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Towards a Sustainable Development Facilitator's Toolkit: Ecological Perspective

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Towards a Sustainable Development Facilitator's Toolkit: Ecological Perspective
by

Aaron Gilbee

An Abstract of a Project
in
Creative Studies

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Science

May 2009

Buffalo State College
State University of New York
Department of Creative Studies

ABSTRACT OF PROJECT

Towards a Sustainable Development Facilitator's Toolkit: Ecological Perspective

World problems are becoming more complex, and as a result, there is a need for guided methodologies to tackle these through facilitation. This project contains 10 tools that were identified and described for the initial development of a facilitator's toolkit for problems related to sustainable development. A literature review that identified common perspectives and a thinking pattern associated with sustainable development. Of the perspectives identified with sustainable development, a natural ecological perspective was taken and guided the toolkit development. Implications from this project demonstrated that the approaches found within the readings aligned with the CPS Thinking Skills Model (Puccio, et al. 2007), as a potential to be an organizational framework for tools to address sustainable development.

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Date

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Section 1: Purpose

Introduction

Green is a way of thinking (Gladwin, et al., 1995). However, Eco-pulse, a survey conducted by the Shelton Group, found that 47% of consumers believed that it was hype and an effort by marketers to appear better in public (Ebenkamp, 2008). There is confusion over what “green” is and what it means. For purposes of this project, green or thinking linked to sustainable development will be described as visionary approach to the tackling of organizational problems (Interface, 2008 C). Section 2 will elaborate further on the literature foundation that introduces the conceptual underpinnings behind this description.

Two Examples

Two outcomes of this visionary approach in use can be found in Interface Global and the Municipal Resort Community of Whistler, Canada. Interface Global started in 1973 as a small carpet manufacturer specializing in carpet tiles (Interface, 2008 A). After 21 years of business and becoming the world’s largest carpet manufacturer, market conditions and global factors contributed to a major visionary leadership shift that was thrust upon the corporation’s chief executive officer (Anderson, 1998). Its leaders began a significant change initiative to refocus the company from a financial capital based outlook to one that spans financial, social, and environmental concerns. After recruiting the leaders developing the sustainable development vision, also interchangeably used as “green” in this project, the corporation adopted industrial ecological principles into the heart of their corporate practice (Interface, 2008 B). Interface has reported that they have yielded \$256 million in sales from products using sustainability principles through dematerialization, have cut significant use of petroleum based products from their

product line, and have transitioned their business model from an open system to a closed loop (Anderson, 1998). This change initiative utilized several innovative techniques and progressive green methodologies. These tools will be shared in Section 4 in relation to CPS: The *CPS: The Thinking Skills Model* framework (Puccio, et al., 2007).

In contrast to Interface, Whistler, Canada is a municipal resort community that will host Nordic events of the 2010 Olympic Games in Vancouver. The community in 2000 undertook a significant strategic community development process towards being sustainable by 2020 (Whistler, 2009). The result of this effort has been 75% retention of workers to reside within the community, an 11% decrease in greenhouse gas emissions in 2007, and a 53% participation of registered voters in the 2005 elections documented in a community scorecard (Whistler, 2007). Currently, Whistler has publicized its efforts at <http://www.whistler2020.ca/>.

Though completely distinct in their organizational purposes, both the corporation of Interface and the town of Whistler utilized the same vision and general strategic framework to put together their plans for 2020. The end goal of their efforts was to achieve sustainable development. The Brundtland Commission (1987) established sustainable development in a document called *Our Common Future*. During the 97th plenary meeting of the United Nations, the Commission of scientists presented “the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development” (para. 1). From this statement, they recommended that the efforts of the UN should be directed towards sustainable development. They defined it as a principle of “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Commission, 1987, para. 2).

Current mainstream paradigms exist that are counterproductive to the progress necessary to achieve the principle (Pollock, 2009; Anderson, 1998). In March 2009, companies thwarted the efforts of scientists to research the effects of genetically modified crops (GMO) upon wild crops (Pollock, 2009). An important step in green processes is monitoring and examination by independent third party groups, whether that group is the public (Green Marketing Blog, 2009) or a government agency (LEED, 2009). Pollock (2009) commented that, "If a company can control the research that appears in the public domain, they can reduce the potential negatives that can come out of any research."

In this case GMO companies were at risk of losing financial stakes tied to such outcomes, especially since GMO companies have found significant resistance already to their products throughout Europe (GMO Compass, 2009). In addition, resistance in potentially high value markets would strengthen if negative research results became public. From a strictly profit perspective, the move appeared smart. However, the predominant business paradigm that is linked to the green movement is full cost accounting or triple bottom line: people, planet, and profit (Savitz & Weber, 2006). Full cost accounting methodology would raise questions concerning GMO crop interactions with the natural ecosystem and ultimately raise questions related to biodiversity. Already, the questions about the overall impact from this one example has been making headlines in Mexico where local maize populations have been contaminated by the genes of GMO crops (Stevenson, 2009). The controversy about this situation occurs because the ultimate impact of the introduction of genetically modified crops into the wild is not yet known, and research to investigate these kinds of questions has been thwarted.

Project Description

The issue related to GMO crops and natural ecosystems represents just one of many debates that rage among those who want sustainable development. The purpose of this project was to identify tools and frameworks used by those pursuing the vision of sustainable development that would help organizations to change the perspective of those involved from a singular focus to one that includes wider systems. Potentially, these tools will provide direction and insight in addressing the major questions and help organizations to make their processes more aligned with the definition, referred by this project as a vision, of the Brundtland Commission. The tools identified in this project will help ground the vision of sustainable development for general use by facilitators.

However, it is important to note that this toolkit will host many of the flaws associated with the tools in it. Facilitators using this kit will have to pay special attention to the interactions of different systems, the interactions of individual perspectives which are inherently biased, and the interfaces of the two (U.S. Nuclear Regulatory Commission, 1981).

Rationale

It is my desire that this project add value for any facilitator that hopes to use it and that it will help to make the transition into the green economy more easily undertaken and more successfully navigated. From the view of many theoretical perspectives, the world is growing more interdependent and more closely interconnected because of trends in technology and increased demand for resources (Commission, 1987). It is the convergence of these mega-trends that drive this compilation of tools, and those pursuing sustainable development have been specifically identified because they are leading in addressing issues arising from these mega-trends (Commission, 1987). This project

contains a review of the literature, identification of key perspectives in how they pursue the vision, and methodologies create a core of a toolkit that is relevant to handle facilitations for complex and dynamic problems. For future work, this project begins a prototype of organizing a global perspective using CPS: Thinking Skills Framework (Puccio, et al., 2007).

Value Added

This project resolves questions that might arise about how sustainable development fits within the context of creativity. For facilitators, Section 2 provides value in understanding those who follow the vision. At the end are tools that are in use by the leaders of the movement. There is the potential for this project to be used in efforts linked to eco-efficiency. For me, this project clarified key confusions I had in regard to my own understanding of the concept and began to make tangible a vision of sustainable development for my own professional development.

