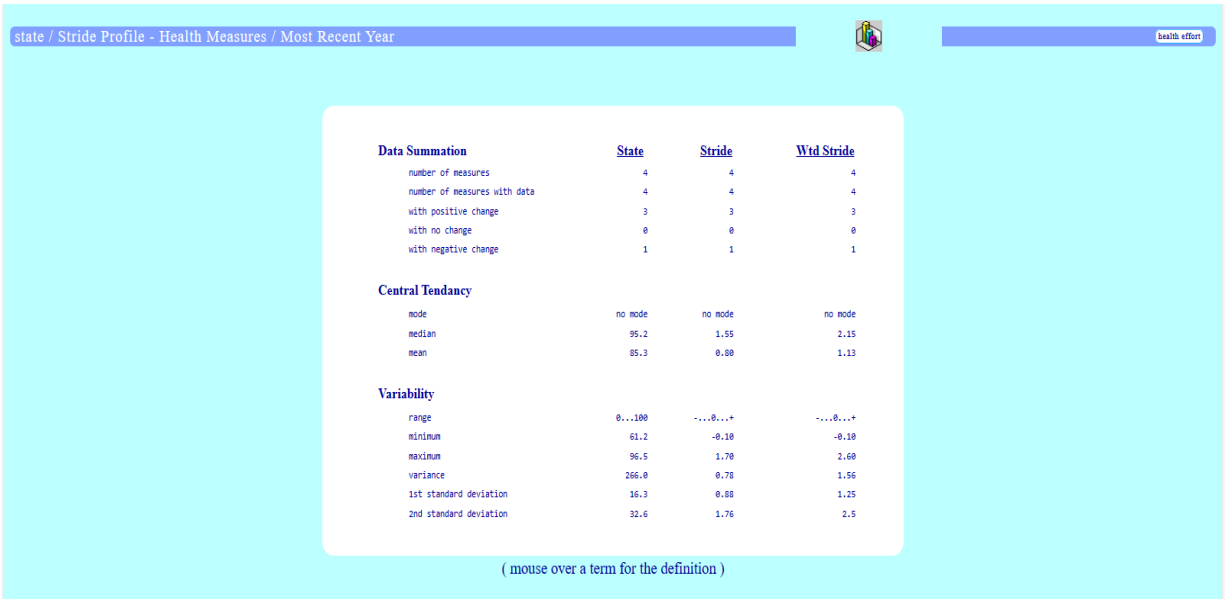


Starting from the left of each profile measure, a link to a description of each profile measure is provided. Small graphs of up to 5 year, county, value and rate trends for the measure are shown next. Links to higher resolution, up to 8 year, v/r trends and v/r trend data are available at the end of each measure line. The higher resolution charts have linear and nonlinear curve fitting, linear correlation, and data reference, and state and stride trends are provided with the rate trend. The right half of Figure 7 is to present the area the profile is about.

The second line of the effort situation UI (Figure 4) contains plan and measure options including:

- an articulation of the ultimate outcome or ideal of the effort situation that may, optionally, be a link to the long-range plan of the effort, a presentation of the ideas of the effort to try to improve the situation;
- an icon control to 5 plan extracts with measure insertion;
- the average profile measure state, change in state, and effort budget/expenditures which is a link to a descriptive summary of the state, stride, and weighted stride of the measures of the effort profile with mouseover term definitions (Figure 8) and a link to mean, effort situation state, change in state, weighted stride, and expenditure trends and an effort analysis; and
- an icon control leading to a facility to produce value, rate, state, stride, or weighted stride graphs of up to 9 profile measures.

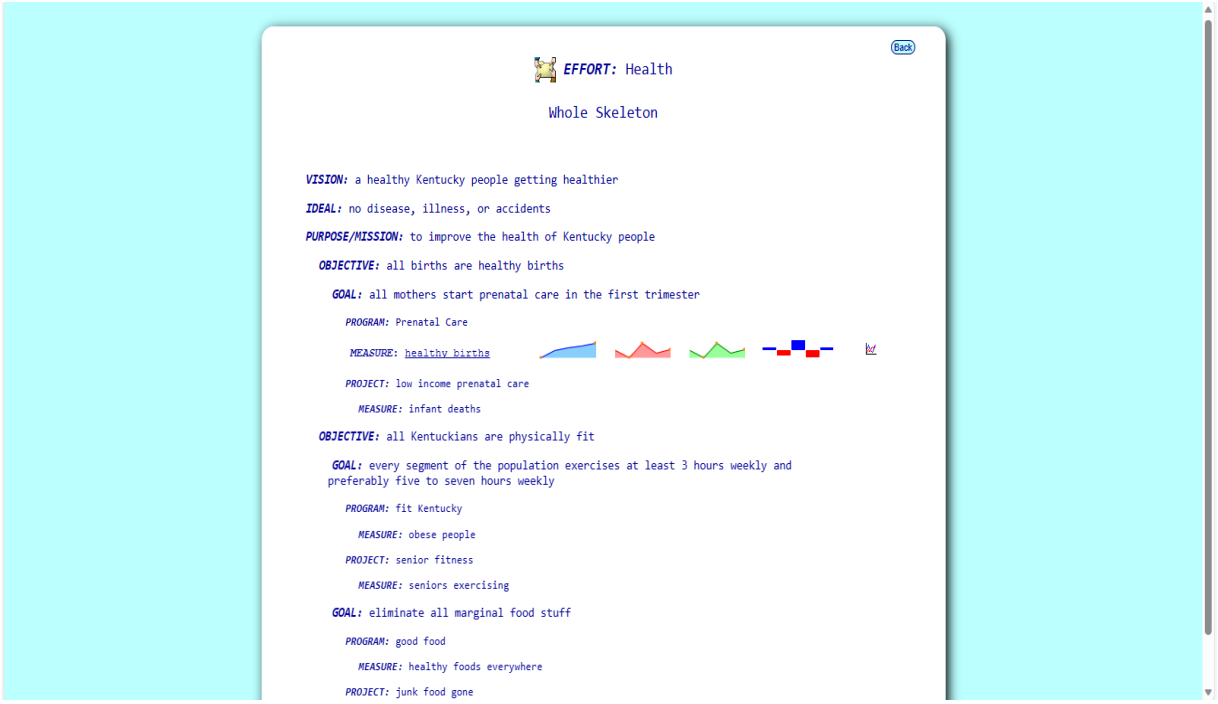
Figure 8: Descriptive Summary of the State, Stride, and Weighted Stride of the Measures of the Effort Profile



The long-range plan is a description of the intended action of the effort. The plan is built using MS Word and a long-range planning tag structure - ideal/ ultimate outcome, objective/long-range outcome, and goal/intermediate-range outcome (after Ackoff and Emery, 1972:chapter 14), converted into HTML using MS Word, reviewed, and uploaded into the information system using the Manage Media choice of the Content Assistant (CA, p. 46), the set of function used to build STEEP content.

The plan can begin with an articulation of the vision, become an outline, and be shredded out as desired. Measure description and trend links can be automatically inserted into the plan, and small, measure value, rate, state, and stride trend graphs with a link to more detailed charts can be inserted into the plan extracts. The plan extracts present the strategic/tactical structure, action initiatives, behavior/ performance measures, the whole plan skeleton, and a tree view of the plan. The whole skeleton extract is shown in Figure 9.

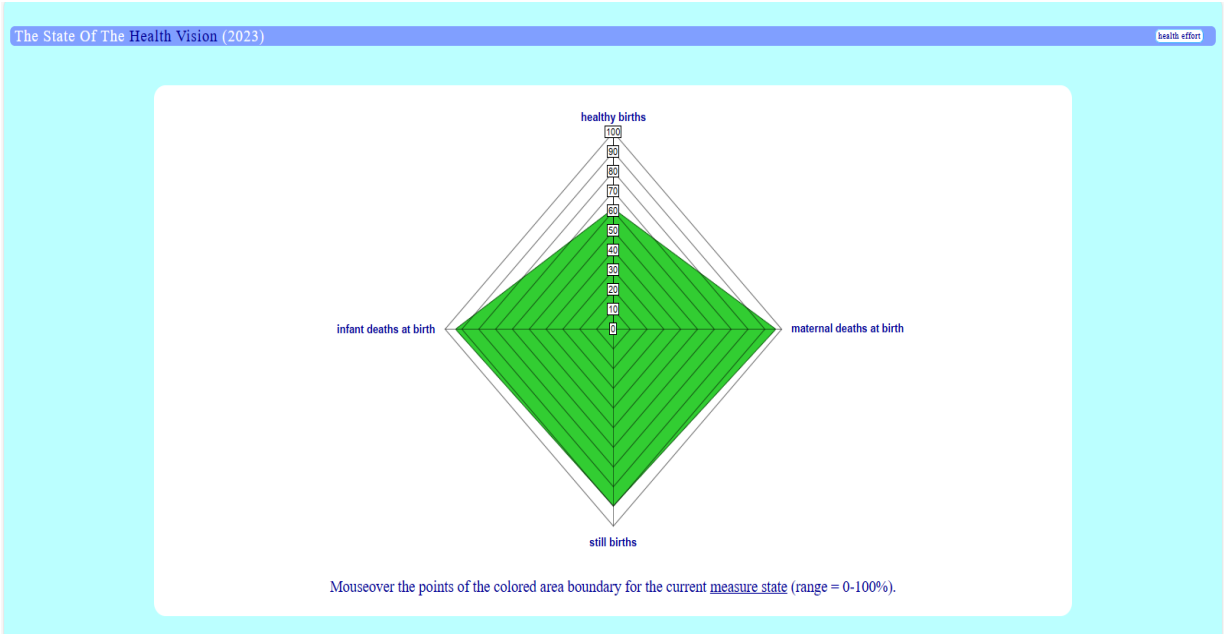
Figure 9: Whole Skeleton Plan Extract



Notice the measure name that is a link to the measure description, small value, rate, state, and change in state, 5 year graphs, and the link to better charts that have been inserted into the skeleton. This can be done by simply entering the measure token after the measure tag when developing the plan, instead of the actual measure name.

The vision of the current state of an effort situation is presented in the polygon of Figure 10. All effort situation profile measures would be shown on this vision visualization. A mouseover of any of the vertices around the green area perimeter shows the state of the measure aligned with that point. As the effort situation approaches its ideal state, the color expands to fill the polygon.

Figure 10: Effort Situation Vision



The operational indicators for assessing the progress of the effort situation toward its ideal state are the average state and change in state of the measures of the effort situation measure profile. The ideal state of the effort situation may be said to be achieved when all of the measures of the effort profile of best understanding are their best case. This is, of course, a highly improbable state, hence the value of the ideal in long-range planning and the continual cycle of investing in, working toward, and hoping for improvement.

The third line of Figure 4 (p. 24), the profile column headers, has 4 links to lists of measures sorted by state, stride, weight of measure importance in the profile, and weighted stride. The 1st, 2nd, and 3rd lists have visuals with measure trend drill downs.

Measure

The fourth line of Figure 4 from the top and left, the 1st measure line and where the *measure* level begins for each profile measure, provides:

- an indicator of the preferred behavioral outcome of the measure;
- a link to the measure description with legend shown to the left on mouseover, with a link to the measure library or information resource;
- value with dimension mouseover;

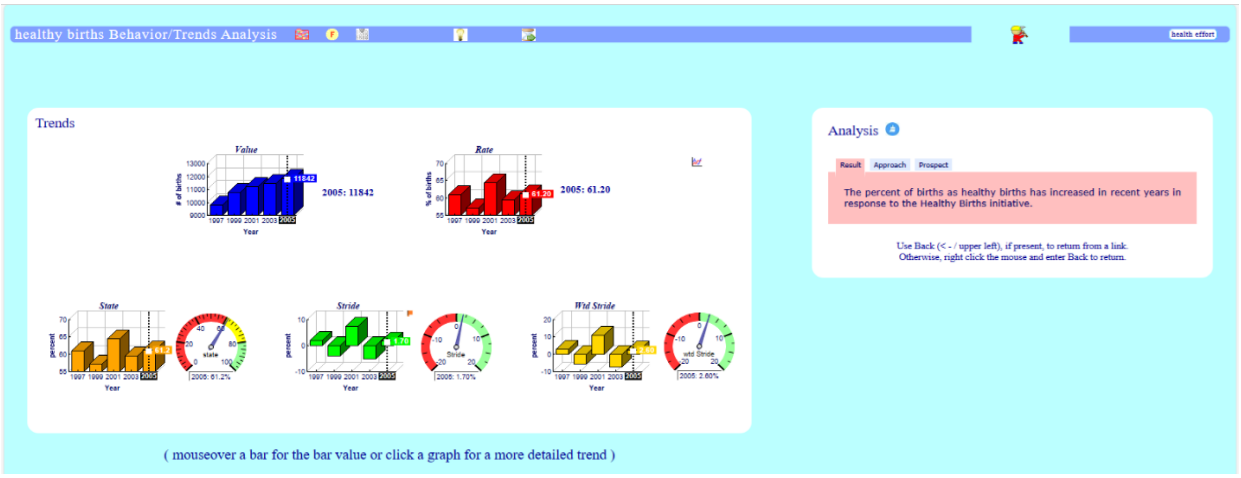
- rate with dimension and comparison rates mouseover;
- state, stride, weight of relative importance, and weighted stride (product of the weight of importance and the change in state); and
- 2 controls at the end of the measure line that lead to the measure console and o-additional measure looks.

The state of a measure and the stride, or change in state, are computed for each measure at data entry or update when any component used in these calculations change. The description of every profile measure includes v/r dimensions, preferred behavior, range (rate), weight of importance in the effort profile (1=no weight), legend (can have an embedded link), relevance (can have an embedded link), issues of concern (4 issues allowed that can be links or a single link to a document on issues), current target (rate) and comparison rates, measure/data responsibility with emails, data reference (can be link), and measure considerations.

The 1st control at the end of each measure line of Figure 4 presents small value, rate, state, and stride, 5 year graphs on mouseover. A click on that control leads to the console UI for the measure (Figure 11). The console presents:

- measure data (banner left icon);
- o-measure facts;
- o-timeline;
- o-significant measure ideas;
- o-important history;
- o-additional measure data looks for the measure (banner gap);
- up to five year value, rate, state, stride, and weighted stride trends with drill down to higher resolution charts with linear and nonlinear curve fitting, linear correlation, and data reference, and current year gauges for the state, stride, and weighted stride (body left);
- o-Learn More link (upper left of body left)
- link to a single graph, up to 8 years, of value, rate, state, and stride trends (upper right of body left); and
- an analysis that can have 8 forms including simple link, text only, tabbed links, ebook, and 2 tabs with text and 1 link styles on (shown/body right) or off screen.

Figure 11: Measure Console



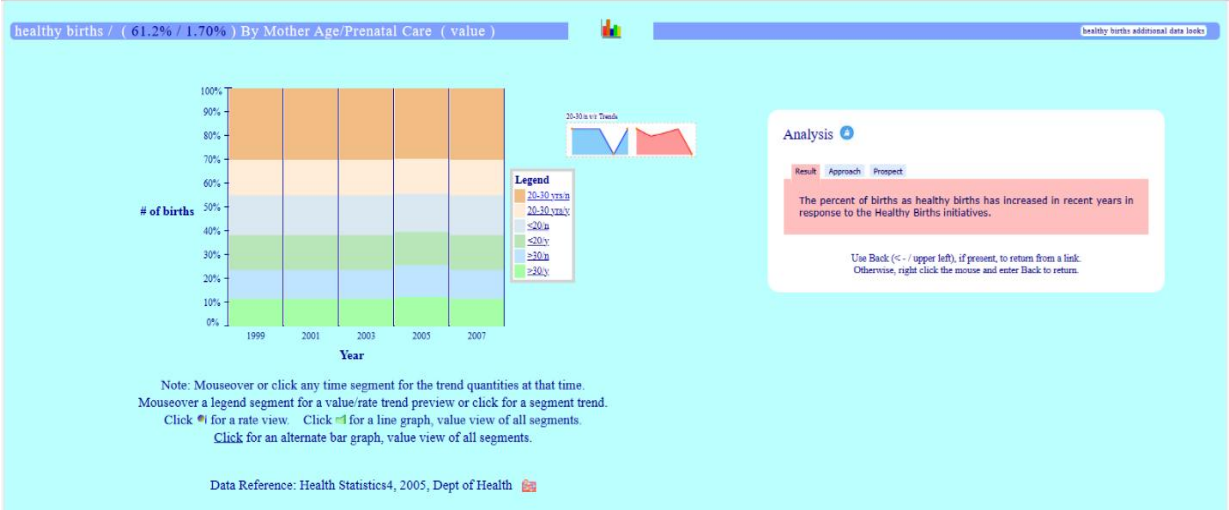
Measure Breakouts

The 2nd control at the end of each measure line of Figure 4 and the gap icon of the banner of Figure 11 lead to 'Additional Data Looks' (*measure breakouts* level) for a measure, if available. The data looks menu can include significant segments/subgroups (state breakout - many organizations supported) or any of 3 geographical levels of visuals. Those levels would be district (level - work organizations/many supported), county (looks - 1 organization), and urban areas (many supported) in Kentucky.

The significant segment/subgroup UI is presented in Figure 12 and provides (left to right and top to bottom):

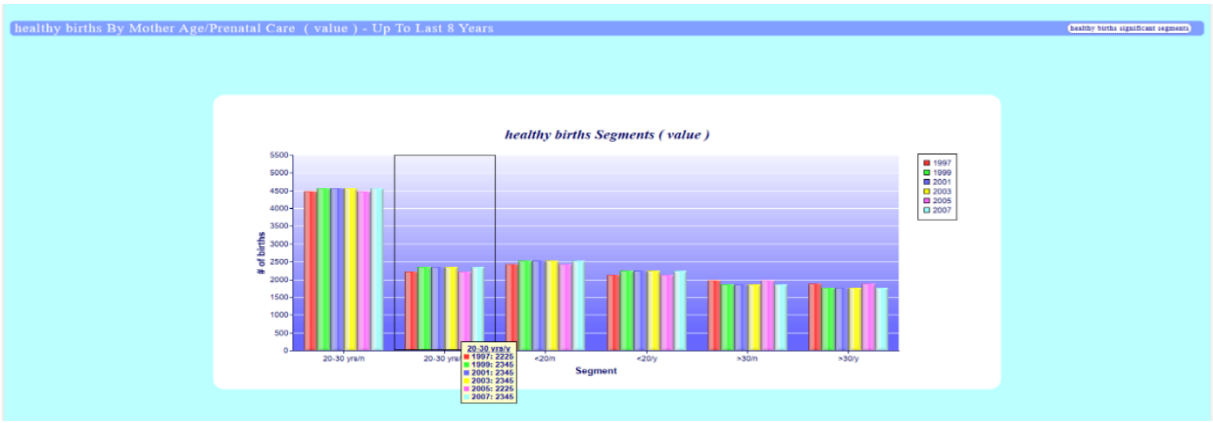
- state and stride of the most recent year of the measure (banner);
- an icon in the banner gap that leads to value (with tree map) or rate horizontal bar charts of the most recent year of all segments;
- significant segment/subgroup, value quantities displayed with a stacked bar chart (shown) and rate quantities shown with a vertical bar graph; mouse over of any area on either chart that highlights the area and produces a tooltip of subgroup quantities and percentages with a pointer to the segment highlighted;

Figure 12: Significant Segments/Subgroups UI



- mouseover of a segment in the legend that produces small graphs of up to 5 year value and rate trends;
- a click on any of the subgroups in the legend leading to higher resolution, up to 8 year value or rate trend graphs with linear and nonlinear curve fitting, linear correlation, and data reference and the rate chart is presented with up to 8 year state and stride trend graphs for the segment;
- 2 other charts available in the note (above) including a single graph of up to 8 year trends of all subgroups that allow a user to isolate segment trends to examine segment trend patterns of interest and the 2nd graph (Figure 13) that allows for the examination of all segment trends as side by side bar charts;

Figure 13: Bar Chart of Each Segment Trend

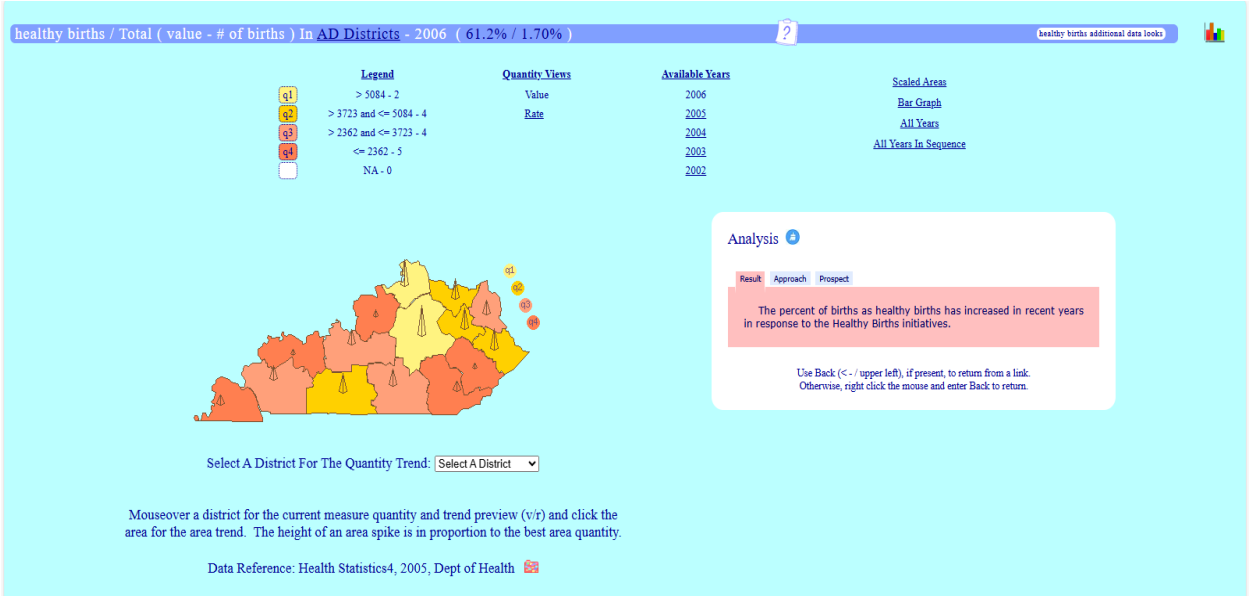


- a link to chart data; and
- an analysis (displayed to the right in the body if on screen as in Figure 12) that can have 8 forms including simple link, text only, tabbed links, ebook, and 2 tabs with text and1link styles on (shown) or off screen.