Section 2: Literature

Introduction

This section contains an investigation into the literary underpinnings of the vision of sustainable development to identify the history and commonalities in thinking that span its literature and its link to creativity. First, there will be an exploration in to the vision of sustainable development, then a history of the commonly used definition of the vision, how that definition operationalizes, and how the sustainable development links to creativity.

History: Sustainable Development is about the Future

Hammond (1998) presented three world future scenario studies: market world, fortress world, and transformed world. Market world is future scenario of a world with common economic markets and economic systems free from government regulations. It is the world written by Hammond (1998) as being a corporate tycoon's dream that results in increasing pollution and the rise of terrorist groups that seek to level economic disparity. In this scenario, there is continuous struggle for justice. Fortress world is an outcome from a collapse of world governments and the conversion of major metropolitan centers into feudal states. In this scenario, the result is a world that exists much like the Medieval Age of Europe. The third and final scenario raised by Hammond (1998) was transformed world, which demonstrated changes in policy, practice, and thought in the world governments. Social activist receive support for their efforts, corporate philanthropy rises, policy development becomes based from science, and issues of poverty are addressed. It is a world of increased democracy and of increased leadership as corporations, governments, and social groups work together to solve the problems. These three different future case studies provided the backdrop for sustainable

development. To understand how this vision was applied, it is important to understand the definition that developed this future scenario, the existing perspectives within that definition, and the shared thinking pattern within those perspectives.

The principle established in 1987

In the literature, the major definition for organizing and understanding sustainable development came from the Brundtland Commission's seminal report *Our Common Future* (Commission, 1987; McMichael, 2008) which was convened by the United Nations Development Programme. The report was a compilation of systems scientist and observed a common global trend in resource use. The trend identified that the ecosystems that source raw materials used in human production were significantly compromised and their capacity to be maintained impaired. Based upon this conclusion, the Brundtland Commission suggested to the United Nations that the following should serve as their guiding principle for sustainable development: to "meet the needs of the present without compromising the ability of future generations to meet their own needs" (Commission, 1987, para. 2).

In application, they acknowledged that this principle would require a change in common perspective of the global society. This shift would have to be addressed at large and would need to make explicit the following assumptions: to recognize that the human species as a part of natural ecosystems, to put into practice economic systems that would have to account for all aspects of the environmental costs of production, and to develop methods of development that integrated that the viability of the human species as whole requires that all be seen as one family (Ruckenhau, 1989). The findings of the scientists who worked with the Brundtland Commission Report summarized that the results of industrial practices were disconnected from natural ecosystems and that natural

ecosystems were not a consideration in decision making. As a result, the processes used in the shaping human activities need to be more comprehensive to include a wider view of the interactions between society and the environment (Hawkins, et al., 2008) and the need to eliminate poverty.

The principle turns into a vision

Since the introduction of that principle, researchers abstracted it into a definition of sustainable development (Adams, 2006; Hjorth & Bagheri, 2006; Senge, et al., 2007). For the purposes of this project, the definition will be used as a vision. Collins and Porras (1998) presented a framework for what makes up a vision. A vision consists of a future oriented guiding philosophy and a compelling image. When the Brundtland Commission (1987) presented what they called originally a principle, they developed a definition that fell within this framework. The principle of sustainable development is "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Commission, 1987, para. 2). First, the definition meets the criteria of what is a guiding principle in that it is connected to a source, which is the document *Our Common Future*, and secondly, when inserted into a hands of an individual who has espoused values that align with this guiding principle, this definition connects to values and beliefs of democracy, collaboration, and valuing future generations. Secondly, the definition provides a clear and tangible vision of the future in how processes need to be oriented in order to achieve it. Because the definition of sustainable development meets these two conditions, I am concluding that this principle can be used as a vision.

Putting the vision to work: the need for a more inclusive perspective shift

The Brundtland Commission established the principle of sustainable development in 1987 that is recognized as a standard for practice (Hjorth & Bagheri, 2006; Natrass &

Altomare, 1999; Serageldin & Steer, 2000). The shift in perspective or priorities associated with sustainable development is, generally, more comprehensive than interacting with the world in one way. The legal establishment of the American corporation can serve as an example to illustrate a single perspective. The intrigue of the corporate structure with financial capital is commonly accepted and known. However, the origins of that focus are not. A ruling from the Michigan Supreme Court, in 1919 during *Dodge v. Ford Motor Company*, set the legal opinion (Stout, 2007) that the corporation was “organized and carried on primarily for the profit of the stock-holders. The powers of the directors are to be employed for that end” (Edwards, et al., 2002, p. 3). For the American corporate structure, this statement conveyed a corporate priority system centered on the generation a return to its shareholders. Beyond that statement, the corporation held no duty to stakeholders or individuals with a stake with the processes tied to corporate business, with the exception of being accountable to social regulations and law. In business schools that produced the initial priority patterns of the younger generations of business professionals, Peggy Cunningham, director of the School of Business Administration at Dalhousie University of Britain, expressed that many of the old models of doing business were out of step with the issues faced by the world today (Pitts, 2009). She stated that both collectivistic and individualistic models have helped the world progress to where it is, but these models were inadequate. Cunningham said, “When we look at issues of sustainability, we have to look at not only our own sustainability but that of our society” (Pitts, 2009, para. 11). In academia, Gladwin, et. al (1995) argued that the core set of of practices in the university lend towards a biased view of reality as solely based on human values, the silos of academic research, and a lack of cross pollination of the sciences contribute to a narrow view of sense making. These

academic practices led to an imbalance between organizational structures and their respective ecosystems. Models, based upon solely legal, individualistic, and collectivistic perspectives will not address the larger issues related to sustainability because they are detached from including ecological priority systems.

Analysis and Synthesis of Perspectives: A Major Shift Explained

The vision for sustainable development provided by the Brundtland Commission (1987) is not one to be examined from a single perspective. The vision of sustainable development originated from economic (Daly, 1991) and ecological (Meadows, 1971) theory. These two theoretical approaches have shared Brundtland's definition of sustainable development, but the way they value the use of resources differently (Serageldin & Steer, 2000). Serageldin & Steer (2000) reported that how that difference in approach is referred to as weak and strong sustainability. Weak sustainability referred to the use and the maintenance of capital-those things which provide value to human society-without regard to their unique characteristics (Serageldin & Steer, 2000). From a pure economist view (Gunderson & Holling, 2002), different forms of capital are seen as being substitutable, when they cannot be. For example, it is the equivalent of saying that bamboo is interchangeable for asphalt in road construction. Conversely, strong sustainability refers to a position that capital, identified as distinct, should be maintained at levels where the resource's stocks do not become depleted and harvested at rates directly linked to the rates at which resources replenish (Serageldin & Steer, 2000). Strong sustainability identifies that bamboo is not able to replace asphalt and its harvest should not be greater its natural growth.

Graphic retrieved from Serageldin & Steer, 2000, p. 2

Figure 2.1: Objectives from the perspectives of the environmentalist and economist (Serageldin & Steer, 2000, p. 2).

The economist perspective is similar to weak sustainability, while the views of ecologist are similar to hard sustainability. Figure 2.2 and 2.3 represent how the ecologist and economist generally decided how to prioritize their world view (Adams, 2006). Figures 2.2 and 2.3 demonstrate how the two major perspectives shape their priority systems.

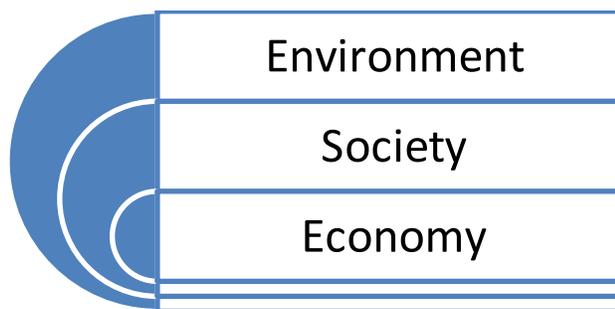


Figure 2.2: A circular model associated with ecologist (adapted from Adams, 2006).

From the view of the ecologist, the economy is seen as a part of a social system, and the social system determined by its environment. From this view, any development that is made needs to have considerations within the limits of natural boundaries. The manifestations of product that align within the view of ecologist of how it interacts with the environment. An example of this perspective is highlighted by Anderson (1998) when

his company decided to transition from using petroleum based fibers in its carpet line to limiting its choices to naturally renewable fabrics.

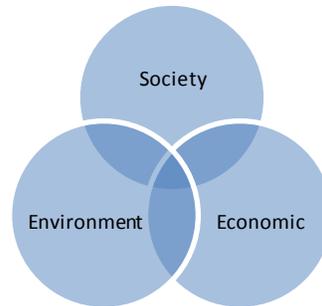


Figure 2.3: A Venn diagram perspective associated with the economist perspective (adapted from Adams, 2006).

The economist view believes that the balance between the three systems is attained when all are considered in proportion. In other words, that which is sustainable is good for the environment, economy, and society and trade-offs between the perspectives are allowable. The products resulting from the priority system of this perspective will choose to use a cheaper recyclable artificial plastic rather than a plastic originating from a renewable resource such as corn; however, it will progress towards eco-efficiency. Conversely, the ecologist would never find the use of petroleum practical for product inclusion.

Synthesis: The key thinking skill associated with the shift

Shared among the two perspectives is an approach to thinking called systems thinking, a methodology first published in 1968 by Jay Forrester (1990). A system is defined as “a grouping of parts that operate together for a common purpose” (p. 1-1). He wrote that there are two kinds of systems: open and closed. An open system is characterized as having inputs that are not linked to its outputs. There is no form of feedback in an open system and no way to track performance. In contrast, a closed

system has outputs that are linked to inputs and thereby provide a method to track performance.

Earlier in this literature review, I highlighted that an issue existed within business schools that was captured by the remarks of Peggy Cunningham (Pitts, 2009). She explained that the decision making patterns being promoted by MBA programs failed to demonstrate the importance of making choices that included other systems to their students. In traditional decision making patterns, Hjorth & Bagheri (2006) argued that decisions are made ending in events or linear causality as captured in Figure 2.4; typically these patterns are not associated with the ecologist or economist. Fritz (1989) is a model that depicts event based thinking.

Graphic retrieved from Hjorth & Bagheri, 2006, p. 78

Figure 2.4: An event oriented decision making process (Hjorth & Bagheri, 2006, p. 78).

The results from this kind of decision making pattern are not connected to a system and provide no way to track performance tied to sustainability (Hjorth & Bagheri, 2006). Researchers (Hjorth & Bagheri, 2006; Natrass & Altomare, 1999; McDonough, 2002) argued that event based thinking is not suitable for the sustainable development because they are not connected to larger systems and ignore the impacts that the events might have on the economy, environment, and society. While giving a speech, McDonough (TED, 2005) explained that this view ignores the question of intent and that major decisions are always connected to a larger outcome. “The question [of design] is what is our intention?... What is our intention as a species?... If [our] end game is global warming, we are doing great” (TED, 2005).

Organizational researchers (Nattrass & Altomare, 1999; Hjorth & Bagheri, 2006) noticed how this event based thinking has been counterproductive to the global future (Commission on Physical Sciences, 1989). Serageldin & Steer (2000) and Nattrass & Altomare (1999) argued that the way to making thinking sustainable is to include the use of systems, whether they are open or closed. The strategic planning process led by the Natural Step in Whistler (Whistler, 2009), the Cradle to Cradle designs of product (McDonough, 2002), and the organizational change efforts of Interface, Inc. (Anderson, 1998) presented case studies of how the inclusion of systems based thinking frameworks have the power towards the vision of sustainable development. The success of these efforts was directly attributed by researchers to changing the priority systems of how choices are made.

The Link to Creativity: Process-Place

Amabile, et al. (1996) defined creativity as “the production of novel and useful ideas in any domain” (p. 1155). However, all domains identified or that will ever be identified in human history lie within the closed system of the earth. It is both the pale, blue dot of Sagan (1994) and the spaceship of Anderson (1998). In both of their metaphors, Earth is the place where all ideas that were ever known and will ever be known exist, as well as the creators of those ideas. The creators of these ideas may not live to directly to experience the impacts from their decisions, but someone along the way will. I noted earlier that the shift in thinking that accompanies sustainable development was an inclusion of multiple perspectives that are based within systems thinking (Hjorth & Bagheri, 2006). In order for ideas to be considered creative from a sustainable perspective, there is a question related to usefulness. For whom is a product of process creative? If it is not useful for a system, then it is not creative; so a comprehensive look at

the interactions of those ideas with their systems should be carried out (Natrass & Altomare, 1999; McDonough, 2002; Commission, 1987). If the impact from a decision results in a preventable negative consequence for the human species, then it cannot be considered useful. For example, shipping of e-waste to third world countries without the infrastructure to recycle electronics (GreenPeace, 2008) and the business transactions that directly support known militant regimes (Earth Rights International, 2008) have been identified with long term consequences that outweigh the short term rewards. E-waste led to heavy metal poisoning of inhabited land (GreenPeace, 2008), and the transactions promoted the psycho-sociological scarring of villages (Gilbee, 2004). As in the case of UNOCAL v. Doe, the Union Oil Company of California (UNOCAL) settled a decade long lawsuit with Earth Rights International over their funding of the Yadana Pipeline (Earth Rights International, 2008). The investment enabled in the direct military capacity to attack once remote villages and resulted in multiple crimes against humanity. After consulting in a military general, UNOCAL knew of this increased military capacity and the high potential of military action against remote villages after consulting a former military general (Gilbee, 2004). The shift to thinking sustainably constrains what is considered useful to fit within the systems within which an idea or product is found.