Examples of two of the 3 geographical levels, district and county for Kentucky, are presented in Figures 14 and 15. All 3 geographical levels, including urban areas, provide similar function. Focusing on Figure 14, the UI presents:

- quantity dimension with rate mouseover showing preferred behavior, comparison values, and target if available (banner);
- an explanation of the district organization (banner);
- state and stride of the measure in the most recent year (banner);

Figure 14: District Colormap

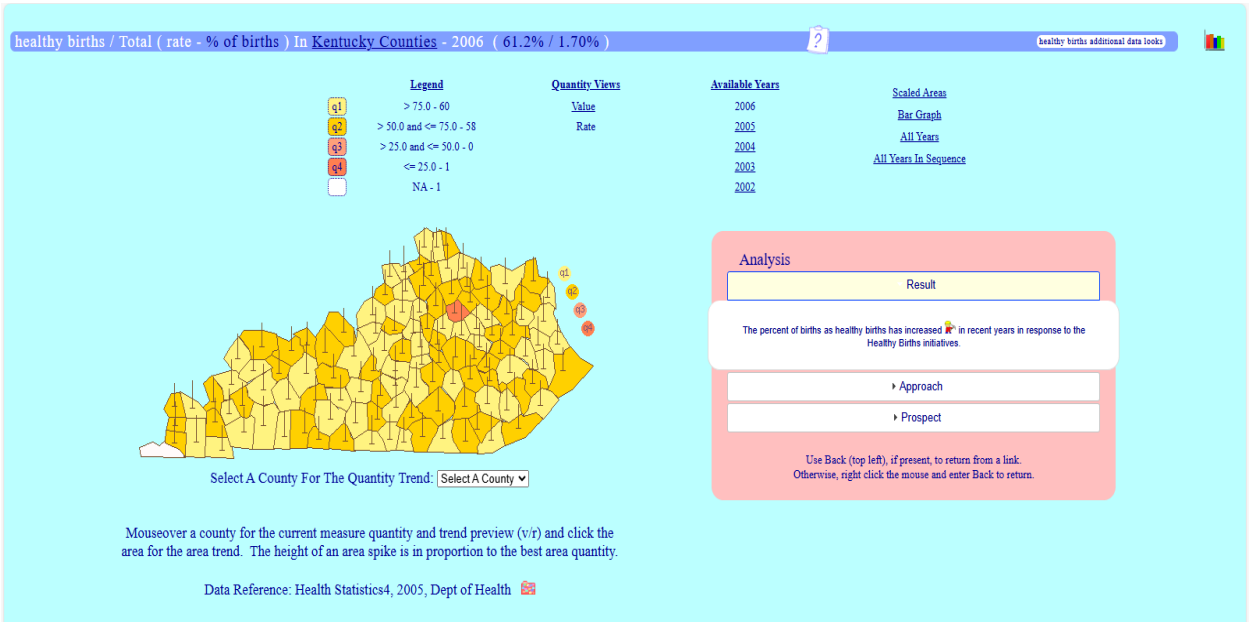


- an icon in the right corner of the banner line that leads to a stacked bar chart and line graph of up to 8 years of quartile trends;
- moving into the UI body, a legend of the colored quartiles;
- value/rate quantity view choices;
- the ability to view the most recent 5 colormaps of the measure quantity shown;
- scaled quartile colormap with quartile area lists;
- value/rate bar chart of the areas;
- up to most recent 5 years of v/r district measure colormaps with up to 5 year,

area measure, trend drill down;

- a sequenced (1st year, next year, etc.) presentation of the last 5 years;
- area mouseover highlights the area, displays the population and area measure quantity (v/r), and produces up to 5 year small v/r graphs (left of colormap);

Figure 15: County Colormap



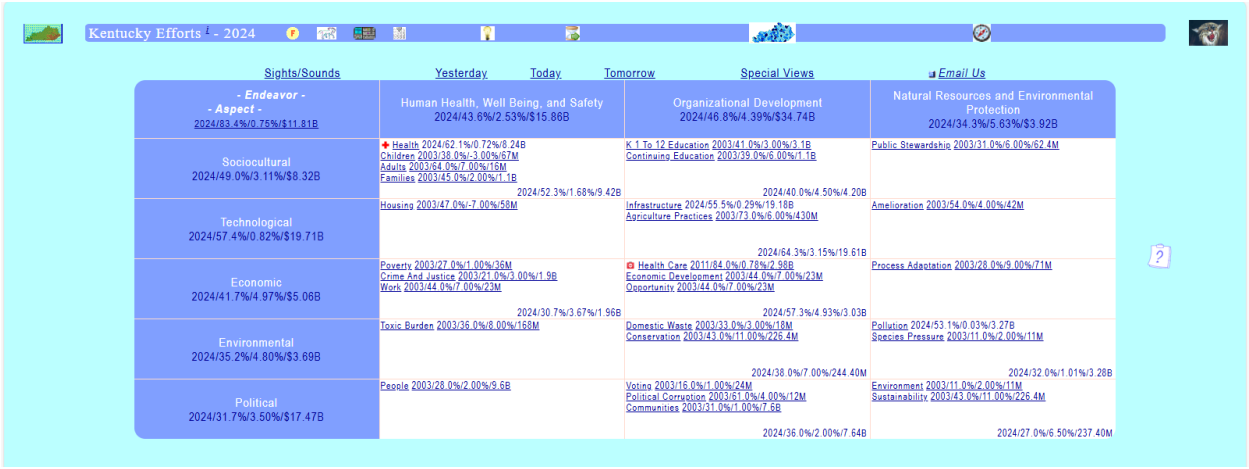
- mouseover of a quartile control (right of colormap) highlights the areas in that quartile;
- click on a colormap area or selection from the dropdown below the colormap presents an up to 8 year trend, higher resolution graph of the quantity in the area (district in Kentucky) with linear and nonlinear curve fitting, linear correlation, data reference, and measure quantity average and range of the areas of the colormap in the most recent year for comparison;
- area drilldown, rate trend is shown with state and change in state trends;
- link to the data for the area, v/r graphs is available at the end of the data reference below the colormap; and
- an analysis is displayed to the right in the body if on screen as in Figure 14 and 15, and can have 8 forms including simple link, text only, tabbed links, ebook, and 2 'tabs with text and 1 link' styles on (Figures 14 and 15) or off screen.

The breadcrumb (right end on banner) on Figures 12,14, and 15 leads back to the Additional Data Looks menu. A menu control returns to the effort situation UI of Figure 4. The effort situation UI breadcrumb leads to the *state* level of presentation shown in Figure 16, 1of 3 primary user interfaces a state may choose at this time.

State

The first *state* level, primary UI is shown in Figure 16. Two others are available (p. 39). On the banner line (left to right and top to bottom), the icons are links to default and optional presentation function, like that discussed for an effort situation, including:

Figure 16: State Level of Presentation – Matrix model

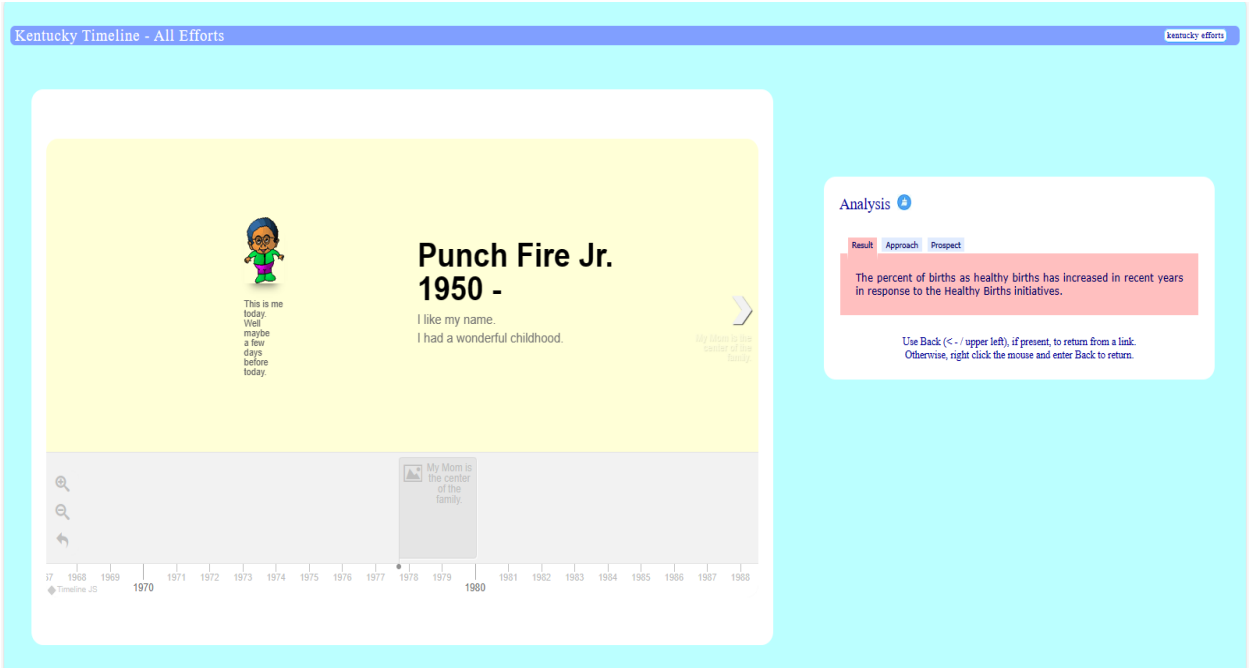


- a presentation of the state of Kentucky;
- o-facts about the state;
- analysis of Kentucky work to improve (6 options are available – simple link, text only, tabbed links, ebook, and 2 tabs with text and 1 link styles off screen);
- o-key state indicators, with mean key indicator state and stride, measure description, and value/rate/state/change in state trends, comprised of select measures considered important enough to draw attention to (2 options are available – list of ordered groups of ordered measures and quilt);

- o-timeline (2 options are available – event chronicle and annotated events with state or change in state trends);
- o-significant state (Kentucky) ideas;
- o-important history;
- o-county profiles with state scope;
- commonwealth (state) vision; and
- a welcome (right of the breadcrumb).

An example of one of the optional features above, 1 of the 2 timeline visuals is shown in Figure 17. This free function was

Figure 17: Timeline



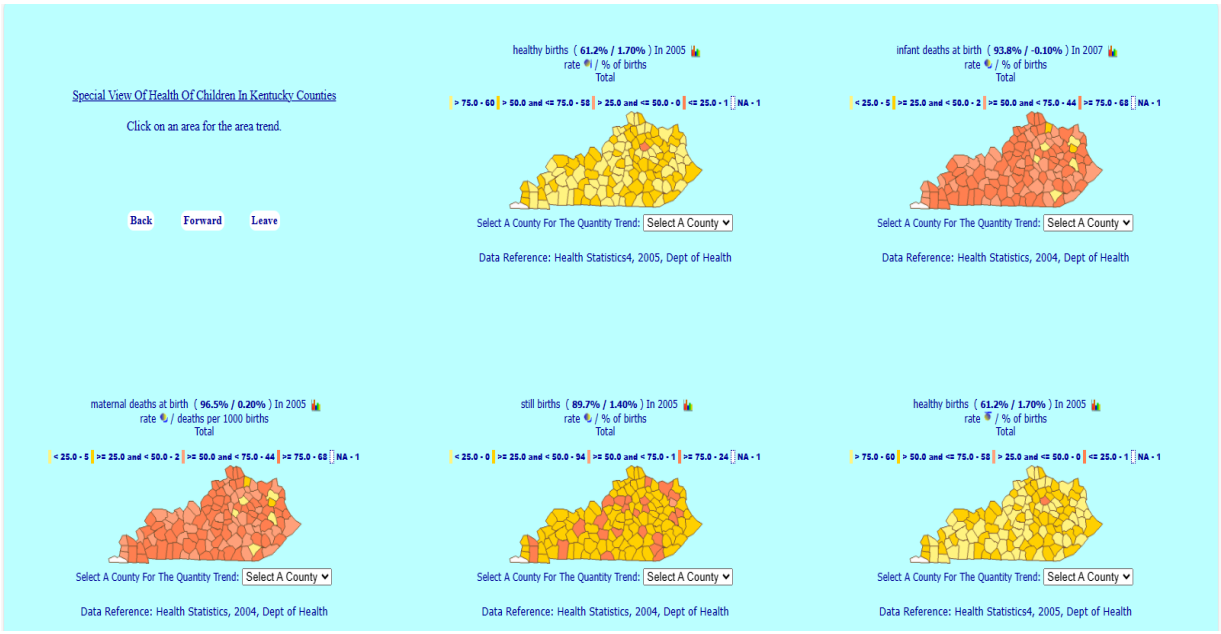
developed by Knight Labs (2023) at Northwestern University. This timeline facility allows a content developer to tell an important story with images, events, and dates. It is an example of software that is available throughout the document universe that may assist communication and understanding in the STEEP presentation.

The line just above the matrix of Figure 16 begins with a link to sites (6) of familiarity. For example, in Kentucky, select images by

recognized state artists might be links to health care in the state, educational opportunity, the park system, natural wonders, recreation, and community life. The next three links might present the story of Kentucky yesterday told by the State Historical Museum in conjunction with state historians, the state today presented by the authors of *The Atlas of Kentucky* (1998), and a discussion of the future Kentucky is working toward.

The next link, Special Views, allows authorized content developers to bring views of the state, considered to be important enough, to the forefront of the application. The are 7 special view options combining measure patterns and analysis. Figure 18 displays one of those choices. Figure 18 presents the most recent Kentucky county, quartile colormaps (value or rate) of up to 5 measures (notice healthy births is doubled up for the demonstration). Counties can be clicked into or selected from the dropdown below each colormap for an up to 5 year value or rate trend.

Figure 18: Quartile Colormaps (Value or Rate) of Up To 5 Measures



A stacked bar chart is available for up to 5 year quartile trends for each measure. The link in the upper left area of Figure 18 is to an analysis of the view. A single link, tabbed links, and ebook forms are available here.

The body of the matrix (Figure 16) presents all of the effort situations presented by the state in the application. Effort situations are represented by profiles of best understanding. Three types of profiles are provided – simple, related, and composite. A simple profile was examined for 1 Kentucky effort situation (Figure 4). A related profile (not presented) could be used for related effort situations like infrastructure including roads, bridges, dams, sewers, water treatment, wastewater treatment, etc., or air, water, land, and food pollution. A composite profile (not presented) is composed of simple profiles and additional measures and might be appropriate for effort situations like toxic burden, people, communities, or the environment.

Each effort situation (see health) line of Figure 16 can have an icon link to the effort situation analysis (optional), link to the effort situation measure profile, and a link to the descriptive analysis of the state, stride, and weighted stride of the measures of the effort situation profile. The matrix column and row titles can be redefined and 1 column and row may be added. For examples, columns called international and national affairs might be added to a national and state level implementations. Column, row, and cell average state, stride, and investment totals may be easily added. The top left, matrix cell link leads to a descriptive analysis of the state, stride, and weighted stride of the measures of all effort situation profiles presented by a state. From there, 3 links are available including 1) color coded lists and list visuals with effort (bar and area) trend drilldowns of average measure state and stride, and investment (most recent year) for the effort situations of the state, 2) an effort analysis and up to 5 year average state, change in state, and investment trends for each effort that can be clicked for higher resolution, up to eight year charts with linear and nonlinear curve fitting and linear correlation, and 3) up to 5 year average state, change in state, and investment trends for all effort situations, with trend graphs that can be clicked for higher resolution, up to eight year charts with linear and nonlinear curve fitting and linear correlation, and analysis. A link to an up to 8 year graph of mean state, stride, and investment trends on 1 chart is also available.

After 1 effort situation is defined, 2 other primary state UIs can be selected (Figures 19 and 20) in Custom Parameters and have most of the function of the matrix user interface of Figure 16. State applications would be accessed independently during development until integration with the national level. A state application, developed by the expert layer of each of the effort situations a state is investing and working in to improve, would in fact be an expert system about the state.

Figure 19: State Level of Presentation – JavaScript model

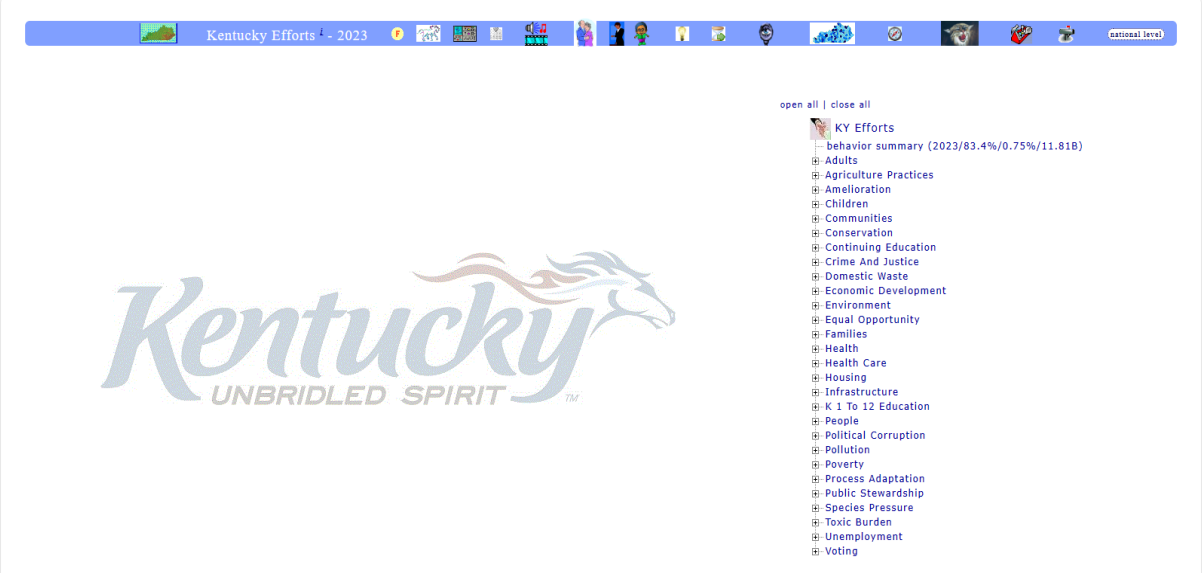
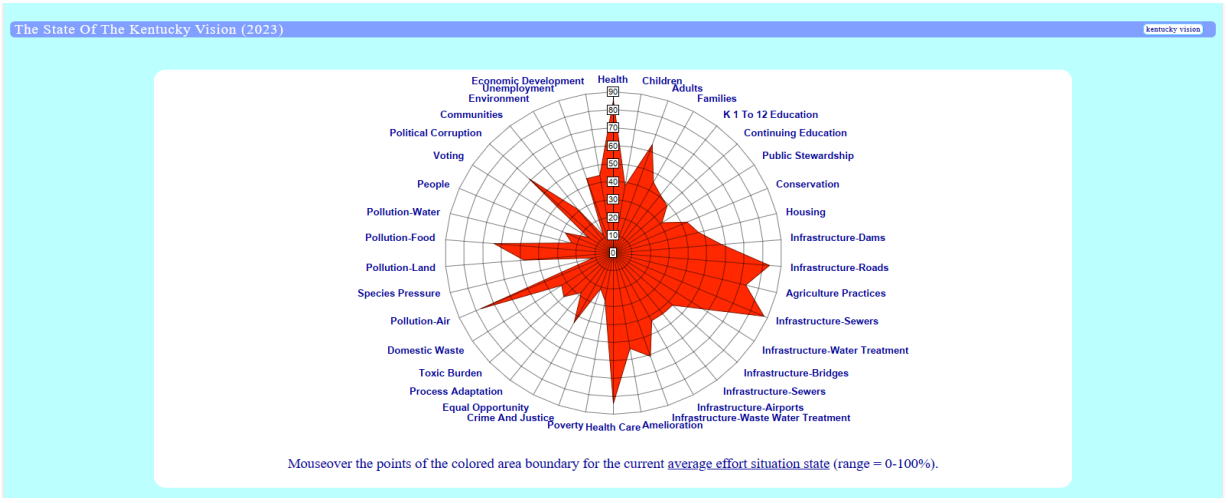


Figure 20: State Level of Presentation – Iframe Model

The vision of the state is composed of the ultimate outcomes of the effort situations of the state modeled in the application (Figure 21) and presented as the polygon of Figure 22, with the same function as the vision polygon for each effort (Figure 10). As the efforts approach their ideal state, the polygon will fill with color.

Figure 21: Vision of the State - Ultimate Outcomes

Figure 22: Vision of the State - Polygon

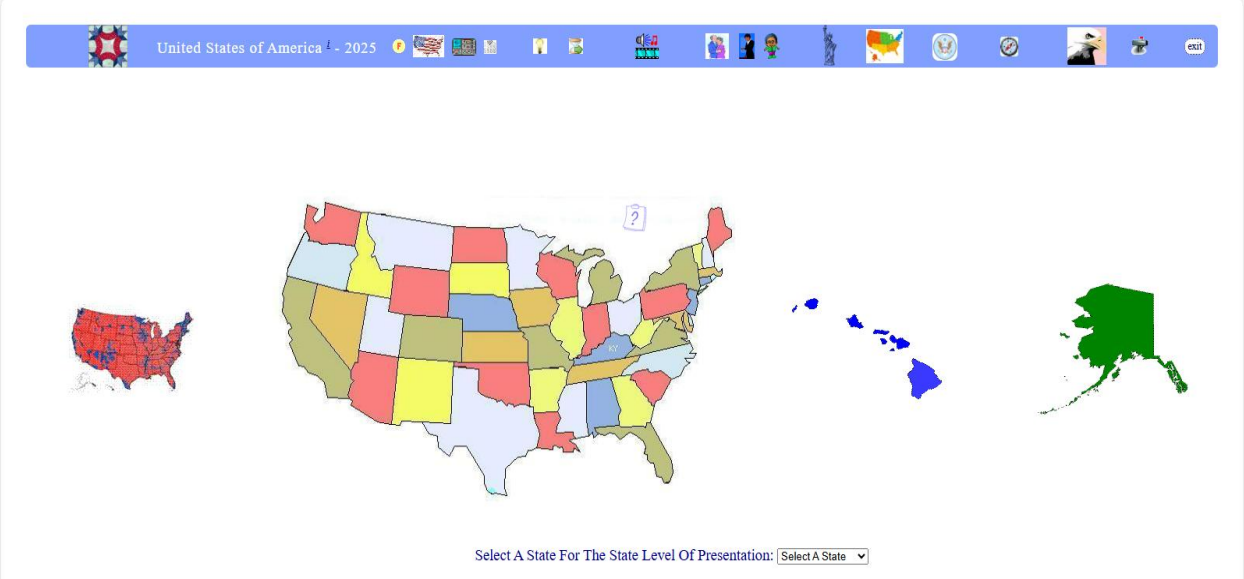


National/Regional

A click on the breadcrumb of any of the 3 primary state UIs (Figures 16, 19, and 20) leads to the *national/regional* level. What the national/ regional level UI might look like is shown in Figure 23. The national

database, consisting of the key national indicator measure set, would be acquired from the many national resources like the Academies, GAO, and CDC (preferred) or pulled nightly and constructed from key national indicator data residing on state cloud platforms (the application can run on a single cloud server). The function available on the banner of Figure 23 is similar to that discussed for an effort situation (Figure 4) and state (Figure 16). The first icon on the banner left would be a profile of the United States followed by o-facts with national scope, an analysis of

Figure 23: National/Regional Level of Presentation



national key indicator trends, national key indicator profile, o-important timeline, o-significant ideas, o-important history, sights and sounds of America, and America yesterday, today, and tomorrow presentations. The 2nd to last icon before the exit breadcrumb is a welcome to the application. The four links to the left of the welcome, left to right, provide:

- the ability to produce quartile national colormaps of the states for any key indicator with state drill down to higher resolution, up to eight year, v/r charts of the key indicator in the state, with linear and nonlinear curve fitting and linear correlation, and data reference, and state and stride trends are displayed on the rate chart (trend analyses could be added to colormaps and/or trend drill down);

- the same function for regional organizations with drill downs to average state and change in state trends for the states in each regional area;
- a rank analysis of the states (with national scope) in relation to the key indicator, measure set with all of the function of the rank analysis discussed for an effort situation (Figures 5, 6, and 7) and a state - key indicator issues at the national level could be integrated with the indicator description as discussed for an effort situation measure of Figure 4 (p. 28-29), and an analysis of key indicator trends in a state could be added to state profiles composed of all key indicators with the function described for Figure 7 at the effort situation level in the space used to present counties; and
- a link to the national vision like the polygons of an effort situation (Figure 10) and a state (Figure 22), except that each perimeter point of the colored area would align with a state.

The STEEP application of a state is accessed by clicking on the state or selecting the state from the drop down below the state areas in the body center and right of the Figure 23 UI. The United States image to the left in the body of Figure 23 leads to a descriptive analysis of all key indicators for all states, with the function described for a state (p, 37). Three links are available to 1) color coded lists and visuals of average, measure state, stride, and investment for all states, 2) an analysis and up to 5 year average state, change in state, and investment trends for each state (trend graphs can be clicked on for higher resolution, up to eight year charts with linear and nonlinear curve fitting and linear correlation), and 3) up to 5 year average measure state, change in state, and investment trends for all states, with trend graphs that can be clicked on for higher resolution, up to eight year charts with linear and nonlinear curve fitting and linear correlation, and an analysis. A link to an up to 8 year graph of average measure state, change in state, weighted stride, and investment trends for the nation on 1 chart is also available. Table 1 summarizes indicator patterns available at each of the 9 levels of presentation in The STEEP Course information system.