There is a concern of the effects of potential interactions.

CPS: The Thinking Skills Model (Puccio, et al., 2007)

Leadership is defined as the “process of positively influencing people, contexts, and outcomes through a deliberate creative approach that is applied to... both opportunities and problems” (Puccio, et al., 2007, p xvi). Its assessment was found in the actions of a leader. Framed within the context of the vision of sustainable development, UNOCAL failed to demonstrate fundamental leadership abilities. They lacked a positive

approach to consider the needs of the villagers and as a result violated numerous indigenous social systems (Gilbee, 2004). Puccio, et al. (2007) created *CPS: The Thinking Skills Model*. It is a descriptive model that is a modification of a process called Creative Problem Solving (CPS). CPS is best used when a process for and the solution of a problem are not known (Puccio, Murdock, & Mance, 2007). For over 50 years, the process has been refined, researched, and developed (Isaksen & Treffinger, 2004; Puccio, et al., 2007). Unlike previous versions, this model contains a parallel framework of thinking skills, both cognitive and affective, to help articulate what people need to do when confronting novel situations. They identified seven cognitive thinking skills, which are identified in Table 2.1, as ones that guide what happens during each stage of CPS.

Table 2.1: *CPS: The Thinking skills of CPS* (Puccio, et al., 2007)

Thinking Skill	Purpose
Diagnostic Thinking (DT)	To make careful examination of a situation and describe the nature of the problem. To take this information to make appropriate process steps to be taken. (p. 54)
Visionary Thinking (VT)	To articulate a vivid image of what you desire to create (p. 54)
Strategic Thinking (ST)	To identify the critical issues that must be addressed and pathways that are needed to move towards a desired future (p. 55)
Ideational Thinking (IT)	To produce original mental images and thoughts that respond to important challenges (p.56)
Evaluative Thinking (ET)	To scrutinize the merits of an idea, and those that seem most feasible are refined into solutions (p. 57)
Contextual Thinking (CT)	To understand the interrelated conditions and circumstances that will support or hinder success (p. 58)
Tactical Thinking (TT)	To devise a plan that includes specific and measureable steps for attaining a desired end and methods for monitoring the effectiveness (p. 59)

This framework provides a cognitive map that helps guides individuals to proactively engage open ended problems. For this project the tools used by those pursuing the vision of sustainable development will be organized within it. In so doing, the result will be the beginning of an organized toolkit that can be used by facilitators to introduce the considerations of the ecological perspective of sustainable development.

Section 3: Methodology

Introduction

This section provides an overview of the process used in the development of this project. It is an on-going effort covering a time span of two years, however progress stalled a year ago when my initial collection of articles was stolen with a hard drive. However, I had remained dedicated to building the collection since that time, and in January, I chose to pursue a project that manifested a product from this material. From this resource, I identified the major methodologies that I have linked to being important to the vision and conducted a literature review based upon the leaders behind the vision. In all, I used more than 11 sources located in Appendix B and conducted an investigation into the similarities of information in these sources presented in Table 4.1.

These similarities were converted into a list of criteria for the selection of tools by I. Tools from that of articles were inserted into an evaluation matrix against those criteria. When a tool that met three or more criteria listed in table 4.2, they were selected and included into the facilitator's toolkit. An unstated but inherit criterion that was used in the primary selection of tools is that the articles were of subjective interest to I, since they were part of literature collected from studies in the field of sustainable development. The tools were sourced from ISO 14000, The Natural Step, Mid-Course Correction, Creativity Tools Memory Jogger, Ecological Design Processes, and academic articles from undirected searches.

After selection into the kit, I practiced the tools individually and with people that were close to me. Photos of the practice sessions were cataloged for learning purposes and are in Appendix C.

The tools were then organized into the Thinking Skills Framework based upon their application within context of the definition of the sub-skills found within it. Table 4.4 provides a quick reference of how the tools fell in.

Project Final Timeline with Hours

Table 3.1: Hours tallied during the project

Activity	Time Frame	Total
Creating Concept Paper	Feb. 22-April 20	10
Reading Literature	Jan. 1-April 10	40
Finding Commonalities	March 10-15	3
Identifying Tools in Literature	Jan. 1-March 30	10
Creating Evaluation Matrix	March 20-25	1
Practicing Tools	March 1-April 5	25
Applying Tools	March 16 – April 5	10
Running Tools Through Matrix	March 25-30	1
Backtracking on core thinking skill: systems thinking	March 16 –April 10	10
Repositioning sustainable development as a vision	April 5-10	2
Inserting tools into <i>CPS: The Thinking Skills Model</i> (Puccio, et al., 2007) Matrix	April 6-9	1
Sections 1-3	March 15 - April 15	10
Sections 4-6	April 10 - 25	14
Final Drafting	April 20 – May 5	15
Prepare project presentation	April 30 – May 5	4
Submit hard copy of project presentation	May 7	1
Present project	May 7	1
Submit CD copy of project	May 8	1
Submit bound final project	May 14 th	1
	Hours Devoted	160

Section 4: Outcomes

This section contains an overview of the process used during the project and the process related outcomes of the project: 1) key similarities between the major texts that deal with sustainable development, 2) the evaluation matrix used to select tools for the kit, 3) the readiness level of the tools for use, and 4) the tools selected. In all, nine tools were identified for the initial development of the toolkit (see Appendix C). This process followed a format of sorting through an unsorted collection of articles, identifying key literature, finding commonalities between key literature, turning those commonalities into criteria for an evaluation matrix, and then selecting tools for inclusion into the kit. The tools were aligned into *CPS: The Thinking Skills Model* (Puccio, et al., 2007) to test speculation that the tools might fall into the model. The tables are found towards the back of the section for the purpose of keeping the tables on one page rather than spread over two and to help the reader see the flow of thought from one stage of the project into another.

Key Similarities between Major Texts

The initiation of the project started more than a year ago. I searched articles from the different fields of research that concern themselves with the issue of sustainable development. Shared among these articles were the authors and texts that are written in the source column of Table 4.1. It identifies the key literature I reviewed to various depths for understanding and themes. The commonalities in the themes were metaphor, System Mapping, The Use of Indicators, Growth Mindset, Wide and Comprehensive Data Sets, Explicit Collaboration, Science Based Methodologies, Systems thinking, and Focus on Place. Metaphor identified that these texts used metaphor in direct application to efforts tied to sustainable development. System mapping, similar to systems thinking except it is applied, reflected a visual model created to convey the message of how a

process works. Indicators were a theme in that they were live reflections of a system dynamics that identified whether or not a relationship was increasing or decreasing and an active signal to communicate change. Many of the texts contained data that spanned wide breadths of information, so the tools need to demonstrate the ability to organize large data sets. Collaboration across domains and professions was another key feature of many of the texts because sustainability showed ownership of a group process rather than of just one person. Science-based methodologies indicated that the texts had originated in scientific principle or the thoughts behind the text were scientifically testable. Systems thinking reflected the principles behind a tool aligned with the principles laid out in Forrester (1990). A focus on place identified that in some way a tool connected to the physical environment where it would be applied. Many of the commonalities were strongly interconnected because they shared the same applied outlook of being grounded to an objective reality.