Indicator Patterns At Each Presentation Level

Table 1

National

- Analysis – National Scope
- Key Indicator Profile – All Key Indicators
- Colormaps – Any Key Indicator
- Rank Analysis And State Profiles – All Key Indicators
- Vision – All States
- Descriptive Measure Analysis And Average Measure State, Stride, Weighted Stride, And Total Investment In all Efforts Situations, 5 And 8 Year Trends
- Color-coded, Effort Situation Lists And Visuals – State, Stride, and Investment
- Special Measure Views

Regional (Many Organizations Supported)

- Colormaps – Any Key Indicator

State (Each State)

- Analysis – State Scope
- Rank Analysis And County (In Kentucky) Profiles
- Vision - All Effort Situations
- Descriptive Measure Analysis And Average Measure State, Stride, Weighted Stride, And Total Investment In all Efforts Situations, 5 And 8 Year Trends
- Color-coded, Effort Situation Lists And Visuals – State, Stride, and Investment
- Special Measure Views
- Effort Situation Profiles Of Best Understanding – Each Effort

Effort Situation (All Effort Situations Presented)

- Analysis – Effort Situation Scope
- Rank Analysis And County (In Kentucky) Profiles – Selected Measures
- Vision – All Profile Measures
- Optional Long-Range Strategic Plan With Measure Trend Insertion
- Descriptive Measure Analysis And Measure Average State, Stride, Weighted Stride, And Effort Situation Investment 5 And 8 Year Trends
- Effort Situation Profile Of Best Understanding
- Ordered, Effort Situation Measure Lists And Visuals – Measure State, Stride, Weight Of Importance, And Weighted Stride With Measure 8 Year Trend Drilldowns

Measure (All Measures)

- Analysis – Measure Scope
- Effort Situation Profile Measure Line With Description, Current Year data, And 5 Year Measure Trend Preview
- Measure Dashboard – Measure Value, Rate, State, Stride, and Weighted Stride 5 And 8 Year Trends
- Measure Breakouts - Significant Segment/Subgroup And 3 Geographical Levels

Significant Segment/Subgroup (Many Organizations Supported)

- Analysis – Significant Segment/Subgroup Scope
- 5 Year Value/Rate Bar Charts – All Segments/Subgroups
- 8 Year V/R Line Graph Drilldown – Each Legend Segment/Subgroup
- 8 Year Removeable/Add Back V/R Line Graphs – All Segments/Subgroups
- 8 Year V/R Bar Chart Visuals – All Individual Segments/Subgroups

Intermediate Level Colormap (Many Organizations Supported – e.g., Districts)

- Analysis – Colormap Organization Scope
- Current Year V/R Color Maps With Area 8 Year Line Graph Drilldown
- 5 Year, V/R Color Maps, Manual And Auto Step Through
- Scaled Areas V/R Color Maps And V/R Area Bar Graphs – Most Recent Year V/R Color Maps Of Most Recent 5 Years

Base 1 Level Colormap (1 Organization Supported – e.g., Counties)

- Analysis – Colormap Organization Scope
- Current Year V/R Color Maps With Area 8 Year Line Graph Drilldown
- 5 Year, V/R Color Maps, Manual And Auto Step Through
- Scaled Areas V/R Color Maps And V/R Area Bar Graphs – Most Recent Year V/R Color Maps Of Most Recent 5 Years

Base 2 Level Colormap (Many Organizations Supported – Urban Areas)

- Analysis – Colormap Organization Scope
- Current Year V/R Color Maps With 8 Year Area Line Graph Drilldown
- 5 Year Color Map Manual Step Through
- V/R Area Bar Graphs – Most Recent Year

In concluding the 'The STEEP Course' presentation, a few comments about information input overload, security, and intention are relevant.

- Replaceable control icons that come with the application (e.g., timeline icon used at the national, state, effort situation, and measure levels) should be the same across levels – the nation, all states, all effort situations, and all measures, to minimize the information processing cost of application navigation.
- The analysis forms, including tabs with links, ebook, and both tabbed text with 1 link styles, on and off screen, used at the national, regional, state, effort situation, measure, and measure breakout levels, should be standardized to minimize the cognitive cost of comprehending an analysis. For example, at the measure and measure breakout levels, the 2 tabbed text with 1 link on screen forms might be most used and the tabs might be 'what' (a measure measures), 'why' (a measure is important/what a unit change means), 'how' (the measure data is collected, compiled, and accessed), and 'what we have learned' (from the measure trend behaviors). At the national, regional, state, and effort situation levels, the tabs with links, ebook, and 2 tabbed text with 1 link off screen forms are the available analysis choices and the tabs might be 'current state', 'important issues', and 'challenges'.
- Analysis presentations should be constructed in layers with a single link, access point to the next layer. The entry layer would seek to convey the best understanding with the least cost to understand. Inner layers would provide more detail for those who want to delve into the details of the analysis. A second layer might present an opportunity to incorporate modern infographics to shred out the understanding, and a third layer might lead to deeper details like plans with budget summaries.
- There is substantial presentation space for the addition of content in this information system. Some examples might include opportunities to dig even deeper presented by links to indicator systems specializing in the focus of an effort situation or a link to solicitations for bid opportunities or job openings. The addition of content should be seriously considered. The caution is not to overwhelm. The hope of the STEEP presentation is effective, easy

to comprehend communication of expert understanding, based on best data, information, and knowledge, about progress in the effort situations America is investing and working in to improve.

- There are no privacy concerns in this information system. The primary security consideration is reliable ongoing operation.
- The intention of this idea is not to govern, form policy, make decisions, or be a venue for deliberation. The purpose is to provide a factual presentation with sound understanding, composed by talented people, based on best measures, data, information, and knowledge, about the progress of America in its steep course journey toward a better tomorrow. The presentation aim is to be part of a firm foundation supporting better governing, informed policy and decision making, deliberative consideration, civil discourse, building trust in the partnership, and assessing the progress of our nation.

Content Development

All Content for 'The STEEP Course' information system is entered and maintained using the Content Assistant (CA) UI of Figure 24. The

Figure 24: Content Assistant

Content Assistant is used to enter and update: the organization identity; measure descriptions, behavior / performance data and analysis, information resource / library, additional data looks, and do measure exploration; effort situation definitions / profiles, behavior / performance data and analysis, information resource / library, and the all efforts analysis; measure / effort data and images; user security permissions; effort coordinators and measure contacts communication; optional visualizations including facts, key indicators, timelines, significant ideas, important history, special views, and county profiles; and custom parameters, significant segment substitutions, and coordinate / population data for intermediate and base level geographic presentations.

The Content Assistant is a set of user interfaces (UIs) with complete DOM field control including editing for allowed characters and form on change of focus to another field and when the content is saved, on-screen documentation, and backend processing for:

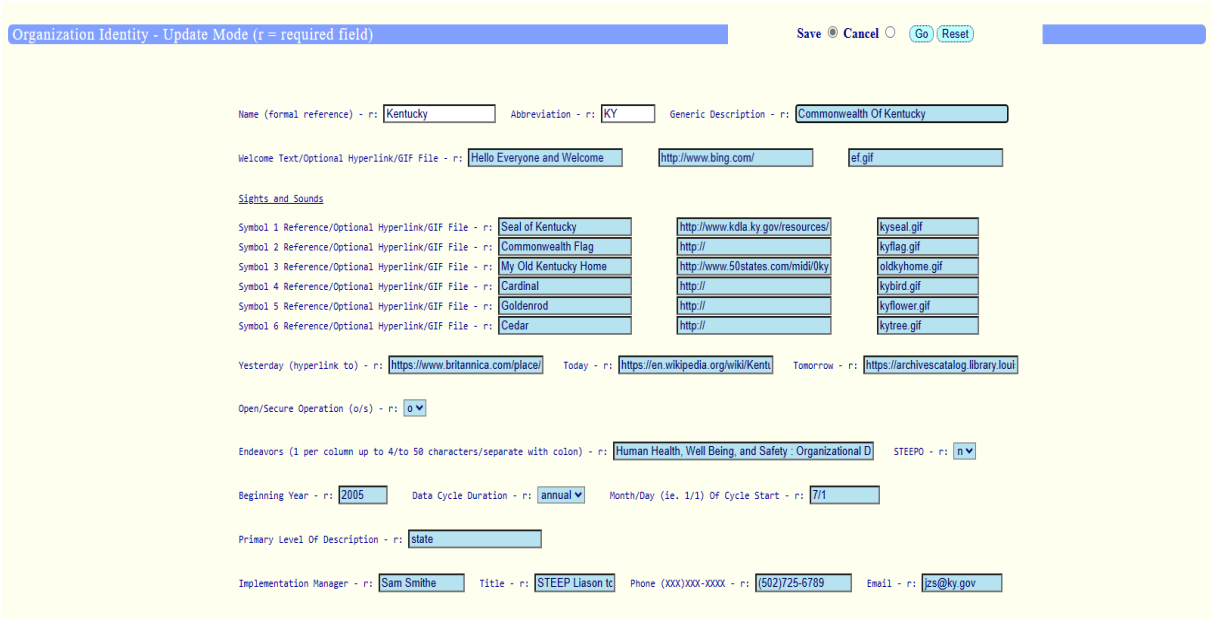
- entry and update of organization (e.g., United States) identity;
- entry and update of measure description, behavior and performance data and analysis, virtual library entries, and additional data looks;
- whole organization, measure exploration;
- entry and update of effort definition, behavior and performance data and analysis, virtual library entries, and analysis of all efforts;
- client and server media management/upload;
- entry and update of content security specifications;
- communication with effort coordinators and measure contacts;
- definition of optional visualizations including facts (organization, efforts, measures), key indicators (organization, efforts), timelines (organization, efforts, measures), important history (organization, efforts, measures), significant ideas (organization, efforts, measures), special views (organization), and area (e.g., county/state) profiles (organization, efforts); and
- entry and update of custom parameters, significant segments, and coordinate and population files.

Initial Application Entry

When the application is initially entered, before any content has been entered, the user is routed directly into the Content Assistant (CA). The password to use the first time the application is entered is 'trialpw'. After even 1 password has been entered, the 'trialpw' password will no longer be valid. The first 2 tasks, when beginning the application setup, are entering the identity of the organization and setting up passwords.

The identity of the organization is entered by the STEEP Implementation Manager or assistant using the Organization Identity user interface (UI) of Figure 25, the first CA option. This data entry form requires: a Name or formal reference, Abbreviation, and Generic Description; Welcome text, optional hyperlink, and welcome .GIF filename; 6 Sights and Sounds options including references, optional hyperlinks, and .GIF filenames; Yesterday, Today, and Tomorrow links; Open/Secure Operation choice; up to 4 Endeavors - used 1) to define number and column titles in the primary matrix user interface that the application begins with (the primary UI can be changed at any time) and 2) in structuring the organization vision; the Beginning Year of the

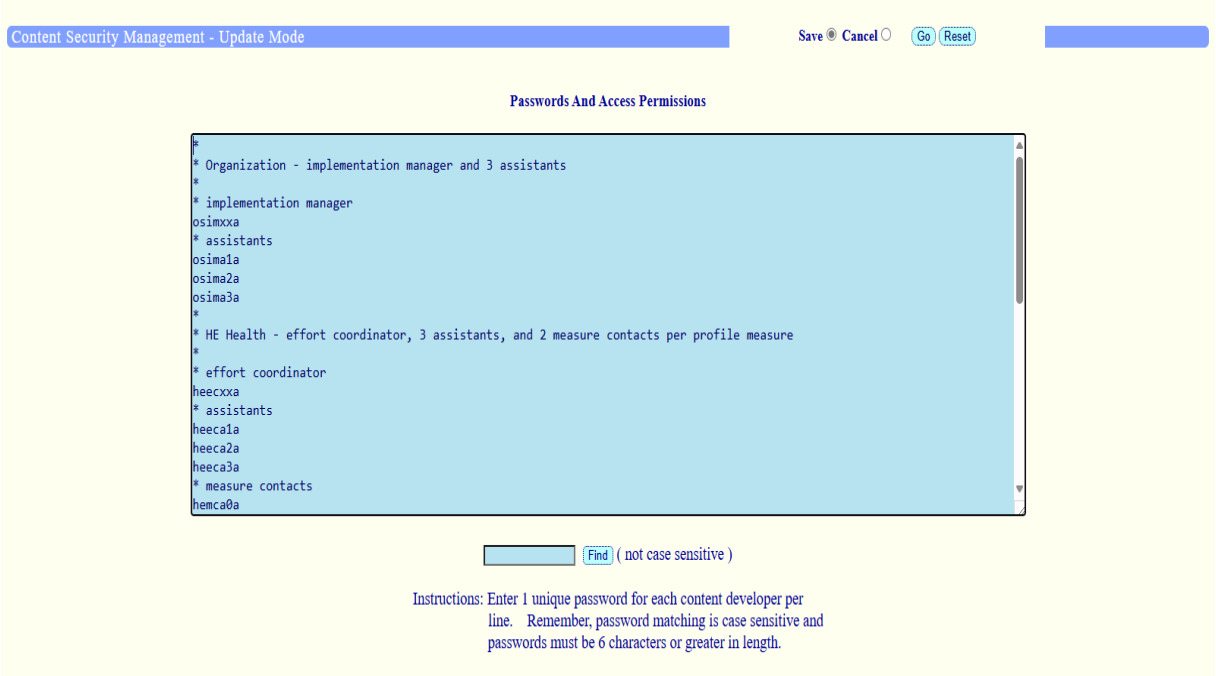
Figure 25: Organization Identity UI



application, the Data Cycle Duration (e.g., annual), and the Month/Day Of Cycle Start (e.g., 1/1); the Primary Level Of Description (e.g., state); and the Implementation Manager name, title, phone, and email. The Welcome link and .gif, the Sights and Sounds options links and .GIFs, and the Yesterday, Today, and Tomorrow links will require some prior consideration before entry.

The STEEP implementation manager and effort coordinators or their assistants will create and maintain their blocks of passwords, using a sample password file, Notepad, and the Content Security UI of the CA (Choice 12, Manage group, Figure 26). The sample and UI password files are organized into organization and effort blocks. When a new effort is added to the application and a block is created, the effort coordinator or assistant will copy the initial block from a sample

Figure 26: Content Security UI



password Notepad file, provided to copy initial organization and effort blocks from, into a Notepad file on their work computer. All passwords in an effort block would be modified to begin with the 2 character effort

code agreed on at effort onboarding and sized to the effort profile of best understanding. An initial organization or effort block would then be copied into the UI in effort order. When modifications or additions are made to a block of passwords using the CA UI, those changes would be carefully copied from the UI to the Notepad file. Names of people using a password would be added or changed in the Notepad file on the password line. This Notepad file would serve as a sharable record of the effort team, the passwords they use, and their content authority.

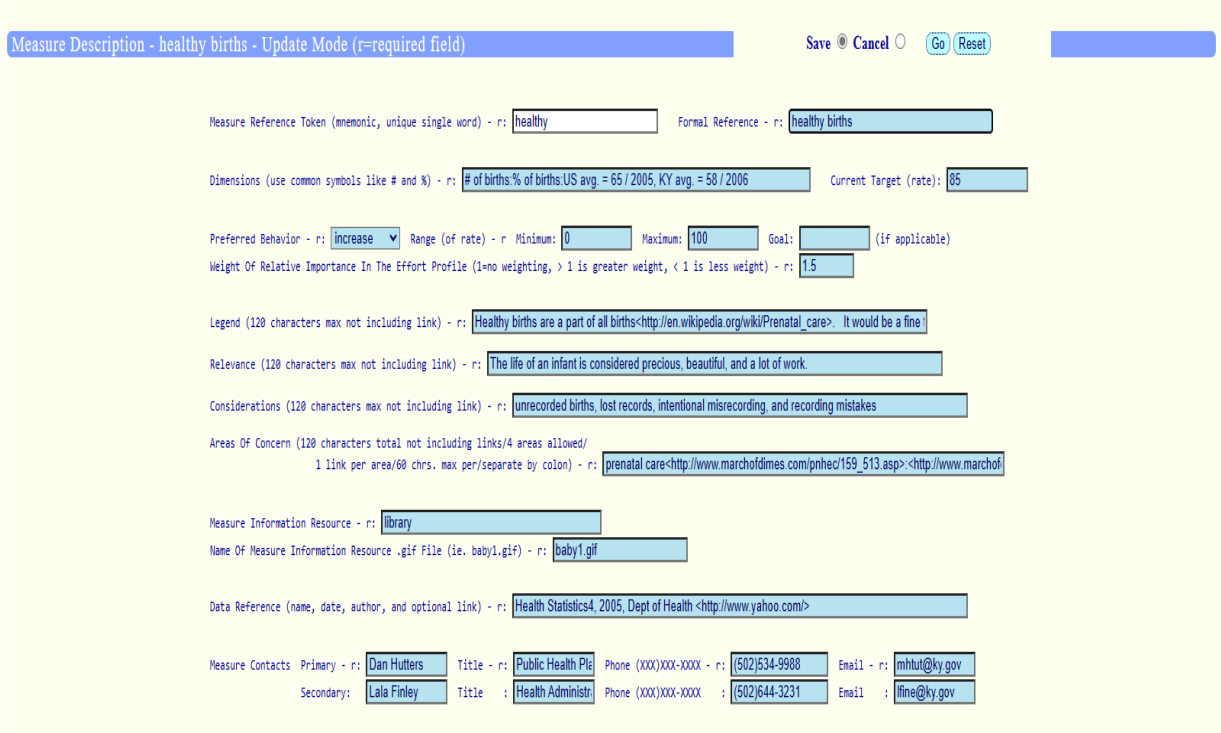
Initial password setup should be begin right after the identity of the organization is entered. The structure of the blocks correspond to the distributed human resource organization that would content populate the application and develop the information system presentation. The content authority of a password ranges from universal, allowing a user to work on all application content, to measure specific, only allowing a user to work on the content of a single measure. When the identity of the organization and initial passwords have been entered, measures can begin to be described.

Measure

The description of effort situation measures can begin after the organization identity is established and passwords have been setup and distributed. Each measure in every effort situation profile must be described and behavior data and a performance trend analysis must be entered and maintained. An optional library and optional, additional measure data look data can also be entered and maintained using the function of this group. These tasks are done using the following 4 UIs, the first 4 choices of the Measure group, the 2nd group of the CA.

The Description UI (Figure 27) requires the entry of a unique measure token, formal reference, value and rate dimensions, the preferred measure behavior (increase/decrease/seek a goal), the rate range, weight of measure relative importance in the profile, legend (what it is), relevance (why it's important), considerations (like unrecorded events or lost records), areas of concern (issues/4 allowed), measure

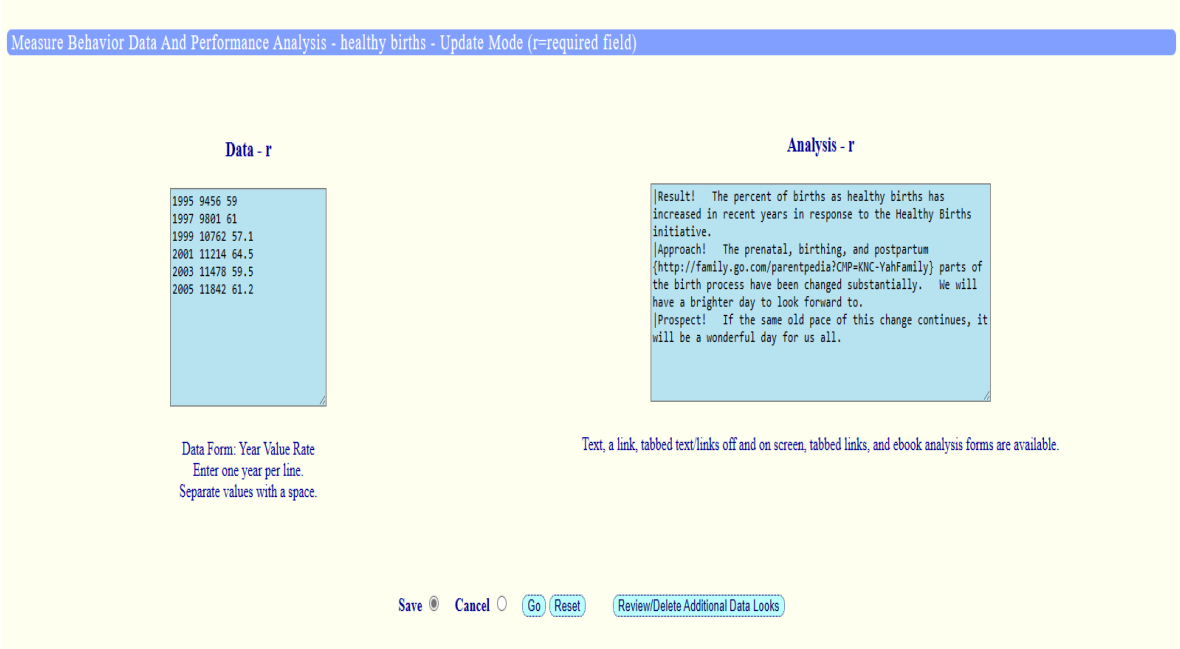
Figure 27: Measure Description UI



information resource, information resource GIF (a default is preloaded into this field), data reference, and information for 2 measure contacts. The legend, relevance, considerations, and areas of concern can be links. The information resource can be a single link or a library of links. The measure contacts can be emailed by double clicking on the email field of the contact. The two measure contacts would enter and maintain this description, with the exception of the measure weight. These weights for all of the measures of an effort situation profile would be derived using a nominal group process involving the effort expert organization, to attenuate dominant and amplify recessive personalities.

The Behavior / Performance data and analysis entry/update UI (Figure 28) is used to enter and maintain application level (state) measure behavior data and a trend analysis and are required to complete setting up a measure at the application (state) level of aggregation. A single year value and rate are entered on a line separated by a space. Eight analysis forms are available including text, a simple link, tabbed text with 1 link

Figure 28: Measure Behavior And Performance Analysis UI



(2 styles) on or off screen, tabbed links, and ebook. The tabbed text with 1 link styles on screen will probably be the most used for the measure analysis. The first time in, initialization for the different analysis forms is available, inserting the structure of the form chosen into the analysis field, if required. State, stride, and weighted stride calculations are done when the data is initially saved, when any part of the measure description used in the computation or the measure data changes, and nightly during database maintenance. The analysis focus should be the meaning of measure dynamics.

The Virtual Library entry/update UI (Figure 29) is used to enter and maintain a measure library. The measure library is optional. Library entries may be added or deleted. All fields are required except the URL. Entry of a URL enables the entry as a link to the document in the library. The category field allows a content developer to create sections of related content in the library.

The addition of measure data looks provides the ability to breakout the application data into several kinds of data looks. These include

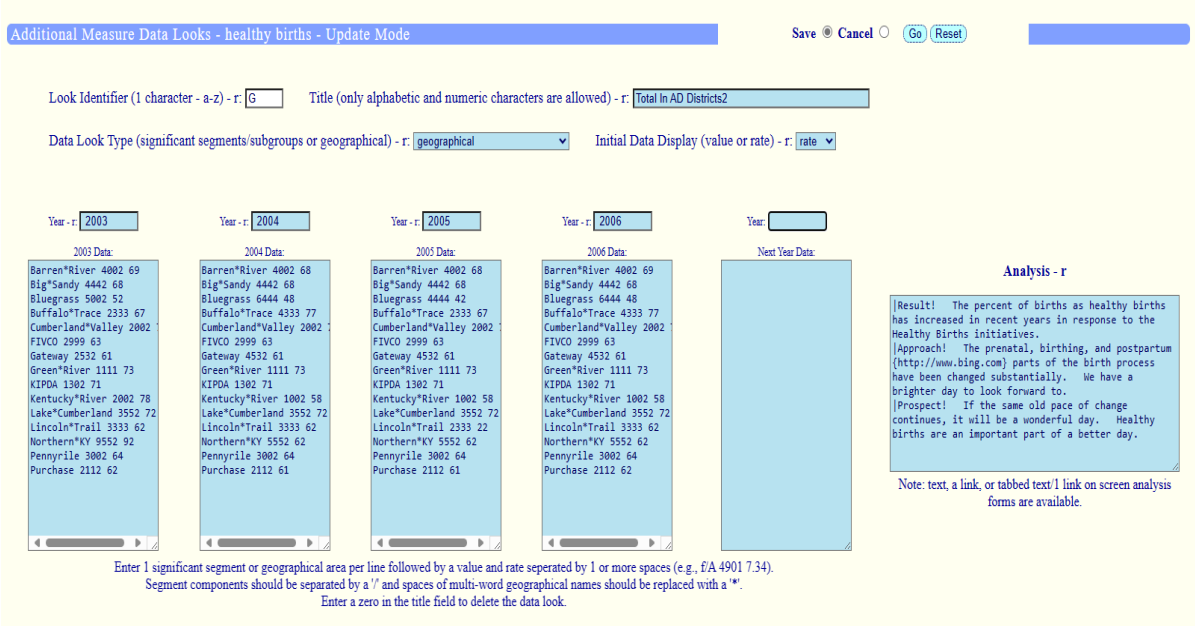
Figure 29: Measure Library UI

significant segments/subgroups (many significant segment/subgroup organizations are supported), intermediate level geographical (e.g., district – many organizations are allowed), base level 1 geographical (e.g., county – 1 organization is supported), and base level 2 (urban areas – many organizations are allowed) visuals.

The Additional Measure Data Looks UI of Figure 30 is used to enter/update additional measure data looks. Up to 26 (a-z) are allowed. The Look Identifier range (a-z) should be divided into 4 groups to cluster the kinds of looks in the measure looks menu in the order of kinds of looks presented above. Look Identifiers should be selected to put looks in the appropriate group. The look Title, Data Look Type (significant segments/subgroups or geographical), and Initial Data Display (value or rate) are entered next. The look title should be selected to suggest what the look presents.

Below those fields, up to 5 years of data can be entered the first-time in. After that, 1 new year can be entered at a time and the most recent 4 years entered can be edited. Data structure is segment/subgroup (no spaces) value rate or geographical area (asterisk between words) value rate separated by 1 or more spaces. Text, a simple link, and tabbed text/1 link on screen (2 styles) analysis forms are available for the look trend analysis. The tabbed text with 1 link on screen will probably be

Figure 30: Additional Measure Data Looks UI



the most used for the additional data look analysis. The first time in, initialization for the different analysis forms is available, inserting the structure of the form chosen into the analysis fields if required.

In the human resource organization that would support content development in this application, each measure would be populated and maintained by 2 measure contacts. This responsibility would include the entry and update of measure data at the application level and trend analysis, an information resource or library, additional data look data and look trend analysis, and other optional visualizations available to measures including Facts, Timeline, Significant Ideas, and Important History.

The best data, information, and knowledge about the effort situations states and our nation are investing and working in to improve should be presented in this application. Trend analyses should present a first level understanding that is solid but brief, with a link to details. Library entries should be selected to minimize the cost of comprehension while still providing excellent insight into the focus of the library. Additional data looks should be added because the looks represent the best ways of

decomposing whatever measure is being looked at. Optional visualizations should be used because they add something important to the presentation. In general, the presentation should communicate the best understanding of what is being presented easily, not overwhelm, with the least cost to understand. Information input overload must be a constant consideration in the selection and presentation of content by content developers in this information system.

The last choice of the Measure section of the Content Assistant (Figure 24, p. 46), available to each state, is Measure Exploration. All application database measures and measure looks would be available for research purposes to the entire enterprise in this facility. Authorized content developers and research 'guests' have access to this function. A research guest can only use the measure exploration function and has no content development authority.

The Measure Exploration choices of the CA UI are presented in Figure 31, the 5th choice of the Measure group. The choices of this menu

Figure 31: Measure Exploration

involve all the measure data of the application. The data available to a particular choice would be compatible with the exploration option.

The exploration/visualization options are grouped into 1) application level - state (1 measure graph, up to 9 v/r/s/S/d measure graphs, up to 4 measures v/r same graph, up to 5 s/S/d measures same graph, up to 4 relational graphs), 2) application level significant segment/subgroup breakouts - state (up to 4 v/r breakouts), 3) intermediate areas (e.g., district - 1 measure v/r up to last 5 years color maps, up to 5 measures most recent year, rank analysis, scatter/bubble analysis, 1 measure up to 5 areas), 4) base 1 areas (e.g., county - same choices as intermediate maps), and base 2 urban areas (1 measure v/r color map).

Many significant segment/subgroup, application breakouts, intermediate geographical organizations (e.g., district in Kentucky), and base 2 urban organizations are supported. The base 1 level supports one geographical organization (e.g., county in Kentucky). The intermediate Rank Analysis and Scatter / Bubble analysis choices require the selection of data with the same organization (e.g., AD districts).

An example showing how the enterprise research facility works is presented in the next 2 images. This example will show the steps to generate the most recent 5 years of district colormaps for 1 measure (choice 7, Figure 32). Taking that choice from the menu above, a content developer is presented with the UI of Figure 32. The measure and quantity (value or rate) to be charted must be selected and then the Generate button can be pressed to produce the chart of Figure 33.

Each of the 6 areas in Figure 33 is an iframe. The top left iframe displays header information. The header area (top row left) provides a link to a color quartile (shown), stacked bar (v/r) chart, up to 5-year trend. The other 5 iframe areas present the most recent, up to 5 years of district colormaps, value or rate (shown in iframe 2 – middle top row), and provide links to a 5-year trend (v/r) of the measure in a district (shown in iframes 3, 4, 5, and 6 – left to right, top to bottom).

Figure 32: Measure Exploration – Choice 7 UI

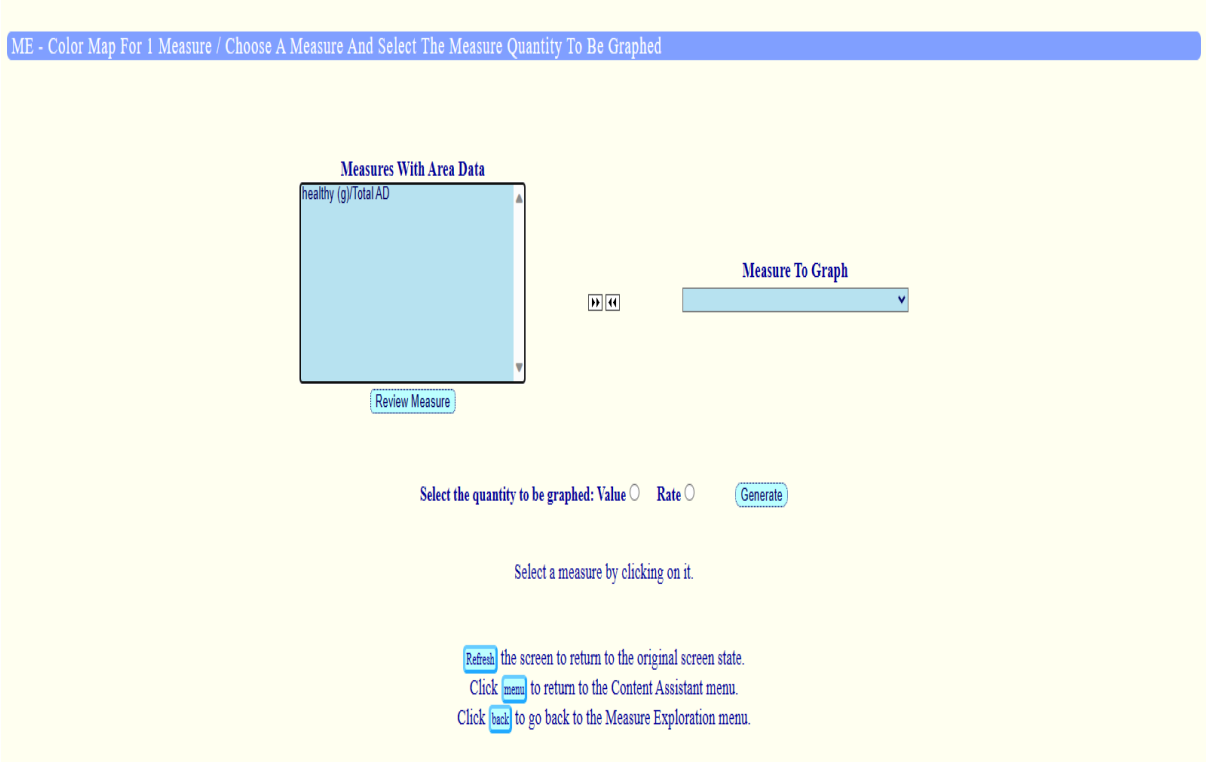
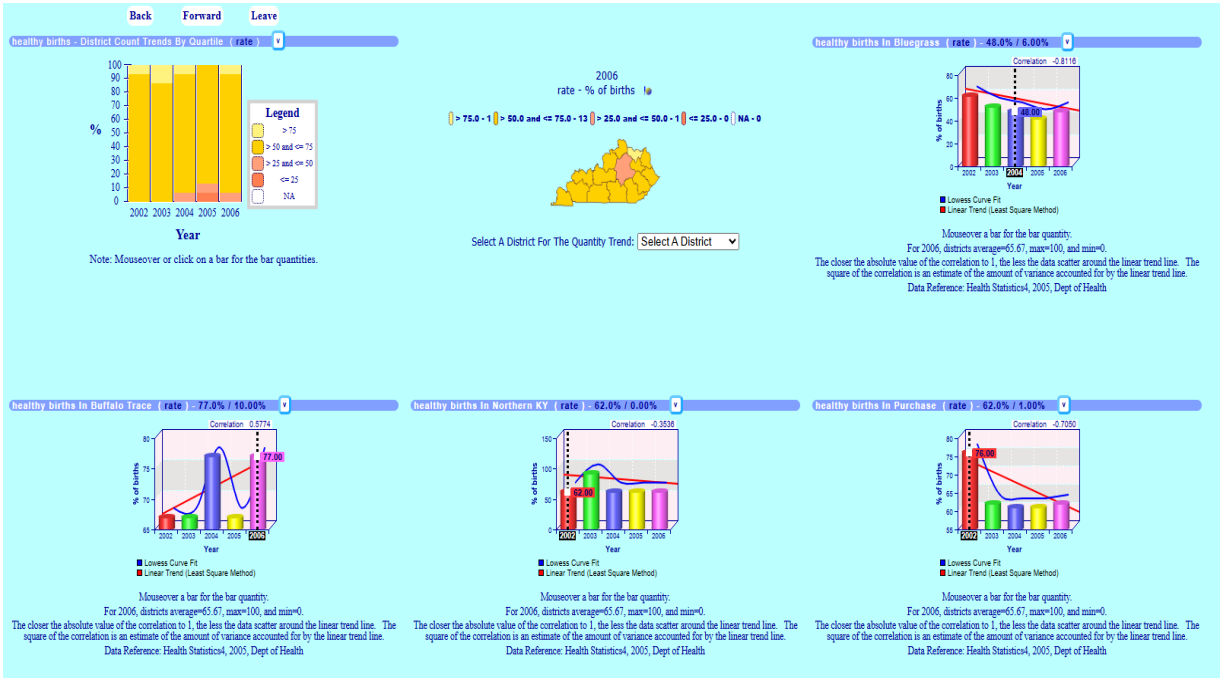


Figure 33: Most Recent 5 Years Of District Colormaps For 1 Measure

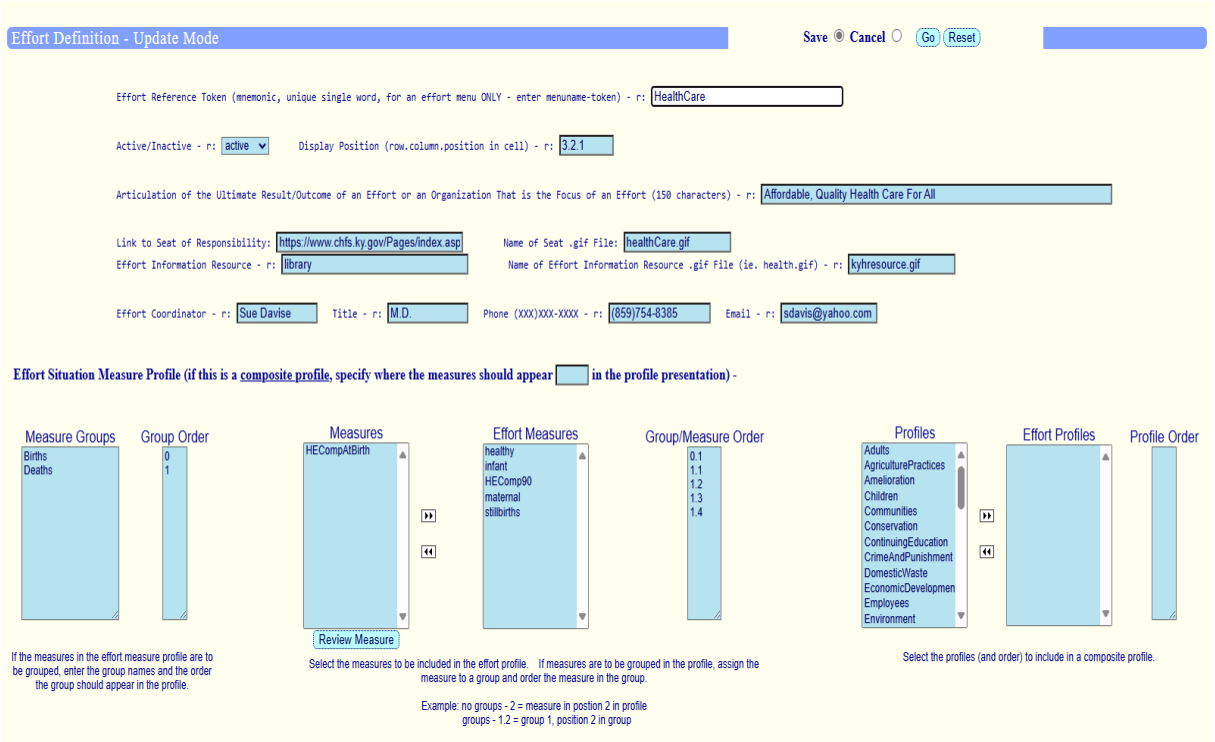


Effort Situation

The definition of an effort situation profile can begin after one measure or all effort situation measures have been described. Each effort must be defined, behavior/ performance calculations for each year requested, and a performance trend analysis must be entered and maintained. An optional library and a required performance analysis for all efforts are also specified using the function of this 3rd group of the CA.

Each effort situation is defined using the Definition / Measure Profile UI of Figure 34. The effort situation definition for a simple profile includes a unique effort reference token, active/inactive indication, display position, effort situation ultimate outcome (ideal), link to seat of effort responsibility and name of link GIF file (a default is preloaded into this field), effort information resource, information resource GIF (a default is preloaded into this field), effort coordinator information, measure groups and group order, measures, and measure

Figure 34: Effort Definition UI

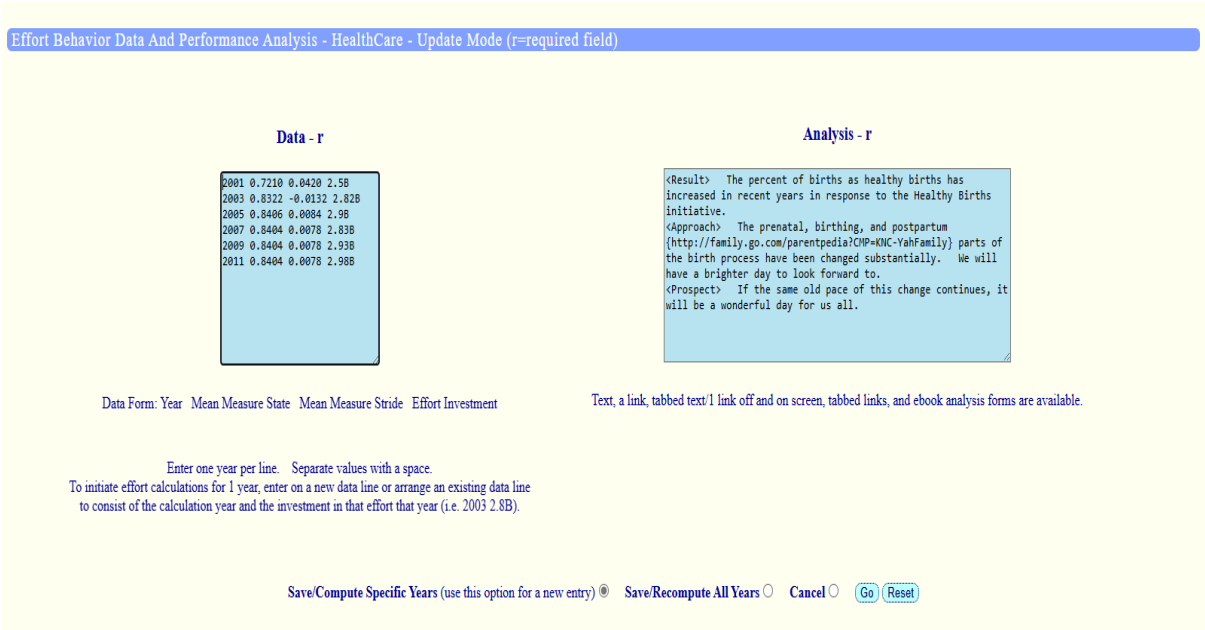


group and order in the group. An effort can become inactive. The display position is used to place an effort in the matrix primary UI (if used) and organize the effort vision. The information resource can be a single link or a library of links. The effort coordinator can be emailed by double clicking on the email field of the coordinator. The effort coordinator or assistant would enter and maintain this definition.

When an effort has been defined, initiation of effort behavior computations and entry of an analysis of effort performance is done using the effort Behavior / Performance UI of Figure 35. Initiation of effort performance calculations (state and Stride) for a year is requested by the effort coordinator or assistant by entry of the year and budget/ expenditures separated by 1 or more spaces in the Data field.

The calculation process places the state and Stride between the year and budget/expenditures. Removal of the state and Stride quantities for a year and selection of the Save/Compute Specific Years option requests recalculation for the year. The Save/Recompute All Years option requests recalculation for all years. Also, whenever key measure

Figure 35: Effort Behavior / Performance UI



description data used in measure behavior/performance calculations or measure behavior data for any measure in the profile of an effort change, or the measures of an effort profile change, all years of the effort are automatically recomputed, and recalculation is done nightly during database maintenance.

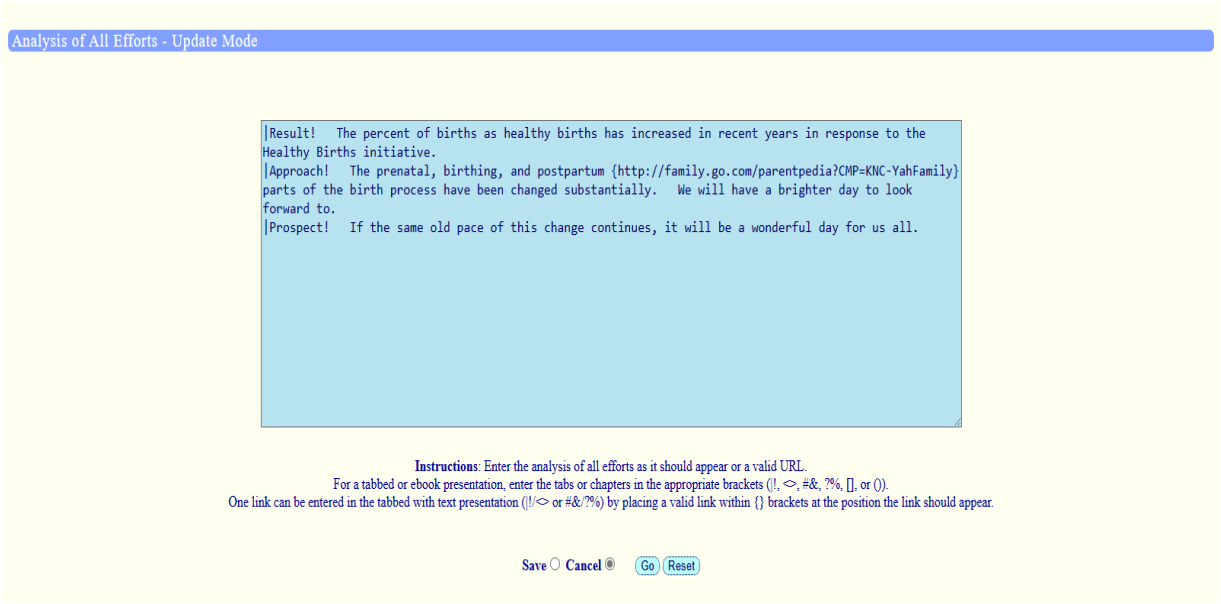
In the calculation of the average state and stride of the measures of an effort measure profile, an attempt to find a match between the effort calculation year and the measure data year is made. If no match is found, the first measurement prior to the effort year is taken so that the effort calculation is always based on the most recent observations available**.** If no measure value is found equal or prior to the calculation year, the measure is not included in the effort performance calculation.

An effort performance trend analysis must also be done. Six analysis forms are available for this analysis. On initial entry, a content developer can select a form to insert the form syntax into the Analysis field to be expanded. Both fields are controlled for allowed characters and form. This analysis is always full screen for efforts.

The effort virtual library UI looks and functions just like the measure library (Figure 29, p. 53). The effort library is optional. Library entries may be added or deleted. All fields are required except the URL. Entry of a URL enables the entry as a link to the document in the library. The category field allows a content developer to create sections of related content in the library as chapters of an ebook.

The last choice of the Effort Situation section is the Analysis Of All Efforts UI of Figure 36. This user interface facilitates the entry and maintenance of a performance analysis for all effort situations presented in an application (e.g., all Kentucky effort situations). Six analysis forms are available for the analysis. On initial entry, a content developer can select a form to insert the form syntax into the Analysis field to be expanded. This organization analysis is always full screen.

Figure 36: Analysis Of All Efforts



Manage

The Manage group of the Content Assistant (4th group, Figure 24, p. 46) includes Media and Content Security. Managing media is done from a client (authority determines what content can be worked with) or the server (requires universal authority). Server work can be done with the server or client interface. The client/server media management choices support distributed management with central support.