Turning the Commonalities into Criteria

For quick reference, Table 4.2 demonstrated how the tools selected aligned with the criteria developed from table 4.1. Dropped from table 4.1 to the development of a criterion was the commonality of “Growth Mindset”. Inherent to the growth mindset was acknowledging how processes worked as well as whether or not something was scientifically testable. Two of the other criteria, such as systems mapping and science based methodologies, had the capacity for the results of a tool to be tested and changed, which made having a criterion for this one purpose redundant. Systems thinking was also dropped because it was a philosophical base that was inherent in systems mapping when it is executed correctly. Also note that the ultimate decision for inclusion into this project is a yes/no format that indicated whether or not a tool met three criteria. If it did, it was

included. I made this choice was because of the tight time constraints to complete the project.

After selection for the toolkit the chosen tools, depending on their readiness for facilitation, were adapted and then entered into Appendix C. Depending upon the tool, the amount of time spent in its refinement for presentation in the project varied. Table 4.3 shows the level of readiness of the tool in terms of validity of the transcription from its source document. Tools were labeled with the following: tool documented from a source with direct instruction; tool has instructions on application, needs adaptation; tool required minimal adaptation, but has no instructions for application; and tool required heavy adaptation from source. “Tool documented from a source with direct instruction” identified a tool that was copied almost directly from the source. “Tool has instructions on application, needs adaptation” labels a tool that required minimal practice for introduction into Appendix C and some tweaking to its instructions. “Tool required minimal adaptation, but has no instructions for application” identified tools that came as they were without instructions, and they were left in that manner in the Appendix. This was done because of the nature of the tool. Finally, “tool required heavy adaptation from source” meant that the level of work required understanding the tool and how to apply it were significant. Tools that required this effort produced the outcomes captured in Appendix D to demonstrate that I do understand, for myself, how to complete and apply the tool. Table 4.3, which is provided under the next heading, presented the issue of readiness of a tool for use in an applied setting.

The Question of Readiness

Table 4.3 presented the general readiness of a tool into this project. The tools were identified from different sources, of which few were specifically designed for facilitators. Below the table identifies the source of raw data for the tool as “Documented

from a source with direct instruction”, “Tool has instructions on application, needs adaptation”, “Tool required minimal adaptation, but has no instructions for application,” and “Tool required heavy adaptation from source”. In the first column, I identified those tools that were adapted by an author for specific application to group facilitations. The second labels that the tool was found in a source that provided instruction for the development of the product, but the tool was not designed for group facilitation. The third column provides a data that a tool required minimal adaptation for group facilitation, but its source had no written instruction on how to develop it. In the last column, I classified that the tool originated from a source that was not designed for facilitators and provided no instruction for use or application. These tools required my own personal observation from outside practice and were a reflection of their execution in minimal opportunities.

At the bottom of Table 4.3, a scale has been provided to help create a level of awareness of error likely to be found in the write ups found in Appendix C. For this project, this scale is a way to identify how much work a tool might that need for further refinement and development. The concept paper identified that this project is a rough draft kit and exploratory in nature, and these tools, especially at the lower end of this scale, were imperfect for inclusion into the project. They have been identified as meeting three of the criteria specified in Table 4.1, so they fit the scope of the state of the toolkit as is. The value added by their inclusion included that these tools are publicly shared and future researchers will be provided a baseline for the testing of the product.

Speculation into How the Tools Might Fit in CPS: The Thinking Skills Model (Puccio, et al., 2007).

The project ended when I speculated how the tools that were identified earlier might fit within *CPS: The Thinking Skills Model* (Puccio, et al., 2007). Based on my limited experience with the tools identified in the project, I used the Thinking Skills

definitions to serve as a starting point to perform a categorical card sort. Table 4.4 presents this category sort.

There is some speculation on the exact fit of the tools within the framework of the model, but the tools identified did align within the framework of *CPS: The Thinking Skills Model* (Puccio, et al., 2007). Implications are discussed in Section 6.

Table 4.1: *Similarities in Texts Dealing with the Concept of Sustainable Development.*

Shared Similarities	Source
Metaphor	The Natural Step, Biomimicry, Cradle to Cradle, Waste Management Hierarchy
System Mapping	ISO 14000, Natural Capitalism, The Natural Step, Mid-Course Correction, Sustainable Design, Cradle to Cradle, Ecological Design Process, Waste Management Hierarchy, Green Economics, Limits of Growth, Ecological Principles for Economic Development
The Use of Indicators, including newly developed and common	The Natural Step, Biomimicry, Natural Capitalism, ISO 14000, Sustainable Design, Limits of Growth, Ecological Principles for Economic Development, The Natural Step
Growth Mindset	The Natural Step, Mid-Course Correction, Cradle to Cradle, Limits of Growth
Wide and Comprehensive Data Sets	ISO 14000, Mid-course Correction, Sustainable Design, Limits of Growth, Ecological Principles for Economic Development
Explicit Collaboration	Our Common Future, Mid-Course Correction, Biomimicry, The Natural Step
Science Based Methodologies	ISO 14000, The Natural Step, Mid-Course Correction, Biomimicry, Natural Capitalism, Sustainable Design, Limits of Growth, Ecological Principles for Economic Development
Systems thinking	Ecological Design Process, Our Common Future, Mid-Course Correction, Biomimicry, The Natural Step, Waste Management Hierarchy, Green Economics, Limits of Growth, Ecological Principles for Economic Development
Focus on Place	Biomimicry, Ecological Design Process, Ecological Principles for Economic

Development

Table 4.2: *Evaluation Matrix for Tool Selection*

	Do it allow for the use of metaphor?	Is it able to link to System Mapping?	Can it integrate with indicators?	Does it all for the organization of wide and comprehensive data sets?	Does it allow for explicit collaboration?	Is it scientifically testable?	Does it allow for the consideration of place?	Go for it	No go
Identifying Relationships: Biotechniques	Y	Y			Y	Y		X	
Hierarchal Process Mapping			Y			Y	Y	X	
Resource Flow Mapping			Y			Y	Y	x	
Waste Management Hierarchy			Y			Y	Y	x	
Guidelines for Drawing Systems		Y		Y	Y			x	
Generalized Biomimicry Process	Y	Y					Y	x	
Bubble Up-Bubble Down			Y		Y			x	
The Natural Step Framework	Y		Y				Y	x	
Factor X			Y		Y		Y	x	

Table 4.3: *Readiness of Tools for Inclusion into the Project*

	Documented from a source with direct instruction	Tool has instructions on application, needs adaptation	Tool required minimal adaptation, but has no instructions for application	Tool required heavy adaptation from source
Identifying Relationships: Biotechniques	X			
Hierarchal Process Mapping		X		
Resource Flow Mapping				X
Waste Management Hierarchy			X	
Guidelines for Drawing Systems	X			
Generalized Biomimicry Process		X		
Bubble Up-Bubble Down	X			
The Natural Step Framework			X	
Factor X		X		
Potential Reliability in Transcription due to amount of work associated	High←		→Low	

Table 4.4: *Organization of tools within CPS: The Thinking Skills Model Framework.*

Thinking Skill	Definition (Puccio, et al. 2007)	Tool Identified
Diagnostic Thinking (DT)	To make careful examination of a situation and describe the nature of the problem. To take this information to make appropriate process steps to be taken. (p. 54)	1. Hierarchical Process Mapping
Visionary Thinking (VT)	To articulate a vivid image of what you desire to create (p. 54)	2. Brundtland Commission Definition (Identified in Section 2 as a vision)
Strategic Thinking (ST)	To identify the critical issues that must be addressed and pathways that are needed to move towards a desired future (p. 55)	3. Generalized Biomimicry Process; 4. The Natural Step Framework; 5. The Waste Management Hierarchy
Ideational Thinking (IT)	To produce original mental images and thoughts that respond to important challenges (p. 56)	6. Identifying Relationships: Biotechniques; 7. Factor X
Evaluative Thinking (ET)	To scrutinize the merits of an idea, and those that seem most feasible are refined into solutions (p. 57)	1. Hierarchical Process Mapping; 8. Bubble Up-Bubble Down
Contextual Thinking (CT)	To understand the interrelated conditions and circumstances that will support or hinder success (p. 58)	9. Resource Flow Mapping; 10. Basic Systems Mapping
Tactical Thinking (TT)	To devise a plan that includes specific and measureable steps for attaining a desired end and methods for monitoring the effectiveness (p. 59)	

Summary

In summary, this project provided a framework for the organization of tools scattered throughout different sources of literature that are connected by a vision to be organized into a facilitator's toolkit. I used the tools of highlighting, clustering, an evaluation matrix and categorical sorting to complete the products introduced in this section and in Appendix C. This methodology was largely exploratory in nature and the resulting toolkit presented here is in a rough draft form that needs improvement and development. However, the major outcomes of the project were two: a methodology to identify tools that are located from a wide base of resources and a speculative demonstration of how the tools might be able to be organized in the Thinking Skills Framework (Puccio, et al., 2007).

Section 5: Key Learnings

This project demonstrated how what appears to be a simple thought can reveal itself to be much larger than one might perceive. When I started, I intended to create the simplest concept that can be developed by a student in the program, which, in my opinion, was a customized toolkit. The initial project began with articles that I had collected over the last year as I explored what I conceived originally to be a field of sustainable development. As I read these articles, I became introduced to the major thought leaders and books that have influenced many people. This project forced me to review some of the works of these individuals to understand what they were originally communicating as their message behind their texts. Late in the project, it had dawned on me that what I was pursuing was not a field, but instead a shared vision that was developed in 1987 by the Brundtland Commission. The vision was established when they reported that globally that the activities of our species were undermining the ecological systems upon which nations are based. When I made this connection, I relied on my awareness of the history of the vision's development and included the future scenarios research of Hammond (1998) at the introduction of Section 2 to establish sustainable development as a powerful dream. This late addition, I believe, was critical to help future readers to understand how this project will fit into the writings of my peers in the reading room. This one revelation, upon a few others dealing with process, forced me to step back and then acknowledge that my original plan was ambitious and that for all practical purposes of creating a finished and polished product undoable within the time and task constraints of a semester. The creative process identified here demonstrated that my creative process is far from being clean, especially as the processes of discovery and

emergence arise. It was also iterative because I needed to re-explore how sustainable development fits within the context of this project.

Originally, I had conceived a project where I would have four stages: review literature, find tools, practice those tools, and then present them. I failed to do that as holistically as I thought possible because those who are pursuing sustainable development, which I had to cognitively reshaped as a vision from a field in my head, were from different professional sectors and domains, yet they had this common. The Natural Step, for example, is a persuasive tool (Upton, 2000) that has been used in manufacturing (Anderson, 1998), community building (Whistler, 2009), strategic planning (Anderson, 1998; Whistler, 2009), organizational alignment (Anderson, 1998; Nattrass & Altomare, 1999), and product development (Anderson, 1998; Nattrass & Altomare, 1999). McDonough's (2002) concept of Cradle to Cradle design is no less versatile in its capacity to cross sectors and domains, but it has specifically had success in design. As I tried to catalogue my readings, the most pressing thing for me became the need for understanding the roots of what I researched. Common to those pursuing this vision of sustainable development was the shared thinking patterns associated with systems found in Table 3.2. As soon as this form of thought arose, I had to modify my initial approach because I had not comprehended what a system was. A system has its own principles that have been established by Forrester (1990). I could not undertake this project appropriately without reading this book because it lays out the principles behind systems thinking that lie behind the vision of sustainable development. If these principles are violated, the application of systems thinking fails because the parts are as important as the whole. If one part of a system is changed, according to Forrester (1990), the entire system changes including its emergent properties.

The tangible outcomes of this project in comparison to the original concept paper were the literature review, the products identified in Section 3, and the items in the appendices. It is significantly different than what was initially planned in the Concept Paper (see Appendix A).

Discoveries: Key Learnings and Comments

This part of the section discusses my key learnings and insights as a result of this project. I briefly overview the vision of sustainable development and why I had overlooked its reality, the importance of different perspectives in pursuit of the vision, and a few project process notes.

About Sustainable Development

I initially explored the field of sustainable development from its most notable literature: ISO 14000, The Natural Step, Mid-Course Correction, Biomimicry, Natural Capitalism, Sustainable Design, Limits of Growth, Ecological Principles for Economic Development, and about 60 academic articles and United Nations' documents from a loosely directed search conducted over a period of a year. At the time when these articles were discovered, I had an interest in a specific component of the larger field. Not once did I deeply ask, "What is sustainable development?" Certainly, I was aware of the principle of the Brundtland Commission, but I had not seen once in any articles or books sustainable development labeled as a vision. The question finally arose during this project and resulted in an investigation to understand better what rests behind the phrase of "sustainable development."

During this relevant, yet tangential, discovery, I found controversy existed within the decision making processes that were most commonly applied in real world settings, and the effects of simple event-based thinking patterns provided short term benefit at the

expense of long term benefits (Hjorth & Bagheri, 2006). For example, the disposal of a recyclable cup into the trash expresses a decision to discard an unwanted item. The short term gain is that cup does not take up space in the home after use. However, that cup will end up joining a larger waste stream created by similar decisions by other people. It is a choice made without consideration how it interacts with larger systems. The shift into thinking sustainably is to recognize that cup is a part of a larger system and that system is connected to economic markets that, depending on the sustainable development perspective used, demonstrate emergent interactions with ecological and social systems (Adams, 2006). The ultimate abstraction from the awareness generated by the perspectives was the common and ambiguous vision (Anderson, 1998; Hammond, 1998) of recognizing that humans are a species living with Earth and not just on it. Anderson (1998) referred to the earth as a spaceship to emphasize that we are contained by it.