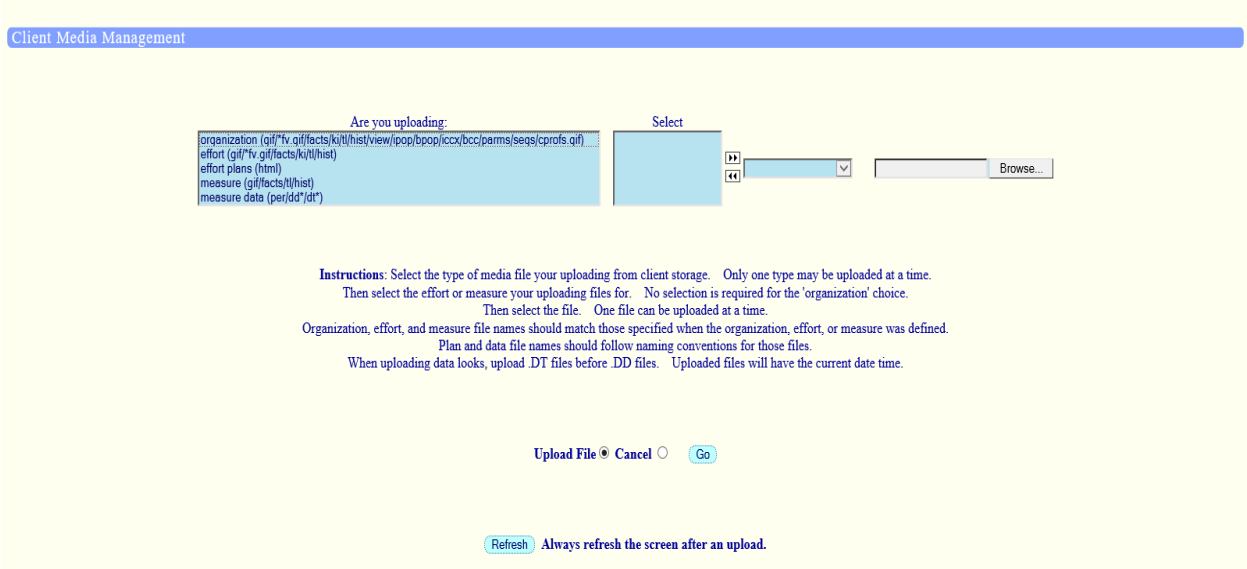
The server function (Figure 37) looks at the external optical drive or USB device drive (designation defined in the custom.parms file) for files to import based on file names specified during data entry and files found on the drive. One type of file can be brought in at a time using the server facility. Select the type of file being imported. If organizational content is being imported, no additional selection is required. The efforts or measures must be selected if effort, effort plan, measure, or measure data packets are being imported.

The client function (Figure 38) uses a browse strategy to locate a file in client storage to upload to the STEEP server. Select the type of file being imported. If organizational content is being uploaded, no

Figure 37: Server Media Management

additional selection is required. The efforts or measures must be selected if effort, effort plan, measure, or measure data packets are being uploaded. Then select the file. One file can be brought in at a time using the client facility. Both server and client functions correctly name imported or uploaded files and integrate the content of those files into the application database, creating or updating content.

Figure 38: Client Media Management



Content that can be managed (imported or uploaded) using these facilities include:

organization icons and a base 1 (e.g., county) level profile icon;

measure library icons, measure behavior/performance data, and additional measure data look packets;

effort favicons and effort seat and library icons;

effort plans;

facts, key indicator, timeline, significant ideas, important history, and view packets;

custom parameters;

group comparisons (Model 2);

significant segment abbreviations; and

intermediate and base level population and coordinate files.

The Content Security choice (Figure 26, p.49) has been discussed in the Initial Application Entry section. The content authority of a password ranges from universal, allowing a user to work on all application content, to measure specific, only allowing a user to work on the content of a single measure. Initial password setup should be begin right after the identity of the organization is entered. The STEEP implementation manager and effort coordinators or their assistants will create and maintain their blocks of passwords.

Communicate With

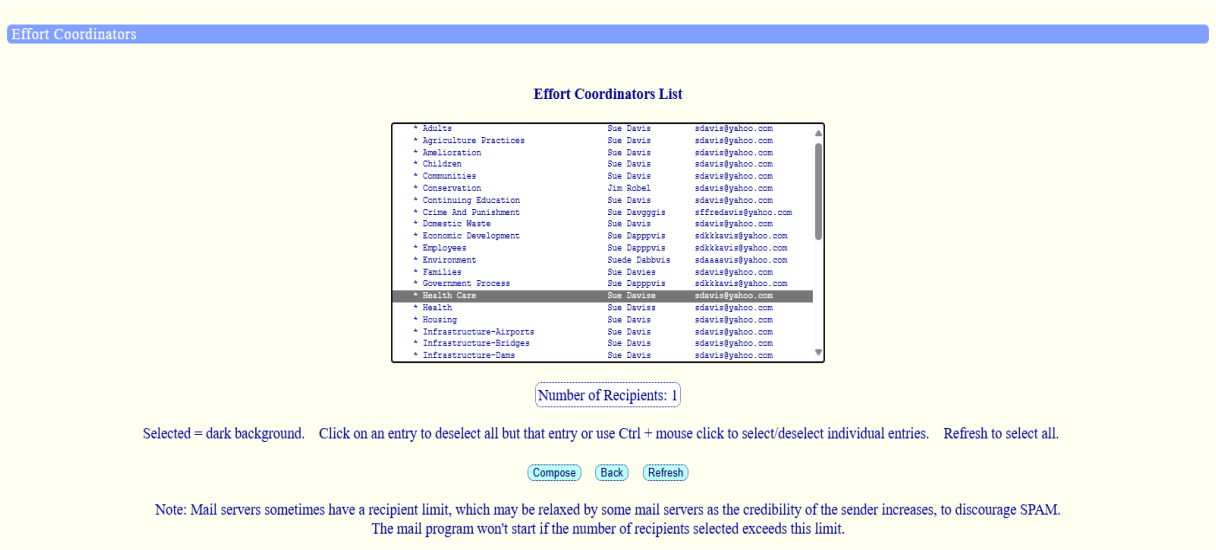
The communication functions of the information system, designed to facilitate communication with effort coordinators and effort

measure contacts, are the 2 choices in this section of the CA (5th group, Figure 24, p. 46). In addition to the ability to click on the email field of effort coordinators when using the Effort Definition user interface (UI) and measure contacts when using the Measure Description UI, the 13th and 14th content development tasks of the Content Assistant, Communicate With Effort Coordinators and Effort Measure Contacts, facilitate communication with one or more effort coordinators or measure contacts.

The structure of the following 2 UIs correspond to the anticipated human resource structure of an application. Universal or organizational authority is needed to use these facilities. Simply select the list of people to communicate with, compose the note (using your machines email function), and send it.

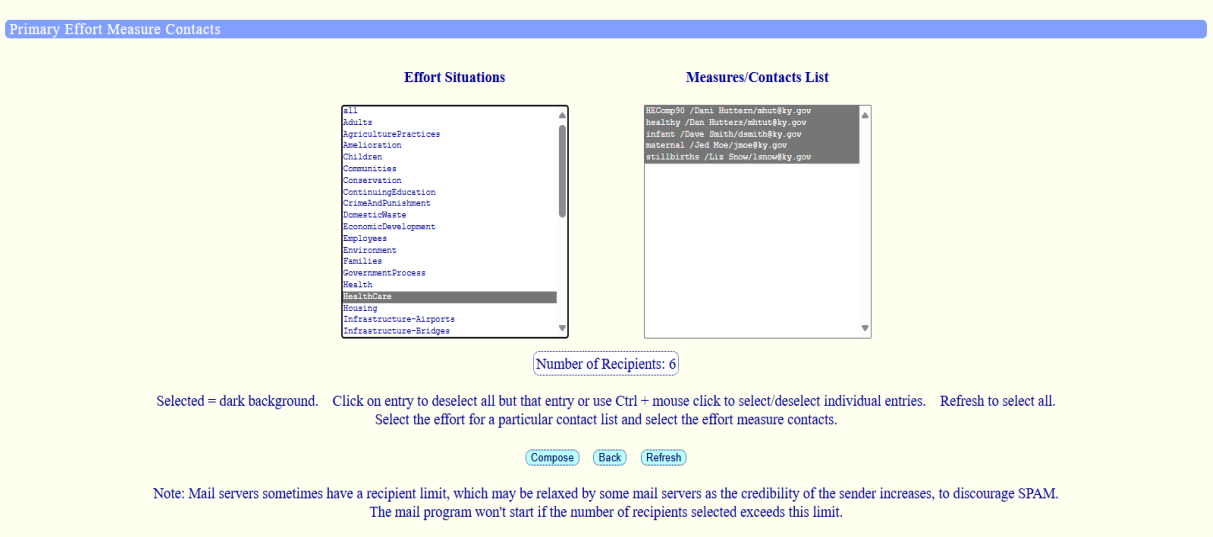
The UI of Figure 39 allows a person to communicate with one or more effort coordinators. The UI comes up with all coordinators selected. A more limited list is selected (or deselected) by clicking on the first list member and holding CTRL and clicking on the additional list members.

Figure 39: Effort Coordinators UI



The Figure 40 UI allows a user to communicate with one or more measure contacts. The UI comes up with all contacts for all effort situations selected. Clicking on an effort situation displays only the measure contacts for that effort situation. A more limited list is selected (or deselected) by clicking on an effort situation

Figure 40: Measure Contacts UI



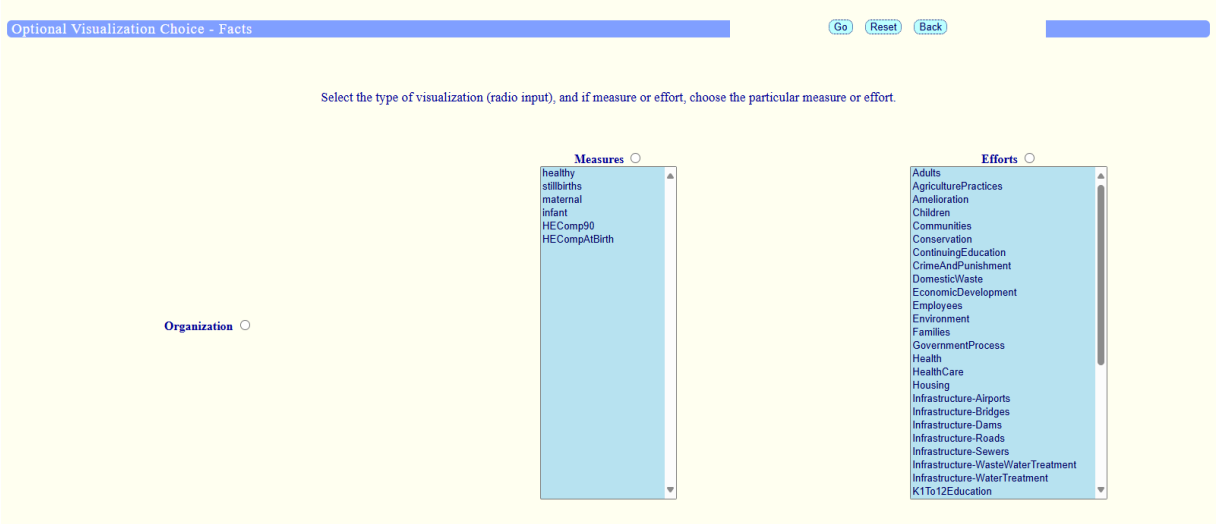
to see only the contacts for that effort situation and clicking on the first list member and holding CTRL and clicking on the additional list members.

Optional Visualizations

The user interfaces (UIs) for developing Optional Visualizations, the 6th group of choices available in the Content Assistant (Figure 24, p. 46) will be presented for Facts, Key Indicators, Timelines, Significant Ideas, Important History, Special Views, and base 1 (e.g., county) profiles. These interfaces enable a content developer to build optional visuals for the organization, all effort situations, and measures. An optional visual can be retracted by entering a zero in the appropriate field indicated on each UI. The UI for optional measure, Additional Data Looks was discussed previously (Figure 34, p. 58).

The Figure 41 UI presents the 1st choice a content developer makes when building fact, timeline, significant idea, and important history

Figure 41: 1st Choice For All Optional Visuals Except Special Views



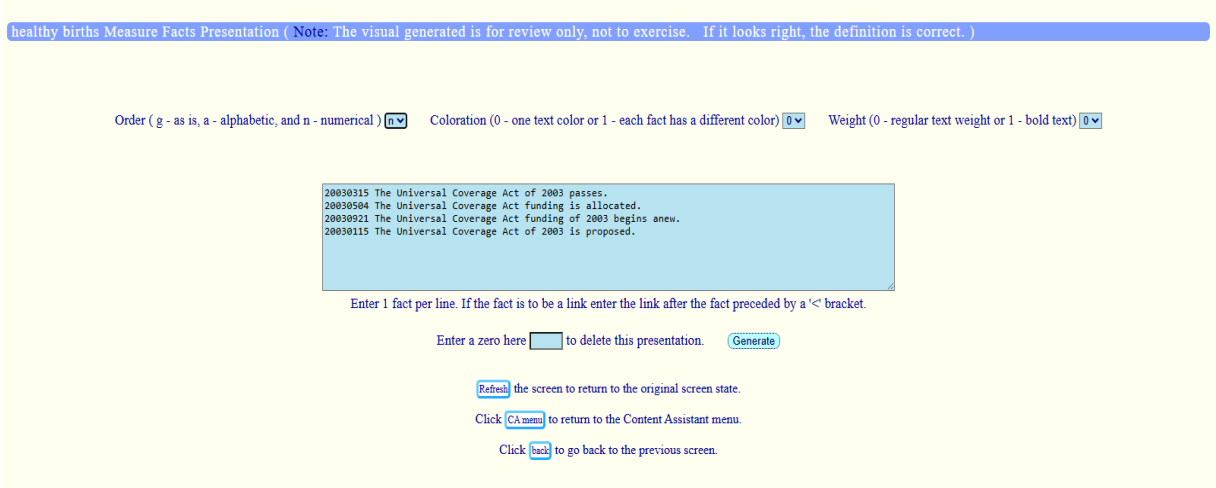
visuals. The type of visualization must be selected (radio input), and if a measure or effort visual, the particular measure or effort must be chosen. The first choice for key indicators and base 1 level profiles is like this visual except that these visuals are only available for the organization and efforts.

The following UIs support the entry of Facts, Timelines, Significant Ideas, and Important History optional visualizations in that order. The Facts UI is presented in Figure 42. The Facts visual has order, coloration, and weight options. Each fact is entered on 1 line.

The 2 UIs for Key Indicators (Figures 43 and 44) enable a content developer to build these visuals for the organization and all effort situations. The UI to use, key indicator list or quilt pattern, is set in the custom parameter file (custom.parms) for the organization and efforts.

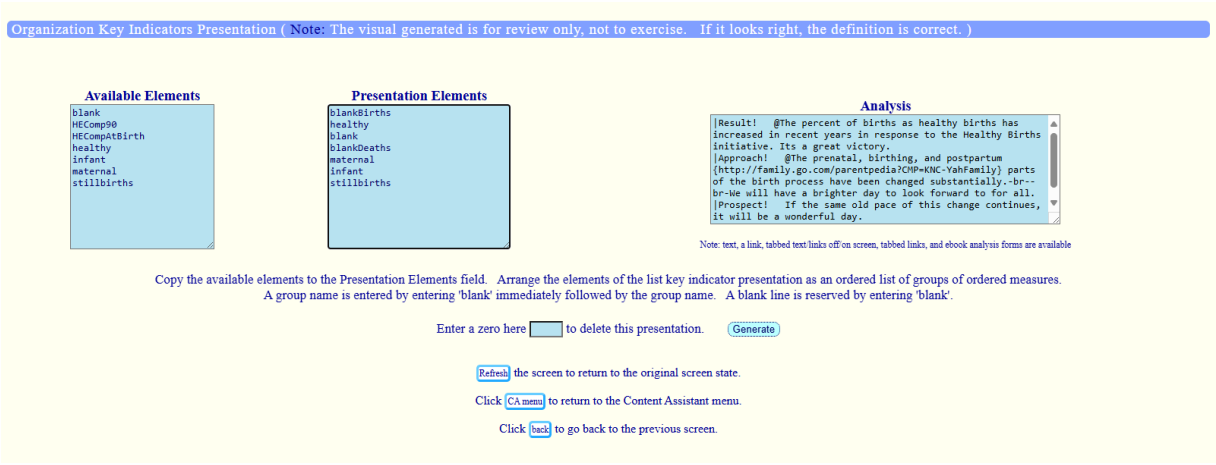
The Figure 43 UI supports the entry of the list of ordered groups of ordered measures key indicator option. First, copy the available elements to the Presentation Elements field. Next, arrange the elements

Figure 42: Facts UI



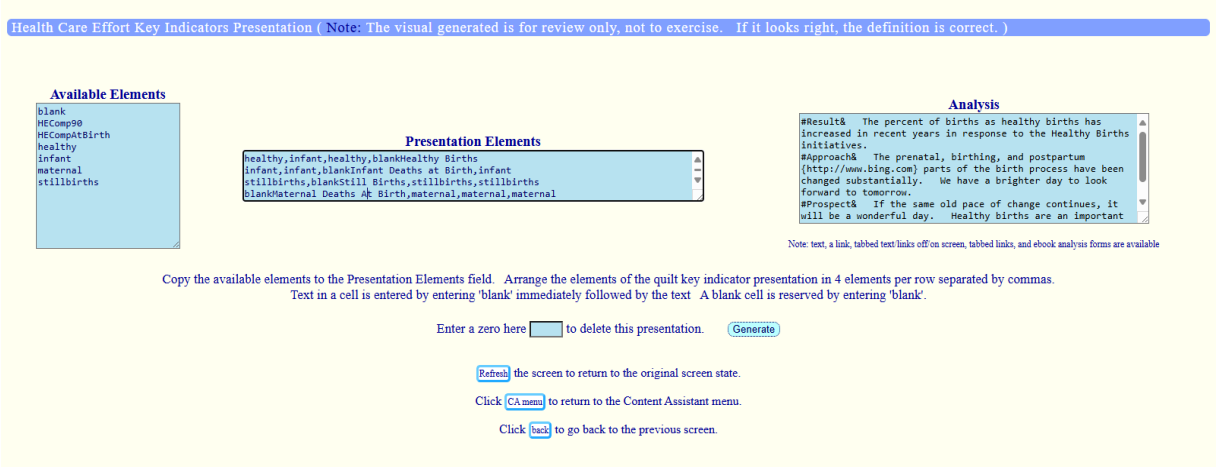
of the list key indicator presentation as an ordered list of groups of ordered measures. A group name is entered by entering 'blank' immediately followed by the group name. A blank line is reserved by entering 'blank'.

Figure 43: Key Indicators UI – List option



The Figure 44 UI supports the entry of the quilt key indicators option. Copy the available elements to the Presentation Elements field. Arrange the elements of the quilt key indicator presentation in 4 elements (cells) per row separated by commas. Text in a cell is entered by entering 'blank' immediately followed by the text. A blank cell is reserved by entering 'blank'. In addition, an analysis can be entered for

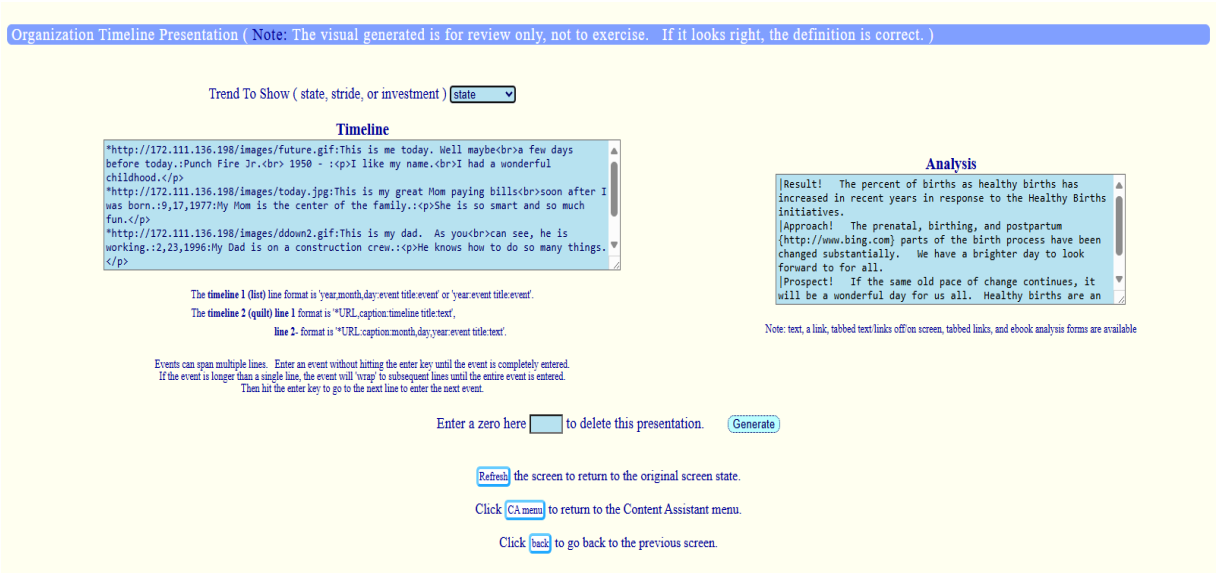
Figure 44: Key Indicators UI – Quilt option



both key indicator visuals. All 8 forms of analysis are supported for the key indicator visuals.

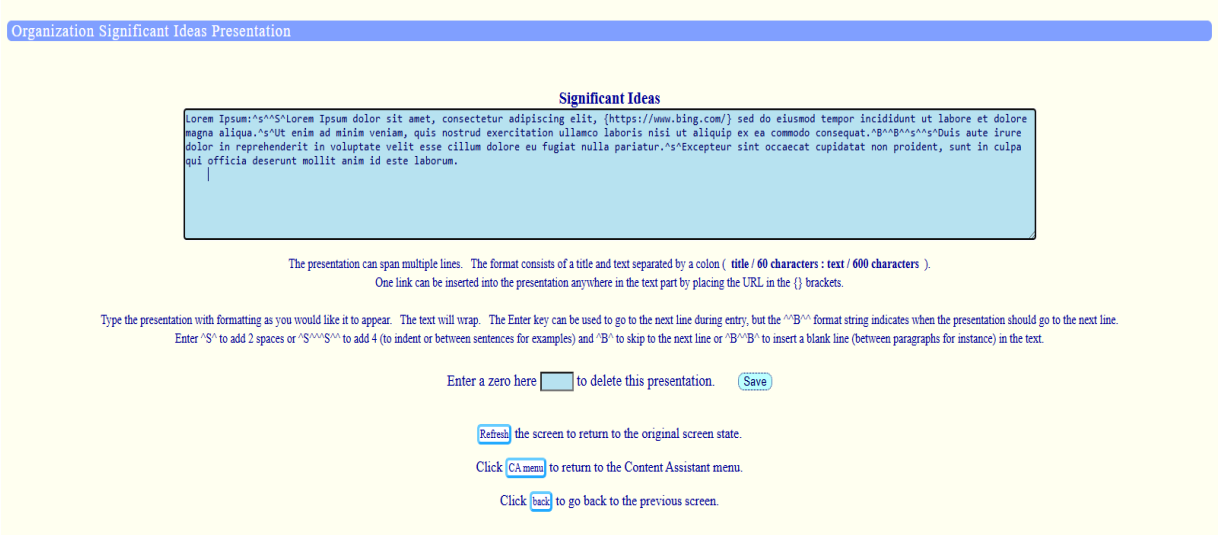
The UI for the entry of Timelines is presented in Figure 45. Two timelines are available depending on the format of the presentation lines entered - annotated events with state or change in state trends (1) and event chronicle (2). In the 2nd timeline, formatting directives for a line break (<br>) and paragraph (text) are supported.

Figure 45: Timeline UI



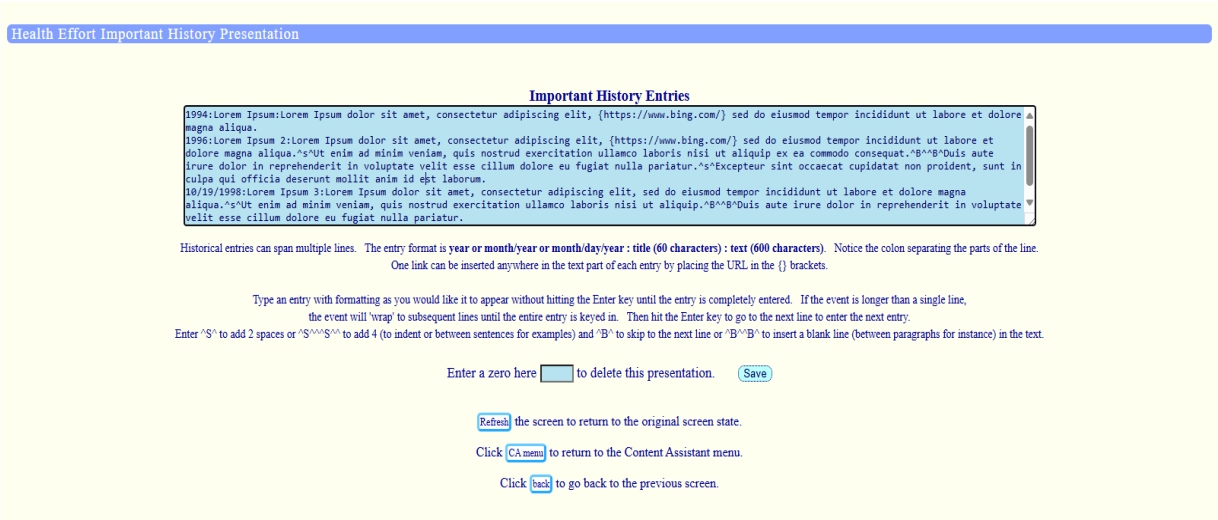
The Figure 46 UI below is for the statement of Significant Ideas. Formatting strings are available to create and indent in this presentation. The presentation can span multiple lines. The format consists of a title and text separated by a colon (title / 60 characters : text / 600 characters). One link can be inserted into the presentation anywhere in the text part by placing the URL in the {} brackets.

Figure 46: Significant Ideas UI



The Figure 47 UI is for the statement of Important History entries. Formatting strings are available to create and indent paragraphs in each

Figure 47: Important History UI



entry in this presentation. Historical entries can span multiple lines. The entry format is year, month/year or month/day/year : title (60 characters) : text (600 characters). Notice the colon separating the parts of the line. One link can be inserted anywhere in the text part of each entry by placing the URL in the {} brackets.

The Content Assistant user interfaces (UIs) for developing Special Views are presented in the next 6 UIs. Special Views are measure-based presentations considered important enough to bring to the forefront of the information system application.

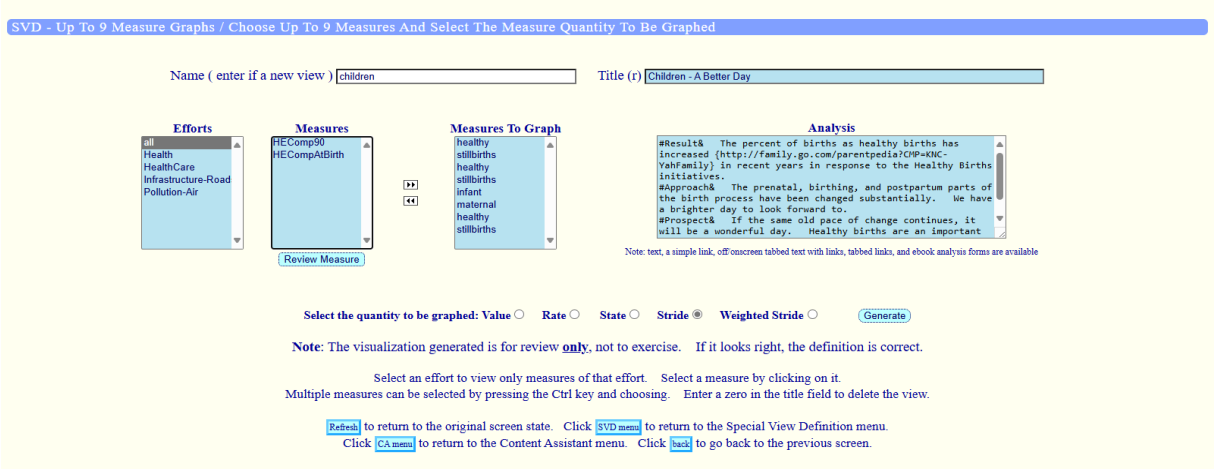
The Special Views choice from the Content Assistant (Figure 48) leads to the following options 7 options. These include; 1) up to 9 measure graphs / value, rate, state, stride, or weighted stride; 2) up to 4 measures, same graph / value or rate; 3) up to 5 measures, same graph / y dimension (state, stride, or weighted stride); 4) up to 4 state breakouts (significant segments/subgroups), up to 5 years / value or rate, 5) color map of 1 measure, up to 5 years / value or rate; 6) color map of up to 5 measures, most recent year / value or rate; and 7) single measure, up to five counties / value or rate, same graph.

Figure 48: Special Views Development Choices UI

When a content developer takes any of the options above, they are presented with a list of any existing special views compatible with the option taken and the option of entering a 'new' view. The first 3 options have a similar user interface. The only difference is the choice of quantities to be graphed. The quantity choices are value, rate, state, stride, or weighted stride for option 1, value and rate for option 2, and state, stride, or weighted stride for option 3.

The Figure 49 UI presents an existing special view for option 1 of Figure 48. The measures to graph and the quantity to graph have to be selected. Graphs can be value, rate, state, stride, or weighted stride charts. An analysis must be specified. When a view is new, analysis form choices are presented and inserted into the analysis when selected.

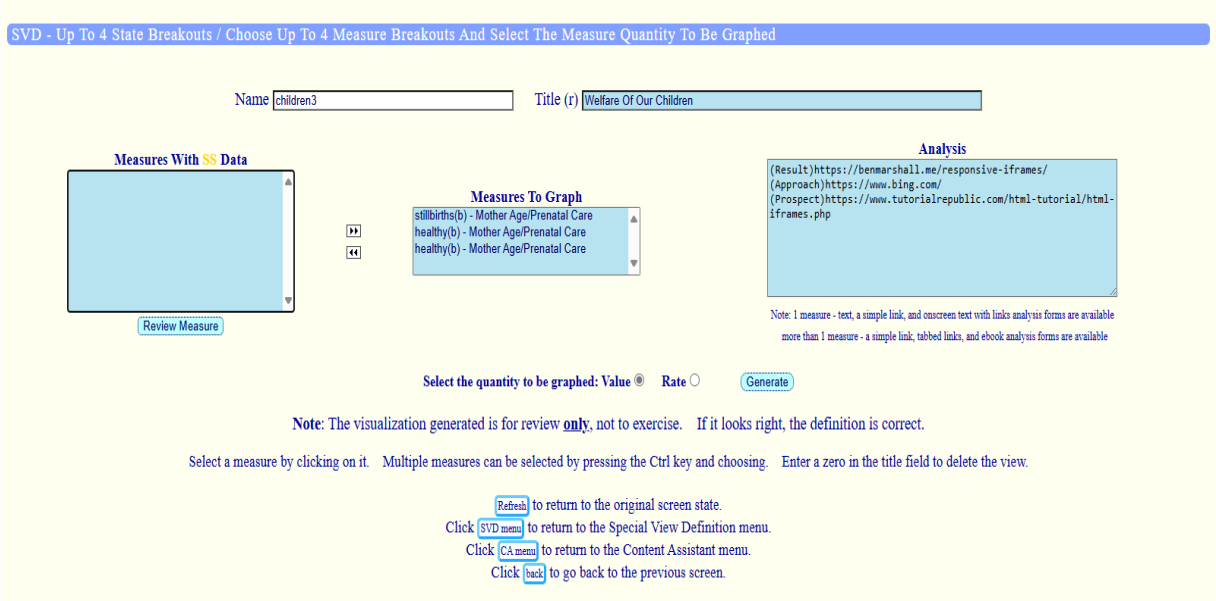
Figure 49: UI For Up To 9 Measure Graphs Visual



When the special view has been entered, the generate control generates the view. When a view is generated, it is not to be exercised. If it looks correct, the view can be saved. All of the user interfaces for special view development work in this same way.

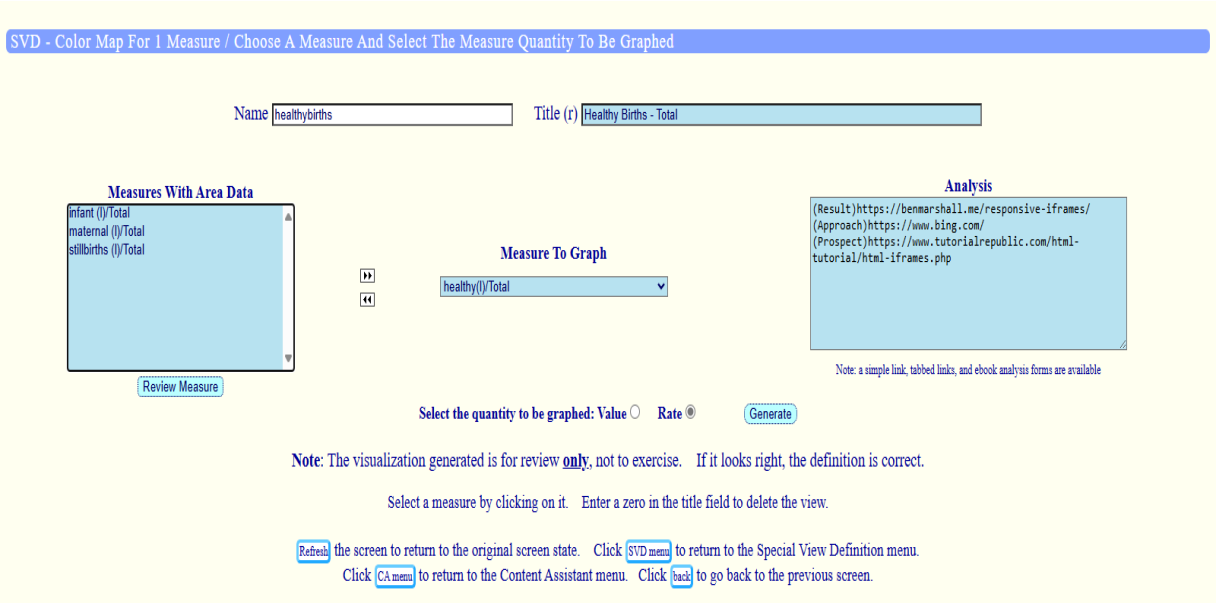
The Figure 50 UI, the 4th Special View option of Figure 48, is for the definition of a special view involving significant segment / subgroup breakouts. Many significant segment / subgroup organizations are supported. Up to 4 organizations and the quantity to graph must be selected, and an analysis must be entered.

Figure 50: Significant Segment / Subgroup Breakouts UI



The Figure 51 user interface is for choices 5 and 6 of the Special View menu with area data. The UI for these 2 options is the same except that option 5 requires the choice of 1 measure, the quantity to be graphed, and the entry of an off-screen analysis. This option generates color maps for the most recent 5 years of measure data. Option 6

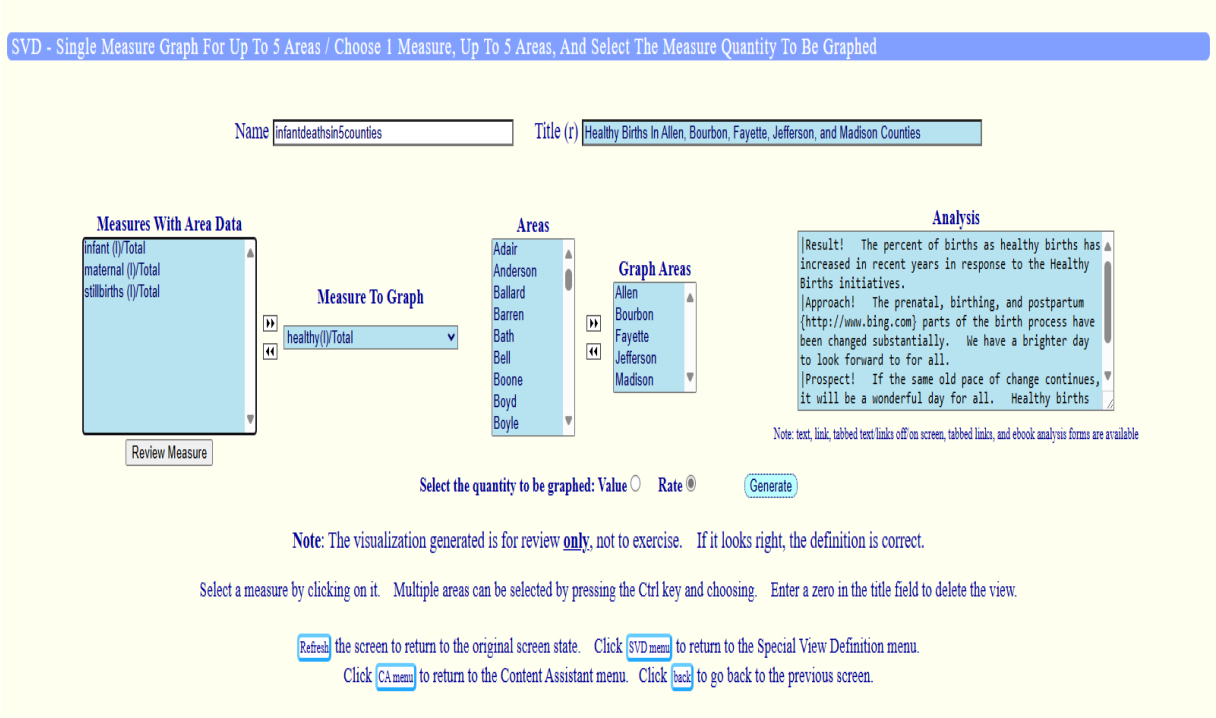
Figure 51: Color Maps For The Most Recent 5 Measure Years UI



requires the selection of up to 5 measures, the quantity to be graphed, and an off-screen analysis must be entered. This special view presents a colormap of the most recent year for each measure selected.

The Figure 52 interface produces 1 graph for 1 measure and up to 5 counties. The measure, county areas, and quantity to graph must me selected, and an analysis must be entered. As above, When the special view has been entered, the generate control generates the view for review. If it looks correct, the view can be saved.

Figure 52: UI For Up To 5 Counties For 1 Measure



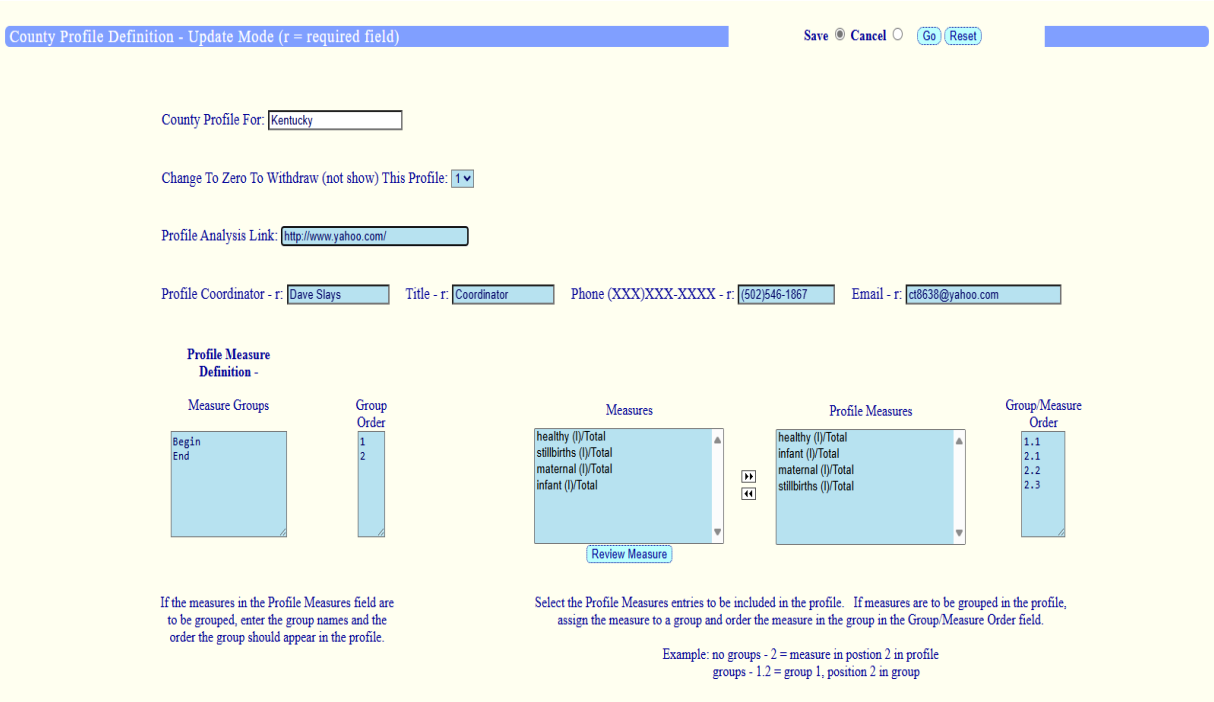
When the last option of the Optional Visualization group is chosen, a content developer must choose what the base 1 profile will be for, the organization or an effort. The enterprise choice is always presented first followed by the efforts in alphabetical order.

The Figure 53 UI allows a content developer to specify the base 1 profile. A single organization (e.g., county) is supported. The first 2 fields are prefilled. Change the 2nd prefilled field to zero to delete the

profile. The 3rd and 4th fields allow the entry of an optional analysis link and the profile coordinator. The 'r' before the coordinator field indicates that the field is required. The Profile Measure Definition includes measure groups if the measures are to be grouped and the group order, profile measures, and the group and order of measures in the group. The following example demonstrates how the Group/Measure Order should be entered in the cases that groups are not used and are used.

Example: no groups - 2 = measure in position 2 in profile
groups - 1.2 = measure in group 1, position 2 in group

Figure 53: Base 1 Profile UI

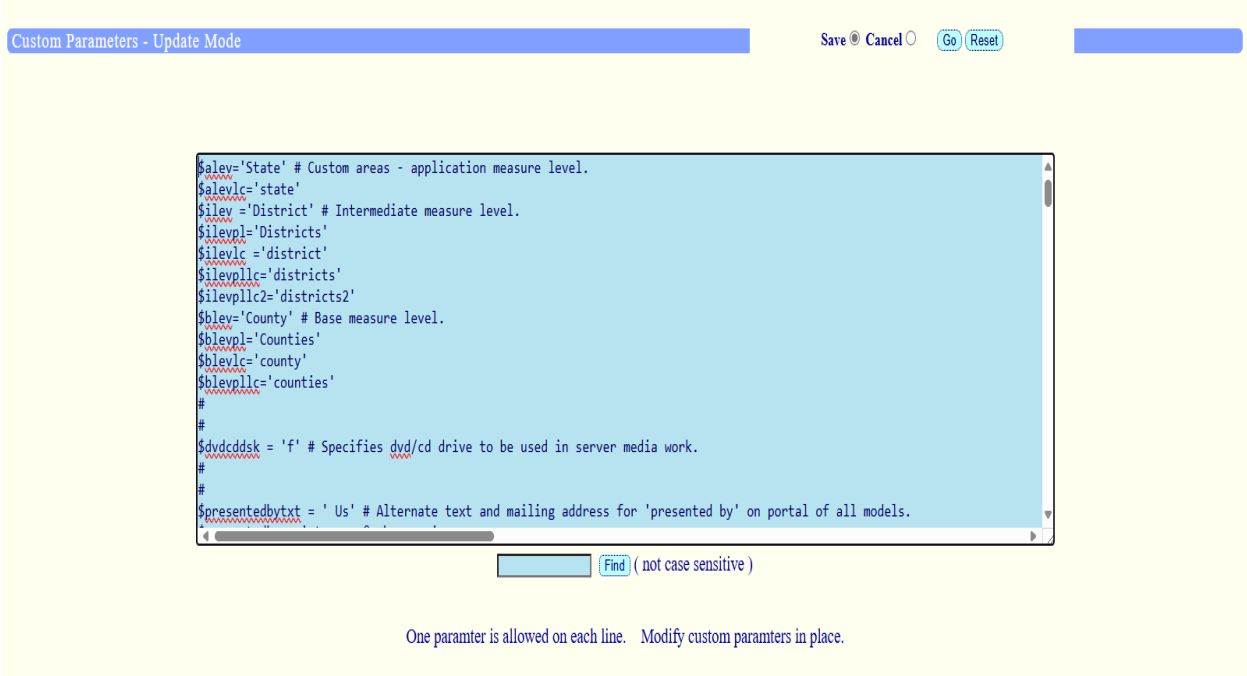


Customization

The last 3 Content Assistant user interfaces (UIs) of the seventh CA group, Customization, are presented next. The 3 customization options are setting custom parameters for the application, defining significant segment/subgroup substitutions for abbreviations for that presentation level, and entering population and coordinate organizations for the intermediate, base 1, and base 2 levels of geographical presentation.

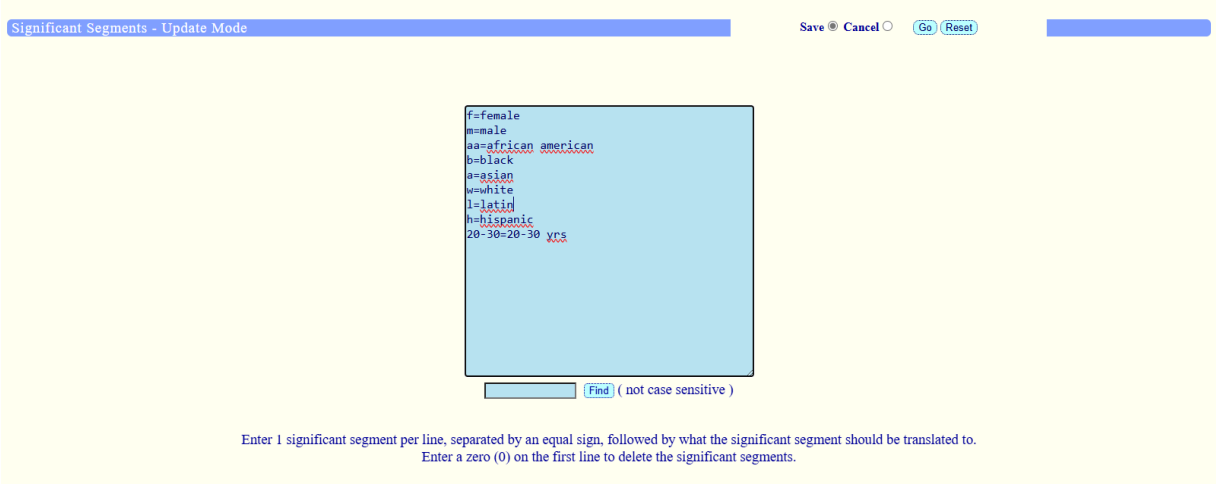
The Custom Parameters option (1st option) leads to Figure 54. This UI allows the specification of a geographical structure, whether to show enterprise and effort visions, which Sights and Sounds visual to use, how many years will be shown on all trend lines, selection of model and primary model interface, choosing optional visual choices, and application coloration (4 colors color about 95% of the application). For all custom parameters, only the string to the right of the equal sign should be changed and that change should match the form of the string supplied with the initial custom parameter file. The custom parameter set cannot be deleted.