This pursuit of a vision of a sustainable society living with Earth has its different perspectives (Adams, 2006), with its own values and merits. However, the vision has its own meaning to different people, and the only thing that connects these individuals is that common definition of the Brundtland Commission (1987), a pragmatically idealistic goal in of itself and paradoxically impossible to attain when one considers the finite capacity of the human mind to compute the information required to make a sustainable decision. From this reality is the commonality, which is identified in Table 2.1, “Continual Growth” found among the literature that results in a flexible mindset of accepting the imperfection of the process towards the perfection of a vision. The debate between the economist and ecologist exists about what the vision means at different levels (Serageldin & Steer, 2000) and that having a fixed mind set is counterproductive to the vision becoming a reality.

The Project's Process and Related Learnings with Comments

I did not have specific process learning objectives as related to this project; instead I wanted to learn as much as I could through doing the project. From my previous experiences, conceptual learning objectives have been achieved rather quickly and once attained serve as a motivator to say I have achieved them, and now it is time to move onto something else. Since the nature of the project is ephemeral in scope, I decided to let it flow and to not encumber my learning. In a nutshell, the three most tangible learnings I have achieved are these: give a project a wide scope so that its focus emerges, set aside an attainable outcome so that all discoveries were a value added, and anticipate the details. Now, I will briefly discuss each one.

I initially gave this project a wide scope so that it would form into whatever understandings or developments would most benefit me. A graduate project is not a tool that is intended for any one specific person except its creator. The framework behind it has been set aside for the creator to move as freely as possible without letting him run too loose. Initially, I wanted to develop a toolkit. However, my intuition and interest during the process did not allow my entire work to focus on that one outcome because it was not what I needed. As shared earlier in this section, the fundamental question of what was sustainable development became the fulcrum of inquiry, and the project reflected that in the literature review. Had I set up a stringent framework, I doubt I would have reached that point. Tangentially, as I say that, I am thinking that it is ironic that I ended up defining sustainable development as a vision in Section 2 and inserting as a visionary tool in Section 3.

The second key learning from this project was the understanding of the importance to set up an attainable outcome to allow for intuition to take hold. The process

of the project required one major product to be developed--that was the project write up itself and 120 hours of doing something. Beyond that, the only other outcomes that a person was responsible for were located in the outcomes of the concept paper.

Essentially, what was written in the contract must be negotiated over and then delivered to the project advisor. In the context of this project, there is a paradox in that I sought after a large ambiguous and complex entity called sustainable development that resulted in a comparatively tangible rough draft toolkit. Because of this ambiguous entity, my responsibility as a researcher and developer of the project was to best convey what I meant by sustainable development, which I think is the purpose of the literature review. It helped me to mold my language to fit the needs of my primary audience, the project advisor, and others I wish to tell about it. The requirement of having data from which to base a toolkit was met when I compiled my articles and the books, but I had to look for criteria upon which to eliminate those tools. It was in the similarities when I finally articulated the role of sustainable development as a vision for this toolkit. I have learned more because of this approach, and now I know how to communicate my thinking to other people on the topic of sustainable development. I also now have a hunch for a significant.

Finally, I had personal issues with anticipating the details of the different stages of the process. I envisioned the project inaccurately; I had inappropriate space to organize the project, and I had not thought through the characteristics of the tools I had identified. First, as examples, I neither saw nor manifested a suitable framework to organize this project well. In my initial drafts of this project, I thought the mental framework would be something like this: look through my collection of articles, find some tools that met some guidelines, select the tools, and compile them into a kit. That did not happen because that

model compromised the rigor in thought required to develop a publishable toolkit. Throughout my studies at the International Center for the Studies of Creativity, I have been exposed to the need to visually articulate complex models, and my studies in sustainability have also confirmed this anecdotally through the skill of systems mapping. Prior to completing this project, I had not visualized what conceptual framework I would need to complete it. I still barely have the form of that structure in my head, which is linked to my third miscue. Historically, I tolerated the lack of structure to complete projects, and now I am becoming less tolerant because the process is too unclear and that level of ambiguity, as I gain more responsibility and maturity, is counterproductive to being capable to juggling multiple complex tasks.

What would have helped me to complete this project to a higher quality is to have a physical space where I could have devoted to managing projects, a creative space like a studio. This second point highlights to a physical miscue of not having the logistics covered. In the past, such a space has been important for my capacity to develop and handle projects such as these. However, I currently do not have that and as a result merged both my student and social life in one space. Without that clear separation, I lost my ability to focus and keep distinct those aspects.

The final major barrier in this project was that several of the tools that were identified originated from sources that were not intended for facilitations or to be tools. I had to adapt what was on the page of the book for the tools and try as much as possible to try to make them understandable. Of the process mapping tools, Hierarchical Process Mapping in Figure C.1 was the easiest although it takes a lot of time to execute. When I practiced it for my project, an examination of the process to get to my car took 10 minutes, which was after I decided to stop because of the repetitive nature of the steps to

develop the map. It came with instructions from two sources, which I still modified for application into facilitation. On the other hand, resource flow mapping was an advanced form of process mapping which required that I sit in with a business group for two meetings and then examine a business plan to match what was said to the paper and then translate it into a usable product. Material in Appendix C illustrated how one correction threw off the rest of the system to the point of arriving with a rough product. Instead, each tool contained a complex process that required individually planning its execution and development which was a difficult challenge within a short time frame of a semester.

In summary, this project resulted in the outcomes of a draft toolkit for sustainable development facilitations, the production of other tangible products in Appendix C, and a literature review that discussed the nature of sustainable development and how it could be turned into a vision. I learned from the process of the project that the content, for example the required understanding of sustainable development as a vision, needed to be put into place before getting into the development of a toolkit. I had to understand that the criteria for the tools that would be entered into the toolkit were based in that vision. This section closes with my understanding of what it takes to plan a comprehensive process and the importance of asking the right questions of how it is best done.

Section 6: Suggestions for Future Projects

Creative Leadership is, according to Puccio, et al. (2007), defined by other people as much as the individual. This section, for the sake of brevity, I will focus on what I believe to be the single most valuable idea and a non-explicit process that originates from this project and ends with several next steps. *CPS: The Thinking Skills Model* (Puccio, et al., 2007) appears to be a curricular leadership framework with the capacity to align individuals within an organization to execute decisions that are aligned with a core group. For example, this project demonstrated how an international definition could be modified to establish a vision and then connect the most appropriate strategies to use within the context of that vision. This was completed when the Waste Management Hierarchy and the Natural Step frameworks were positioned as strategic tools. Though these are already well established within their fields of use, they have now been directly connected to how decisions are made in pursuit of the vision. I observed the ease with which *CPS: The Thinking Skills Model* (Puccio, et al., 2007) can provide organization for useful information. This is definitely something that, I believe, people should be aware of because this can now serve as a basis of an organizational leadership program for executives or others who might want to immerse themselves into understanding a line of thought from experts.