Figure 54: Custom Parameters UI



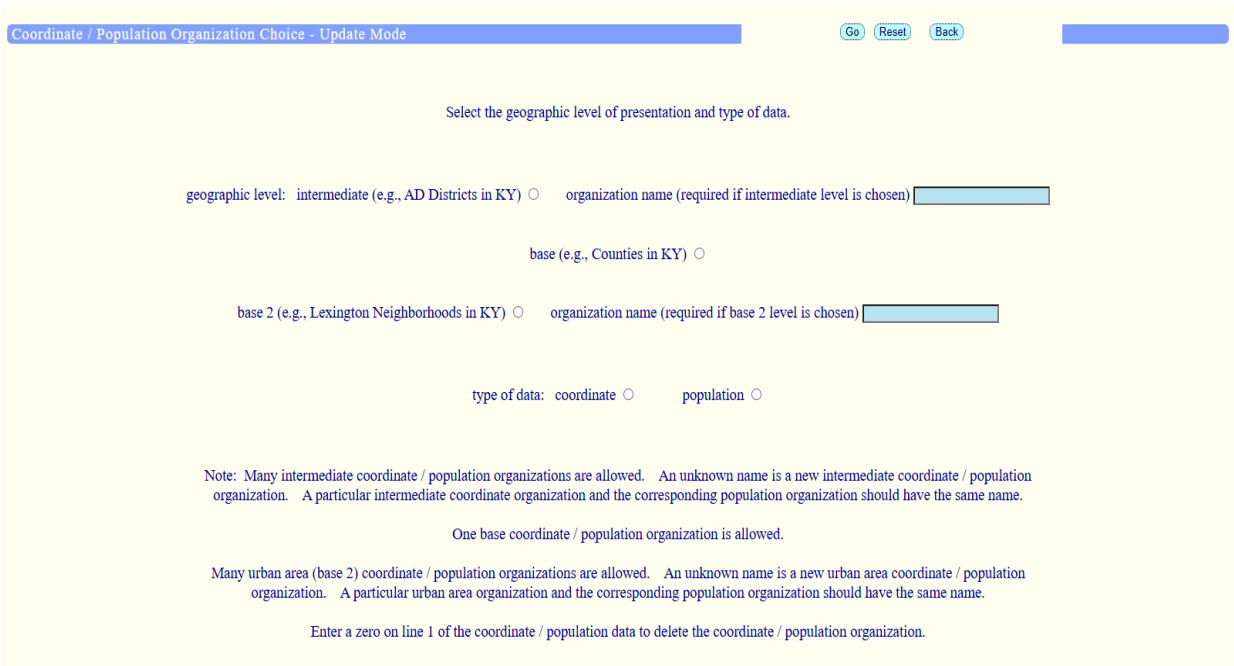
The significant segment / subgroup substitution UI (Figure 55, choice 2 in the Customization group) allows content developers to enter abbreviations and substitute full significant segment/subgroup strings in the significant segment/subgroup visual facility. Each substitution has an abbreviation=substitution structure. Many significant segment/ subgroup organizations are supported. A zero (0) can be entered on the first line to delete the significant segments.

Figure 55: Significant Segments/Subgroups Substitution UI



The 3rd and last option of the Customization group, Figure 56, facilitates the entry of coordinate and population data for the

Figure 56: Coordinate/Population Organization UI



intermediate and 2 base level geographical organizations. The level of organization, the organization file name if intermediate or base 2, and the type of data, coordinate or population, must be specified to access coordinate or population data of a particular organization.

Many intermediate coordinate / population organizations (e.g., districts) are allowed. An unknown name is a new intermediate coordinate / population organization. A particular intermediate coordinate organization and the corresponding population organization should have the same name. One base 1 coordinate / population organization (e.g., county) is allowed. Many urban area (base 2) coordinate / population organizations are supported. An unknown name is a new urban area coordinate / population organization. A particular urban area organization and the corresponding population organization should have the same name. Enter a zero in the name of the coordinate / population organization field on line 1, to delete the coordinate / population organization.

Other customizations include measure descriptions and effort definitions / profiles of best understanding, additional data looks, the entire set of optional visualizations that are not enabled in the Custom Parameters. These include Facts, Key Indicators (specified in Custom Parameters, but not enabled), Timelines, Special Views, County Profiles, and Learn More links that can be inserted into select visuals throughout the information system presentation. This concludes the presentation and discussion of the Content Development function of information system.

An Opportunity

This paper has presented representative government as a continual, hoped for, improvement process organized by repetitive measurement, and based on a partnership of reciprocity between the people and organizations, and institutions and current administration. The people and organizations invest in the offices of government and those offices work to make a difference in the lives and jurisdiction of the partnership within the bounds of propriety, and with the understanding that the partnership does not control everything. The future/ state/difference message could be an important part of the message space of the voting and governing transformations of the process of continual improvement, both decisive and seminal, if not so dissipated, diluted, and at times distorted.

Given the significance of this message in the continual improvement process of representative democracy, *the message seems highly underdeveloped*. The patterns of the process of civilization that are the content of the future/state/difference message are essentially dispersed, ungatherable, and unknowable by an individual. Only through substantial inter- and intra-organizational processes do these patterns, found through repetitive measurement, begin to emerge. In the modern world, these patterns can be presented as a much more accessible, organized, visual, and interactive message about the future America is investing in and working toward, the state of our representative democracy, and difference the partnership is making, composed of the most representative data, information, and knowledge available, based on truth and honesty, as best we know at any time – a deliberate message.

Whether or not 'The STEEP Course' information system, an empty container to be filled, adds anything to the conversation about better information is an open question. However, what there does seem to be broad agreement on is the usefulness and potential benefits of a national indicator system.

Statistical indicators have become basic tools for public administrators at all levels of government and can be used for regulatory purposes, as part of contractual agreements, as monitoring mechanisms, in plan design and development, and for evaluation activities (Koshel, 1997:22). The Office of Management and Budget (OMB) has identified 70 federal agencies that each spends at least $500,000 annually on statistical activities (GAO, 2004:44). Fedstats is an online effort that provides links to a variety of statistics from federal agencies (GAO, 2004:60). Ten principal federal statistical agencies collect, analyze, and produce statistics as their primary mission (GAO, 2004:75). And there are approximately 150 community, state, or regional indicator projects across the United States (Steinhardt, 2016:7).

The potential usefulness (GAO, 2004:22-23 and 176-177) of a national indicator system could:

- highlight areas in which progress has been made in improving the behavior of people or their living conditions as well as areas needing new or higher levels of public attention;
- connect debates about the relative merits of competing demands for reliable

data about actual behaviors and conditions to help determine priorities and make difficult choices among competing agendas;

- provide information about changes over time, which would contribute to assessments about the impact of particular interventions and policies, thereby providing greater accountability and learning;
- facilitate comparisons within or among the states or the nation as a whole with other countries, which are central to understanding the U.S. role in the global community and informing decisions about emerging issues;
- accelerate the identification of important gaps in the nation's knowledge about important issues and populations and the quality of that knowledge through regular collaboration and dialogue with other comprehensive and topical indicator systems;
- expand the level of knowledge throughout the country as users of comprehensive indicator systems pursue more detailed information from topical indicator systems;
- improve the degree of fact-based consensus on common aspirations, which could help shift scarce time, energy, and resources from debating facts and aims to discussing priorities and building bodies of evidence for setting priorities and discovering the most effective solutions;
- allow various individuals and institutions within a particular jurisdiction to see themselves in the context of a larger social unit (e.g., how state issues interrelate with national issues), compare themselves to other jurisdictions (e.g., states comparing themselves with other states), and in relation to other communities and neighborhoods;
- if implemented electronically via the World Wide Web, provide many more people and institutions around the country an accessible and usable *window* into the nation's critical sources of data, thus increasing the return on the large investments already made and leveraging ongoing investments to collect more data more frequently; and
- at the federal level, inform a much needed re-examination of program efficacy and the mandated creation of a government wide performance plan.

The potential benefits of a set of key national indicators include helping to assess the overall position and progress of our nation in key areas, framing strategic issues, supporting public choices, enhancing accountability, and informing citizens, and could help improve evaluations of how well the nation is addressing and

resolving key issues and concerns (GAO, 2003:6). A review of comprehensive key indicator systems showed evidence of positive effects in five areas (GAO, 2004:14-16) including:

- enhancing collaboration to address public issues by revealing significant public policy problems or raising the profile of new, divisive, or poorly understood issues;
- providing tools to monitor and encourage progress toward a shared vision or goals;
- helping inform decision making and improving research by integrating relevant data, information, and knowledge resources in a single, easily accessible, and useable resource;
- increasing public knowledge about key economic, environmental, and social and cultural issues and their interrelationships; and
- aiding in exposing data, information, or knowledge gaps about significant issues resulting from (1) the absence of data or information; (2) inadequate knowledge about the interactions between effort situations (e.g., the impact of economic development on crime); or (3) a poor understanding about the behaviors and conditions that affect certain population groups.

Transparent, reliable, and timely and useful information is the single most important and powerful tool to inform and facilitate strategic planning and link shared purposes, inform and facilitate congressional oversight and decision making, strengthen accountability and enhance performance, assess progress at all levels of American society, and stimulate greater citizen engagement, helping:

- understand which programs, policies, functions, and activities are working and which are not and reduce waste, prevent corruption, and shift resources where needed;
- educate policymakers and the public about the appropriateness, affordability, and sustainability of a nation's current path and assist in limiting abuses of power, ensuring that no one is above the law and everyone is accountable for results;
- elected officials make tough but necessary policy choices including facilitating better targeting of government actions while ensuring long-term fiscal, social and environmental sustainability, intergenerational equity of existing and proposed government policies and programs, and consideration

of the greater good and the longer term stewardship responsibilities to future generations;
- build public trust and confidence in government, gain public support, and help regular individuals better understand complex issues and encourage greater citizen engagement in the public policy process, backed by credible, objective information; and
- increase our chances of developing well-framed questions, conducting appropriate analyses, making good decisions, arriving at effective solutions, and creating accountability for results. (after Walker, 2004:5-8 and 2008:24-25, and Steinhardt, 2016:6)

A comprehensive indicator system can selectively aggregate information to provide a broader perspective, clarify problems and opportunities, identify information gaps, set priorities, test effective solutions, track progress towards achieving real results, serve as a framework for strategic planning, enhance annual performance and accountability reporting, help inform policy-makers in making important public choices, and aid in conducting baseline reviews of existing government policies, programs, and functions (Walker, 2005:11 and 14).

The primary *challenges* (adapted from GAO, 2004:17-21) a national indicator system will face and how those challenges might be approached include:

- *gaining and sustaining stakeholders' support* by
  - establishing a clear purpose and defining target audiences and their needs to learn about important behaviors and conditions and measure progress toward specific outcomes at all jurisdictional levels for government policymakers, business leaders, researchers, not-for-profit organizations, the media, special interest populations, and citizens,
  - ensuring independence and accountability and avoiding political and commercial pressures, remaining independent from political agendas and commercial interests, working to ensure transparency and accountability, and emphasizing problem areas or opportunities for improvement,
  - creating a broad-based governing structure and actively involve stakeholders - include a blend of public and private officials and represent views from various communities to help ensure that the system maintains a balanced perspective to meet diverse needs and

avoid "capture" by one party or particular interest group, and
    - implementing engaging marketing and supportive communications strategies by integrating the information system into all levels of government, libraries, high schools, universities, media, for profit and not for profit organizations, and special interest groups, as a tool to learn about the future America is investing and working toward and assess the progress of our nation in pursuing that vision, promoting the existence and features of the information system, and providing training and assistance to users where needed;
- *securing and maintaining adequate funding* by
    - securing stable and diversified funding sources, and
    - insuring that a sound financial and operational understanding is in place with each funding source to increase the chance of being able to facilitate adjustments to fluctuations in funding or operations;
- *agreeing on the types and numbers of indicators to include and how indicators or data will be obtained* by
    - designing effective development and implementation processes with transparent, cooperative, reproducible, and repeatable processes in developing, modifying, and customizing the application software that organizes measures/indicators in the presentation,
    - recognizing and enhancing state, effort situation, measure profiles that have been developed, knowing that measures may be added or removed and the profile completely reorganized,
    - acquiring measures and indicators, measure data, or data to compute indicators as needed, insuring data providers reliably provide quality data with reproducible data processes, and acknowledging that states have procedures in place that select measures, collect, compile, and access measure data, and assess the representativeness, credibility, and reliability of each measure, the measure data, and the data source, and
    - insuring key indicators are common to all states and key indicator procedures be reviewed/audited for concerns, needed adjustments, potential substitutions or reorganization, and opportunities; and
- *effectively leveraging information technology* by
    - attracting and retaining staff with appropriate skills by attracting new talent where needed and leverage, promote, organize, incentivize, and support the substantial and diverse skill base already in place in every

state and our nation in each of the effort situations states and our nation are already investing and working in to improve, and

- building a national indicator system, as envisioned here, that would be a distributed information system comprised of 50 dedicated state cloud servers and one dedicated cloud national server, distributing the client processing load, using the World Wide Web and the document universe to acquire the data, information, knowledge, and other content that the information system presentation is built on and disseminate that presentation easily and widely to anyone interested at any time.

An American indicator system, like the 'The STEEP Course' presentation, would certainly be a national laboratory of democracy, operating at the levels of presentation of this information system. Each state would produce and maintain as a standard, ongoing operating procedure, an expert system about that state, from event to measure, measure/fact based, as the state sees itself, contributing key indicators to the production of a guiding image about the nation as a whole. Honig (2011:6) recounted some of the important lessons of this laboratory saying that:

- citizens can find common ground and care about results;
- diverse points of view can have a shared frame of reference;
- facts and words matter — process can equal substance;
- relevance, credibility, and legitimacy should be balanced;
- increasing utility of measures increases potential impact;
- looking at the whole reveals the parts in new ways; and
- what we don't know is as interesting as what we do.

Certainly, these would be valuable lessons, strengthening the connective tissue and supportive structure of the United States of America.

In America, power resides with the people and their duly elected representatives, and knowledge serves to both inform and constrain the use of power (GAO, 2004:1). The opportunity before us is to build a reasonably comprehensive American indicator system. It would be a common basis of relevant, reliable, credible, recognized, comparable, and transparent data, information, and knowledge, that presents the position and progress of the nation as a whole and its parts. It would aggregate vital information across sectors, levels of societies, and institutions, and integrate the amazing wealth of state resources,

specialized/relatively comprehensive indicator resources, and federal expertise in a way that is accessible, useable, understandable at the initial presentation level with the option to explore. It would be available to any person or institution, anywhere, at any time, for any purpose, to help all Americans better define, assess, and communicate about the progress of our nation in the situations that America is investing and working in to improve and the most important issues facing the country (after GAO, 2004:2, 22, 31, and 175, Walker, 2004:7 and 10, and Hoenig, 2011:3 and 6).

An information resource, like 'The STEEP Course', would, if founded on truth and honesty, embraced by government, promoted and positioned effectively, and free of political agendas and commercial interests, be a solid foundation, powerful platform, and reliable companion in the journey to a better tomorrow. It would: inform American people about and allow them to assess the progress of our nation, states, and effort situations; influence the tone and conduct of civil discourse by providing a common basis of credible fact; build trust in the partnership at all levels by presenting the hard and important work of government; provide easily accessible, expert selected, reliable measures with easy to understand, progress indicators, from events to measures, at all levels of the partnership for policy, program, and project planning, monitoring, and evaluation; and present our country, states, and effort situations as whole entities, all working to improve America. It would present a step up in American self-awareness, transparency, and accountability - a deliberate message *by* the many people who have been and are involved in the development and maintenance of the processes and procedures that bring data from events to measures and those that would craft the STEEP presentation and explain the meaning of measure behavior, *of* the behavior of our people and the condition of our place, and *for* all Americans, private organizations, public institutions, levels of government, and the partnership of our representative democracy.

References

Abraham Lincoln Online, 2018, House Divided, https://www.abrahamlincolnonline.org/lincoln/speeches/house.htm

Ackoff, Russell L. and Emery, Fred E., 1972, On Purposeful Systems

Chantrill, Christopher, 2023, Government Spending Details for 2023, https://usgovernmentspending.com/classic

Council on Foreign Relations, 2021, Why Does the Census Matter?, https://www.cfr.org/backgrounder/why-does-census-matter

Eliot, M. J., Ed., 1910, American Historical Documents, No. 43, Harvard Classics

Galbraith, J. K., 1996, The Good Society: The Humane Agenda

GAO (United States Government Accountability Office), 2003, HIGHLIGHTS OF A GAO FORUM Key National Indicators: Assessing the Nation's Position and Progress, May, https://www.gao.gov/assets/gao-03-672sp.pdf

GAO (United States Government Accountability Office), 2004, INFORMING OUR NATION Improving How to Understand and Assess the USA's Position and Progress - Report to the Chairman, Subcommittee on Science, Technology, and Space, Committee on Commerce, Science, and Transportation, U.S. Senate, https://www.gao.gov/assets/gao-05-1.pdf

Gurria, Angel, 2008, 'How Key National Indicators Can Improve Policy Making And Strengthen Democracy', STATISTICS, KNOWLEDGE AND POLICY 2007: Measuring and Fostering the Progress of Societies, ISBN 978-92-64-04323-7 OECD, chapter 1, https://books.google.com/books?hl=en&lr=&id=e-bVAgAAQBAJ&oi=fnd&pg=PA23&dq=related:sl_fqbFLBzIJ:sch

olar.google.com/&ots=pu011F0vdJ&sig=7K7edVZRBZxi2zTVb-ndg28XOrM#v=onepage&q&f=false

Hayek, F. A., 1989, 'The Fatal Conceit: The Errors of Socialism', The Collected Works of F. A. Hayek, W. W. Bartley III (Editor), Volume I, U. of Chicago

Hoenig, Christopher, 2011, A Key Indicator System For The United States, https://acwi.gov/swrr/p&p_library/apr-2011/Hoenig_LeadingAmericanInstitutions_2Q2011.pdf

Kentucky Department of Education, 2022, Kentucky Education Facts, https://education.ky.gov/comm/edfacts/Pages/default.aspx

Knight Labs, 2023, Northwestern University, Projects | Knight Lab (northwestern.edu)

Koshel, J., 1997, Indicators as tools for managing and evaluating Programs at the National, State, and Local levels of Government: Practical and Theoretical Issues (No. 73), University of Wisconsin--Madison, Institute for Research on Poverty, https://www.irp.wisc.edu/publications/sr/pdfs/sr73.pdf

Miller, James Grier, 1978, Living Systems, Chapter 4, p. 121

Nagel. E., 1952, 'Automatic Control', Scientific American, September, Vol.187, No. 3, p. 47, https://archive.org/details/sim_scientific-american_1952-09_187_3/page/46/mode/2up

Smith, A., 1911, An Inquiry into the Nature and Causes of the Wealth of Nations, London: G. Bell

Steinhardt, Bernice, Director, Strategic Issues U.S. Government Accountability Office, 2016, Key National Indicator Systems: A U.S. Perspective, INTOSAI Working Group on Key National Indicators, PPT - Key National Indicator Systems: A U.S. Perspective PowerPoint Presentation - ID:6751200 (slideserve.com)

Richard Ulack, Karl Raitz and Gyula Pauer (Ed.), 1998, The Atlas of Kentucky, The University Press of Kentucky, Atlas of Kentucky - The University Press of Kentucky (kentuckypress.com)

The State Of The USA, 2022, http://stateoftheusa.org/content/working-toward-a-key-national-indicator-system.php

Walker, David M., 2004, Key National Indicator Systems: An Opportunity to Maximize National Progress And Strengthen Accountability, World Indicators Forum, Palermo, Italy, November 11, https://www.gao.gov/assets/knis11112004.pdf

Walker, David M., 2005, 'Key National Indicator Systems: An Opportunity to Assess National Progress, Improve Performance and Strengthen Accountability', The Journal of Government Financial Management, Vol. 54, Iss Collaborative 2, (Summer): 10-14

Walker, David M., 2008, 'How Key National Indicators Can Improve Policy Making And Strengthen Democracy', STATISTICS, KNOWLEDGE AND POLICY 2007: Measuring and Fostering the Progress of Societies, ISBN 978-92-64-04323-7 OECD, chapter 2, https://books.google.com/books?hl=en&lr=&id=e-bVAgAAQBAJ&oi=fnd&pg=PA23&dq=related:sl_fqbFLBzIJ:scholar.google.com/&ots=pu011F0vdJ&sig=7K7edVZRBZxi2zTVb-ndg28XOrM#v=onepage&q&f=false

Wikipedia, 2023, United States census, History, https://en.wikipedia.org/wiki/United_States_census

Wikipedia, 2024, Comprehensive Employment and Training Act, https://en.wikipedia.org/wiki/Comprehensive_Employment_and_Training_Act

Appendix

The set of effort situation 'profiles of best understanding', what emerged from the exercise of the methodology discussed on p. 20, is presented in this Appendix. The order of presentation corresponds to the matrix structure of Figure 16 (p. 35) – each column left to right, all efforts top to bottom. Some profiles are more developed. Some are more conceptual than measured. Some are just beginnings like the 3 effort situations of the Organizational row. These were included as an example of that row. These 32 profiles are the result of a single pass gathering and organization of the result/outcome measure base of Kentucky. Four, Toxic Burden, People, Communities, and Environment, are composite profiles (p. 38). Two, Infrastructure and Pollution, are related profiles (p. 38) of 6 simple profiles. One, Sustainability, was generated with AI. Subtract the 3 Organizational efforts below not shown in Figure 16 and 29 efforts remain as discussed in the methodology (p. 20) and shown in Figure 16. Subtract the 2 related efforts, add back the 6 simple efforts the 2 are composed of, and add back the 3 Organizational efforts, to get the 36 efforts shown in this appendix. They are only examples of what must exist in the measure landscape of Kentucky and every other state. If the real profiles ever come to fruition, they will be created and maintained by the expert layer of each effort situation, and can be different in every way except form.

	Human Health, Well Being, and Safety	Organizational Development	Natural Resources and Environmental Protection
Sociocultural	Health Children Adults Families	K 1 To 12 Education Continuing Education	Public Stewardship
Technological	Housing	Infrastructure Agriculture Practices	Amelioration
Economic	Poverty Crime & Punishment Work	Health Care Economic Development Opportunity	Process Adaptation
Environmental	Toxic Burden	Domestic Waste Conservation	Pollution Species Pressure
Political	People	Voting Political Corruption Communities	Environment Sustainability
Organizational	Employees	Government Process	Service

Health

Effort / Ideal: *No Disease, Illnesses, Or Accidents* x/x/x

yr v r s c i d

Births
- healthy
- stillbirths
- complications at birth
- complications within 90 days after birth
- congenital anomalies

Physical Conditioning/Lifestyle
- BMI
- cardio-vascular
- muscular
- flexibility

- with good diet
- exercises regularly
- don't smoke
- don't abuse substances
- use seatbelts

Morbidity
- all causes
- vaccine preventable
- sexually transmitted
- substance abuse related
- public health incidence

Accidents
- at home
- work related
- cost to employers
- product related
- in public

Disabilities
- people with
- receiving public assistance

Mental Illness
- people with some form
- needing treatment
- needing but not getting treatment
- substance abuse
- with frequent feelings of loneliness, depression, or alienation
- homeless with some form of
- suicide

Deaths
- all causes
- maternal
- infant
- infants born to teen mothers
- childhood
- adult
- senior

Longevity
- age at death
- quality of life in last 5 years

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Children

Effort / Ideal: *No Unwanted Or Mistreated Children* x/x/x

yr	v	r	s	c	i	d

Individual
- abortion
- abused
- institutionalized
- substance abuse
- physical conditioning
- chronic hunger

Family
- from broken families
- abuse (physical, sexual, and neglect)
- child support owed and collected
- discarded children

Institution
- crime in schools
- children in foster care waiting for adoption
- foster care placements before adoptions
- time in foster care
- adoptions that don't work out

Culture
- in poverty
- crime (through 18 years of age)
- homeless children
- child abductions (solved/unsolved)
- murdered children

Environment
- toxic burden
- birth defects
- childhood diseases
- cancer

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Adults

Effort / Ideal: *No Adult Abuse, Neglect, Exploitation, Or Poverty* x/x/x

	yr	v	r	s	c	i	d
Adult Abuse							
Spouse							
Caretaker							
Neglect							
Self-Neglect							
Exploitation							
In Poverty							
Unemployed / Needing Work							
Homeless							
Substance Abuse							
Crime (criminal and victim)							
Murdered Adults							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Families

Effort / Ideal: *No Broken Families* x/x/x

	yr	v	r	s	c	i	d
Families In Crisis (e.g., due to poverty, spousal and child abuse, adultery, substance abuse, death of a child or spouse, homeless, hunger, etc.)							
Divorce (with and without children)							
Divorced Parents Receiving 'Children Of Divorce' Education							
Siblings Separated At Entry Into Foster Care / Adoption Process							
Single Parents In Poverty							
Homeless Families							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Housing

Effort / Ideal: *Affordable Up-To-Standard Housing For All* x/x/x

	yr	v	r	s	c	i	d

No Housing
- homeless
- with mental illness and / or substance abuse issues
- receiving any form of help
- recurrence
- duration
- cause/precipitating factor

Public Housing
- units meeting building codes
- considered substandard
- available / needed
- wait for a unit
- public health incidence
- vacancy rate
- with acceptable water and air quality
- fires
- residences overcrowded
- able to afford
- satisfied with
- no phone
- no vehicle
- crime
- receiving other public services

Private Housing
- owners / renters
- units meeting building codes
- considered substandard
- available / needed
- no treated water
- no sewage treatment
- without energy / power
- no heat
- no garbage collection
- partial / no plumbing
- partial / no kitchen
- with acceptable water and air quality
- fires
- overcrowded
- affordability
- no phone
- no vehicle
- accessibility
- discrimination

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Work

Effort / Ideal: *Every Person Wanting To Work Is Able To Find Safe, Acceptable Work Within A Reasonable Time At At Least A Livable Wage* x/x/x

	yr	**v**	**r**	**s**	**c**	**i**	**d**
Unemployment							
Underemployment							
Employment							
Labor Force Participation							
Occupational Safety and Health							
Workforce Preparedness							
Wages and Income							
Job Vacancy and Turnover							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Crime And Justice

Effort / Ideal: *No Crime Under The Law* x/x/x

yr	v	r	s	c	i	d

Criminal Behavior

- crime by category
- victims receiving some form of support

Apprehension

- crimes reported / unreported
- of crimes reported, suspects apprehended
- average personnel training hours

Arraignment

- of suspects apprehended, number arraigned
- time from apprehension to arraignment

Trial

- of people arraigned, number tried
- time from apprehension to trial
- time from arraignment to trial

Conviction

- of suspects tried, number convicted
- convictions overturned

Punishment

- incarcerated population
- cost of incarceration
- part of punishment served
- crime in prison
- average personnel training hours
- facility capacity / need
- facilities with a 4 or 5 rating

Rehabilitation

- prisoners completing rehabilitation program

Recidivism

- released returning within 2 years
- receiving a rehabilitation program returning within 2 years

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Poverty

Effort / Ideal: *No Poverty* x/x/x

	yr	v	r	s	c	i	d
Homeless							
At Or Below 100% Of Poverty							
At Or Below 200% Of Poverty							
Children							
Children With Low Hemoglobin (<= 5)							
Children With Low Weight For Height							
Children Eligible For School Meals / Early Childhood Programs							
Single Parents							
Older People							
Veterans							
In Public Housing							
Households Receiving Pa Income (e.g., afdc, food stamps, medicaid, wic, etc.)							
Unmarried Births							
Teen Births							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Toxic Burden

Effort / Ideal: *No Toxic Body Burden* x/x/x

	yr	v	r	s	c	i	d
Bad Habits **smoke** **have bad diet** **over eat** **don't exercise** **abuse illegal substances** **drink too much** **are overweight / obese** **diagnosed with hypertension** **has diabetes** **reporting less than good health** **don't use seatbelts**							
+							
abuse							
+							
poverty							
+							
crime							
+							
pollution							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

People

Effort / Ideal: *A Healthy, Fit, Independent Population* x/x/x

yr v r s c i d

health

+

Good Habits
- **don't smoke**
- **have good diet**
- **don't over eat**
- **exercise reasonably**
- **don't abuse illegal substances**
- **don't drink too much**
- **weight in the ball park they should**
- **no hypertension**
- **no diabetes**
- **reporting good health or better**
- **use seatbelts**

+

toxic burden

+

health care

+

education

+

opportunity

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Employees

Effort / Ideal: *Employees That Enjoy Their Work, Do An Excellent Job, And Intend To Stay* x/x/x

K 1 – 12 Education

Effort / Ideal: *Every Person Shall Receive A Safe, Quality High School Or Equivalent Education, Graduate In At Least Fair Physical Condition, And Make An Acceptable Transition After High School* x/x/x

	yr	v	r	s	c	i	d

Equity
- educational funding equity
- eligible children who participate –
  - early childhood education/school meals/after school programs

Facilities
- percent of facilities with a 4 or 5 rating
- class size
- equipment adequacy
- school supplies availability
- learning obstacle equipped
- accidents

Parents
- parents who read to their children every day (age ≤ 8)
- ensure homework is done daily
- attend parent/teacher conferences
- attends school activities
- volunteered for school-related activities/last year

Teacher Preparation/Conduct
- teacher hours of continuing education
- teachers with specialty certification(s)
- teachers with advanced degrees
- disciplinary actions

Academics
- KIRIS / CATS (all level averages distinguished)
- SAT / ACT

Student Conduct
- attendance
- student substance abuse
- student sexual activity
- teen mothers
- disciplinary actions
- suspension/expulsions – substance abuse / violence related
- juvenile crime

Physical Conditioning/Lifestyle
- BMI
- cardio-vascular
- muscular
- flexibility

- with good diet
- exercises regularly
- don't smoke
- don't abuse substances
- use seatbelts

Retention
- retention - 9th graders completing high school
- dropouts
- did not complete high school / mothers
- less than 9th grade education / mothers

Transition
- successful transition after high school
- completed high school or higher

Remediation
- illiteracy
- adult E / L population / enrolled

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Continuing Education

Effort / Ideal: *Kentucky Becomes A Learning State* x/x/x

yr	v	r	s	c	i	d

Literacy
- illiterate target population engaged
- % of population illiterate

Secondary
- high school graduates
- high school graduates entering college

Post-Secondary
- associate degree or higher
- bachelor degree or higher
- advanced degrees
- participating in post-secondary education
- non-traditional students (age >= 25)

Training
- participated in training in last year
- received environmental education last year

Healthy Lifestyle
- with good diet
- exercises regularly
- don't smoke
- don't abuse substances
- use seatbelts
- practices preventive medical / dental care

Learning Skills Exercise
- follows current affairs
- reads regularly
- does arithmetic when required
- converses regularly

Technology Use
- with county library
- uses library
- have or use PC at home, work, or school use
- uses internet
- watches KET
- watches other educational programming

R&D
- expenditures
- library/archive facilities up-to-standard
- library/archive contents up-to-date
- library/archive expenditures/need

Facilities
- percent of facilities with a 4 or 5 rating
- equipment adequacy
- learning obstacle equipped
- accidents

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Infrastructure

Effort / Ideal: *An Intelligent, Well Maintained Infrastructure* x/x/x

Soft

hospitals / clinics x/x/x

mental health facilities x/x/x

nursing homes x/x/x

commercial buildings / structures x/x/x

communications / computation assets x/x/x

plant / equipment x/x/x

day care / early childhood learning centers x/x/x

educational facilities - grades 1 through 12 x/x/x

community colleges / vocational education facilities x/x/x

universities x/x/x

community centers / parks / cemeteries x/x/x

parks / preserves / public lands x/x/x

public housing x/x/x

government / military facilities x/x/x

criminal justice facilities x/x/x

Hard

transportation – roads / bridges / airports / railroads / welcome center / rest areas / truck weigh stations / public transit systems / public vehicles x/x/x

oil / natural gas production / distribution x/x/x

energy / power generation / distribution x/x/x

water supply acquisition / treatment / storage / distribution x/x/x

dams / locks x/x/x

sewers / flood control / impoundments x/x/x

rivers / lakes x/x/x

waste water routing / treatment / disposal x/x/x

pollution control treatment / recycling / containment x/x/x

hazardous / toxic waste treatment / recycling / containment x/x/x

garbage pickup / transport / recycling / disposal x/x/x

Transportation/Roads

Effort / Ideal: *All Roads Shall Be Well Maintained, Safe, And Have An Acceptable Ride Quality* x/x/x

	yr	v	r	s	c	i	d

Interstates
- **U / R mi**
- **ride quality**
- **needing improvement**
- **MRP**
- **accidents**
- **involving death**
- **involving substance abuse**

Parkways
- **U / R mi**
- **ride quality**
- **needing improvement**
- **MRP**
- **accidents**
- **involving death**
- **involving substance abuse**

Metropolitan Primary
- **U / R mi**
- **ride quality**
- **needing improvement**
- **MRP**
- **accidents**
- **involving death**
- **involving substance abuse**

Rural Secondary
- **U / R mi**
- **ride quality**
- **needing improvement**
- **MRP**
- **accidents**
- **involving death**
- **involving substance abuse**

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Transportation/Bridges

Effort / Ideal: *All Bridges Shall Be Functionally Adequate And Structurally Sound* x/x/x

	yr	v	r	s	c	i	d
Interstates							
functionally obsolete %							
structurally deficient							
Parkways							
functionally obsolete %							
structurally deficient							
Metropolitan Primary							
functionally obsolete %							
structurally deficient							
Rural Secondary							
functionally obsolete %							
structurally deficient							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Agricultural Practices

Effort / Ideal: *Best Agricultural Practices Throughout the State* x/x/x

yr v r s c i d

Farms
- number / area – family / corporate
- farm foreclosures
- net income
- using best management practices
- highly erodible land set aside
- productivity
- practicing runoff control
- erosion
- chemical use
- agricultural land lost to development

Cropland
- using best management practices
- under cropping practices to minimize soil disturbance and reduce erosion
- practicing integrated pest management
- pesticide / herbicide use
- crop toxicity

Grazing Land
- using best management practices
- under grazing practices to minimize soil disturbance and reduce erosion
- hormone / antibiotic / pesticide / herbicide use
- meat toxicity

Forests
- with management plans
- under best management practices
- logging operations using best practices
- acreage lost to blight, arson, development, mining, etc.
- acreage needing reforestation – public / private
- acreage reforested – public / private
- pesticide / herbicide use
- 'old growth' forests protected
- communities with forest programs
- communities with Tree City certification

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Health Care

Effort / Ideal: *Affordable, Quality Health Insurance And Care For All* x/x/x

	yr	v	r	s	c	i	d

Preparedness
- people with insurance / health care coverage
- exercising regularly
- with a good diet / practicing proper nutrition
- use seat belts
- do not smoke
- not overweight / obese
- do not abuse substances
- problem with access to food
- indigent / destitute/homeless

Prevention
- mothers without prenatal care in first trimester
- drank, smoked, or did drugs during pregnancy
- children immunized by age two
- had hearing / vision checked before starting school
- having a physical in previous 2 years
- seeing a dentist in last year
- brushing teeth daily
- with fluoridated public water supply
- reporting influenza / pneumonia immunization
- cholesterol screening
- cervical cancer screening
- colon / rectal screening

Maintenance
- density of primary care doctors up to standard
- nurse practitioners
- dentists
- public health clinics
- second tier hospitals
- first tier hospitals
- nursing homes
- public health / medical related violations

Emergency
- density of trained EMS personnel up to standard
- counties with enhanced 911 services
- with ambulance services
- advanced life support capability
- certified emergency treatment facility

Oversight
- malpractice – claims / substantiated by category
- unneeded / botched procedures
- prescription drug abuse
- overcharging
- investigative capacity / need

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Economic Development

Effort / Ideal: *A Robust, Sustainable, And Inclusive Economy* x/x/x

	yr	v	r	s	c	i	d
Economic Growth							
Employment							
Income Levels							
Business Environment							
Quality of Life							
Sustainability							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Opportunity

Effort / Ideal: *Equal Opportunity For All* x/x/x

	yr	v	r	s	c	i	d
Health Care							
Housing							
Education							
Employment							
Unemployment							
Criminal Justice							
Finance							
Public Accommodations							
Public Office							
Investigative Capacity / Need							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Domestic Waste

Effort / Ideal: *Everything That Can Be Recycled Will And Everything That Cannot Will Be Effectively Sequestered* x/x/x

yr	v	r	s	c	i	d

Wastewater

- **wastewater per person**
- **households connected to sewers that should be**
- **straight pipes**
- **sewer overflows**
- **wastewater receiving at least secondary treatment**
- **storm water runoff untreated/needed**

Solid Waste

- **solid waste per person**
- **households with garbage collection**
- **households that don't recycle**
- **solid waste generated / collected**
- **solid waste recovered / recycled/composted**
- **litter – land / water**

Violations/Inspection

- **wastewater discharge violations**
- **wastewater treatment plant violations**
- **solid waste violations**
- **open dump violations**
- **inspection capacity / need**

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Conservation

Effort / Ideal: *Kentucky Becomes a Conserving State* x/x/x

	yr	v	r	s	c	i	d
Personal Accountability							
carbon footprint							
energy consumption							
waste management							
water conservation							
sustainable practices							
Community Involvement							
public transportation							
green initiatives							
inclusive growth							
community health							
Public / Commercial process / infrastructure adaptation							
Industrial Innovation							
process efficiency							
waste reduction							
emission controls							
sustainable supply chains							
innovation index							
system effectiveness							
Environmental Protection							
public stewardship							
process adaptation							
amelioration							
specie pressure							
habitat protection							
pollution							
Robust Policy Advocacy							
legislation enactment							
renewable energy adoption							
national cooperation							
regulatory compliance							
life cycle comparative analysis							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Voting

Effort / Ideal: *All Legitimate Voters Are Registered And Vote* x/x/x

	yr	v	r	s	c	i	d
Eligible Voters Registered							
Registered Voters Voting In Local Elections							
In State Elections							
In Federal Elections							
Voters In Local Elections That Felt Electoral Content Was Presented Well (e.g., offices, candidates, issues, positions, etc.)							
In State Elections							
In Federal Elections							
Participating In Electoral Process In Some Way Other Than Voting (e.g., manning a voting station, participating in a campaign for office, etc.)							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Political Corruption

Effort / Ideal: *No Political Corruption* x/x/x

	yr	v	r	s	c	i	d
Executive Branch							
investigations initiated							
confidential reprimands							
adjudicatory proceedings							
cases referred to law enforcement							
convictions							
investigative capacity / need							
Legislative Branch							
investigations initiated							
confidential reprimands							
adjudicatory proceedings							
cases referred to law enforcement							
convictions							
investigative capacity / need							
Judiciary							
investigations initiated							
confidential reprimands							
adjudicatory proceedings							
cases referred to law enforcement							
convictions							
investigative capacity / need							
Attorneys							
investigations initiated							
confidential reprimands							
adjudicatory proceedings							
cases referred to law enforcement							
convictions							
investigative capacity / need							
Police							
investigations initiated							
confidential reprimands							
adjudicatory proceedings							
cases referred to law enforcement							
convictions							
investigative capacity / need							
Urban/Local Governments							
investigations initiated							
confidential reprimands							
adjudicatory proceedings							
cases referred to law enforcement							
convictions							
investigative capacity / need							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Communities

Effort / Ideal: *Healthy, Participating Communities* x/x/x

yr v r s c i d

infrastructure
+
housing
+
people
+

Means of Livelihood – Context / Entrepreneurship / Economic Development / Civic Support

area considered impoverished
in need of reclamation
illiteracy rate
people without a high school education
labor force participation
elderly
living with polluted water / air
soil erosion – crop / pasture

Junior Achievement participation
had leadership training
started business
considered starting a business
organized group to help community
self-employed people

gross product
net business change – number / size
net business income
manufacturing
exports / imports > 1 by industry
net farm change – number / size
net farm income
net job change
personal income / (costs + all taxes rate) > 1 by income strata
unemployment
work commute
net migration

parent child care satisfaction
small business owner's assessment – community support / government responsiveness

Ways of Life – Human Relations / Civility / Well-being / Cultural Opportunity / Voter Participation

people you can rely on in a time of need
trust others
abortion
divorce involving children
completed high school or higher

volunteered to help a community group / last year
made charitable contributions / last year

feel safe in community
express civic pride
crime
substance abuse
people in poverty

historic sites preserved
went to a museum, festival, performance, or historical site / last year

voter behavior in federal, state, and local elections

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Government Organization

Effort / Ideal: *A Well-Managed, Stable, Fair, Effective State Government* x/x/x

Public Stewardship

Effort / Ideal: *All Parks, Preserves, And Public Lands Are Well Managed* x/x/x

	yr	v	r	s	c	i	d

General Commerce
- tourism revenue
- tourism visitors to Kentucky
- park visitors
- park visitor's satisfaction / intend to return
- arts / crafts revenue
- arts / crafts event revenue
- historical sites revenue
- historical sites event revenue

Resorts
- facilities up-to-standard
- infrastructure up-to-standard
- visitors
- visitor's satisfaction / intend to return
- net revenue
- KY arts / crafts revenue
- community income

Recreation parks
- facilities up-to-standard
- infrastructure up-to-standard
- visitors
- visitor's satisfaction / intend to return
- net revenue
- KY arts / crafts revenue
- community income

Historical Sites
- facilities up-to-standard
- infrastructure up-to-standard
- visitors
- net revenue
- KY arts / crafts revenue
- community income
- sites up-to-date

Preserves
- facilities up-to-standard
- infrastructure up-to-standard
- managed natural areas protected
- old growth forest conserved / lost
- wetlands conserved / lost

Public Lands
- facilities up-to-standard
- infrastructure up-to-standard
- rivers and streams impacted by pollution
- public lakes impacted by pollution
- public lands impacted by pollution
- dams and locks up-to-standard
- public forests under best management practices
- arson / careless behavior-initiated fires / acreage burned

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Note 2: Facilities may include lodges, cottages, campgrounds, recreational facilities, golf courses, conference centers, visitor facilities, museums, etc.. Infrastructure may include roads and bridges, parking lots, walk ways and paths, water distribution, dams/locks, waste and waste water disposal systems, etc..

Process Adaptation

Effort / Ideal: *All Processes/Products Have Been Re-Engineered To Eliminate Associated Toxicity, Accident Potential, And Waste* x/x/x

yr v r s c i d

Toxicity
- **industrial hazardous / toxic releases to air, water, land**
- **industrial hazardous / toxic waste discharges to public**
- **waste water treatment facilities**
- **hazardous / toxic chemical transfers**
- **hazardous / toxic spills**
- **non-permitted hazardous waste facilities (RCRA)**

Accidents
- **product related injuries / deaths**
- **home related injuries / deaths**
- **work related injuries / deaths**

Waste
- **part of product as waste**
- **part of process as waste**
- **product / process related municipal waste**
- **hazardous waste**
- **hazardous waste rendered non-hazardous on site**
- **toxic waste**

Initiative/Violations
- **organizations complying with**
- **pre-treatment**
- **hazardous**
- **toxic**

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Amelioration

Effort / Ideal: *All Solid Waste, Sewage, Wastewater, Hazardous Waste, And Toxic Chemicals Are Eliminated, Properly Recycled, Or Sequestered* x/x/x

yr	v	r	s	c	i	d

Mineral Related
- **land disturbed by coal / mineral mining / not reclaimed**
- **slurry impoundments**
- **slag heaps**
- **mountain tops removed**

Land Use
- **impoverished / abandoned urban land**
- **brownfields**
- **contaminated waste sites – reported / not**
- **non-permitted solid waste dumps**
- **underground storage tanks**
- **waste tire dumps**
- **abandoned cars**
- **closed landfills not completely retired**
- **groundwater contamination**

Hazardous
- **non-permitted hazardous waste facilities (RCRA) hazardous spills**
- **water discharges**

Toxic
- **industrial toxic discharges to public waste water facilities**
- **industrial toxic chemical releases to air, water, and land**
- **toxic spills**
- **toxic chemical sites (Super Fund, state priority, etc.)**

Violations
- **pre-treatment**
- **hazardous**
- **toxic**
- **inspection capacity / need**

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Specie Pressure

Effort / Ideal: *No Species At Risk Or Exotic Pests* x/x/x

	yr	v	r	s	c	i	d
Vascular Plants							
federally listed – endangered / threatened							
rare							
extinct / extirpated							
exotic pests							
Birds							
federally listed – endangered / threatened							
rare							
extinct / extirpated							
exotic pests							
Amphibians/Reptiles							
federally listed – endangered / threatened							
rare							
extinct / extirpated							
exotic pests							
Mussels							
federally listed – endangered / threatened							
rare							
extinct / extirpated							
exotic pests							
Freshwater Fish							
federally listed – endangered / threatened							
rare							
extinct / extirpated							
exotic pests							
Mammals							
federally listed – endangered / threatened							
rare							
extinct / extirpated							
exotic pests							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Pollution

Effort / Ideal: *No Pollution Of Air, Food, Land, Or Water* x/x/x

	yr	v	r	s	c	i	d

Air
- smoking
- air emissions
- toxic air emissions
- air quality levels
- air quality citizen complaints
- air quality violations
- people living with air exceeding EPA standards
- asthma / respiratory related illness incidence
- people living with noise exceeding EPA suggested standards
- inspection capacity/need

Food
- spring/wells exceeding drinking water standards
- households not served by public water that should be
- public water system drinking water violations - after treatment and at the tap
- drinking water advisories
- tissue contaminate levels in fish
- pesticide/herbicide residues in produce
- beef / pork / chicken contaminates levels
- industry health code violations - production, processing, distribution, and preparation
- fish / produce / beef / pork / chicken consumption advisories reported food-born disease cases
- additive load
- inspection capacity / need

Land
- disturbed by coal / mineral mining - not reclaimed
- slurry impoundments
- slag heaps
- mountaintop removals
- impoverished / abandoned urban land
- polluted area - brownfields
- of solid waste at municipal solid waste landfills
- municipal solid waste generated not collected
- disposal of wastes at land farms residual, special, transfer, and construction / demolition sites
- solid waste violations
- litter
- closed landfills not completely retired (GWM, cap, leachate)
- waste tire dumps
- abandoned vehicles
- open dump violations
- underground storage tanks including violations, needing enclosure, removal, or upgrading, meeting release detection rules
- hazardous/toxic waste violations
- non-permitted hazardous waste facilities (RCRA)
- contaminated waste sites
- land, industrial, toxic chemical releases
- toxic chemical sites (Super Fund, state priority, etc.)
- unprotected watersheds
- inspection capacity / need

Water
- average pH of rainfall at monitored sites
- ground water contamination incidents
- monitored waterways impacted by pollution
- stream and river miles impacted by pollution (by basin)
- public lakes impacted by pollution
- citizen water complaints
- swimming advisories
- fish kills
- wastewater quality violations
- lake / stream discharge permits
- discharges to waterways
- toxic chemical releases to waterways
- sewer overflows
- storm water
- litter
- inspection capacity / need

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Environment

Effort / Ideal: *A Healthy, Protected Environment* x/x/x

	yr	v	r	s	c	i	d
public stewardship							
+							
amelioration							
+							
process adaptation							
+							
pollution							
+							
specie pressure							
+							
Habitat Reclamation / Protective Policies & Compliance (additional measures)							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Sustainability

Effort/Ideal: *Kentucky Becomes A Sustainable State* x/x/x

	yr	v	r	s	c	i	d
Economic Sustainability							
resource/process efficiency							
waste reduction							
green investments							
financial performance							
system effectiveness							
Social Sustainability							
health and well-being							
education and training							
inclusive growth							
personal adaptation							
community engagement							
resource conservation							
Environmental Sustainability							
carbon/methane footprints							
biodiversity/habitat protection							
water/food/land/air pollution							
brownfield reclamation							
renewable energy adoption							
effective waste management							
Policy and Governance							
sustainability policies							
compliance and reporting							
stakeholder involvement							
innovation and research and development							

Note: v = value, r = rate, s = state, c = change in state, w = weight of relative importance, d = weighted stride

Service

Effort / Ideal: *Excellent Service* x/x/x

About the Author

Cliff C. Tussey III
steepusa@yahoo.com

Cliff Tussey has a B.S in Environmental and Urban Systems from Florida International University and an M.S. in Cybernetic Systems from San Jose State University. He resides in Lexington, Kentucky.

Over the last several years, he has designed, developed, and tested 'The STEEP Course' information system (p. 19).

His work life has included the design and modeling of processes, information system design and development, and provision of a variety of information services.