For students who might not have an understanding how to plan, I would suggest first looking for similar models to the projects undertaken. If there is not a project that resembles the effort you want to undertake, please read the last part of Section 5 and start by using a process map to guide your understanding of what is required to manage vision and logistics. Be prepared for the content of the project to reshape that process.

Finally, the zenith of this project is in the completion of the tool kit. The form of the concept paper and the selection of tools originated from the key literature identified in Appendix B. In the literature review, three components of the perspectives used in the pursuit of the vision were identified as economic, social, and ecological. Many times the social component is what defines the economic component. For the purposes of this project, most of the texts focus on the ecological component of the perspectives identified in Section 2. The social component in this project is lacking and is a gap to remedy in future planning. To complete this toolkit, further action must be done to locate more relevant tools for inclusion, test and develop those tools, test the tools in an open forum of fellow facilitators, and use their feedback for improvement. The completed project, if it were to true to the heart of the vision, would have to be released freely into the public domain with wide distribution so that all could benefit from it in order to avoid issues of social justice, that is to say that no one person has the exclusive right to monopolize the intellectual property developed here and to encumber the access of those with limited resources to attain benefit from the potential outcomes from its use. However, this does not preclude the rights of an individual for credit of work developed and completed.

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Appendix A: Concept Paper

Towards a Sustainable Development Facilitator's Toolkit: Ecological Perspective

Name: Aaron Gilbee

Date Submitted: 2/22/2009

Project Type:

To begin development of a product that will help facilitators to improve the lives of others

What Is This Project About? (14 Point Bold--red if you have color)

The purpose of this project is to begin the development of a facilitators toolkit tied to sustainable development

Rationale for Choice: (14 Point Bold--red if you have color)

It is my desire that this project will add value for any facilitator that hopes to use it and help to make the transition into the up and coming economy more easily undertaken and more successfully navigated. From the views of many theoretical perspectives, the world is growing more interdependent and more closely interconnected because of trends in technology and increased demand for resources (Commission, 1987). It is the convergences of these mega-trends that drive this compilation of tools, and those pursuing sustainable development have been specifically identified because they are leading in addressing issues arising from these mega-trends (Commission, 1987). This project contains a review of the literature, identification of key perspectives in how they pursue the vision, and methodologies create a core of a toolkit that is relevant to handle facilitations for complex and dynamic problems. For future projects, this project begins a prototype of organizing a global perspective using the Thinking Skills Framework.

What Will be the Tangible Product(s) or Outcomes? (14 Point Bold--red if you have color)

1. A draft toolkit, in the form of a manual in Appendix C
2. An experimental alignment of tools within the thinking skills model
3. An investigation into the concept of sustainable development in the form of a literature review
4. A presentation on the project

What Criteria Will You Use To Measure The Effectiveness Of Your Achievement? (14 Point Bold--red if you have color)

Because of the experimental nature of this project, the effectiveness of this project will be based on how well I begin to understand sustainable development within the context of creativity and can articulate it. The outcomes of the toolkit and alignment of the tools within the thinking skills model would be based upon what I get onto paper.

Who Will Be Involved or Influenced; What Will Your Role Be? (14 Point Bold--red if you have color)

My main role will be as the developer of this product. I hope that I can find some people to provide guidance and review, but that is not essential to the development or success of this project.

When Will This Project Take Place? (14 Point Bold--red if you have color)

This project is part of a larger on-going project that I have developed for myself. Part 1 began when I enrolled in the program and decided to study both sustainability and creativity at the same time.

Part 2 involves the timeframe of the Master's project during the spring of 2009 and consists of research and the design of the toolkit. Further development of the toolkit will be executed after the semester to further refine the ecological toolkit, and then take the steps to fulfill the gap of the social perspective associated with sustainability.

Where Will This Project Occur?

Predominantly, activities in research and design will be taking place in libraries and on my laptop at Buffalo State College.

Why Is It Important to Do This? (14 Point Bold--red if you have color)

A facilitator is a very unique leadership position in most cases. The approach of the International Center for Studies in Creativity, from my experience, is that the facilitator is limited to playing a role that is confined within the paradigm of an organization and those whom they lead. This toolkit is designed to help enhance and raise the overall value of this role by providing an arsenal of proven methodologies to help facilitators to bring in thinking about ecological and social systems that are typically ignored with the traditional facilitator role. As a result, this role, when incorporating these tools, will rise in overall value by enhancing "health and productivity, operational savings, environmental protection, stronger communities, and more" (Ervin, 2005). This claim is substantiated by inherit collaborative methodologies incorporated into Creative Problem Solving and the directed systems thinking associated with green.

Personal Learning Goals: (14 Point Bold--red if you have color)

- To learn how creative process can be integrated into sustainable development
- To practice tools that have a track record of success
- To expand my repertoire of tools and tactics for sustainable development
- To gain experience in the practical application of these tools and to present them in an understandable way to my colleagues
- To develop a fuller understanding and articulating the value of facilitation and sustainability

How Do You Plan to Achieve Your Goals and Outcomes?

This project is a combination of elements requiring a loose mentality, meanwhile there are deliverables that need to be achieved. In regards to dealing with items of literature and my content learnings, I will be loose because there are items of confusion in regards to the topic that

need clarified. As those moments of revelation appear, I will seek them out wholly and understandably.

In terms of the tangible products need to be produced, because the element of the content is crucial, I need to be flexible with the structures of the project and not assign hard numbers to it.

The structures that must be formed are:

- The evaluation matrix with criteria based upon the literature commonalities for the selection of tools
- The insertion of tools into the thinking skills model
- The write-ups of the tools
- Examples of experimenting with the tools

The criteria of tool selection include the following:

- Do they allow for the use of metaphor?
- Are they able to link to System Mapping?
- Can they allow for the development of Indicators?
- Do they organize wide and comprehensive data sets?
- Do they allow for explicit collaboration?
- Are the scientifically testable?
- Do they allow for the consideration of place?

Evaluation: (14 Point Bold--red if you have color)

The learning aspect of this project is the most crucial component, so ultimately my utmost evaluation piece will be tied to my learning goals and whether or not I felt that I had achieved them. If I can articulate my understanding from this project to others in a way that they understand, I will have achieved what was needed for me.

A secondary evaluation is tied the quality of the ideas that result from this project. If the idea has merit and value if the information from this project can be translated into other forms.

Prepare Project Timeline: (14 Point Bold--red if you have color)

Activity	Time Frame
Creating Concept Paper	Feb. 22-April 20
Reading Literature	Jan. 1-April 10
Finding Commonalities	March 10-15
Identifying Tools in Literature	Jan. 1-March 30
Creating Evaluation Matrix	March 20-25
Practicing Tools	March 1-April 5
Applying Tools	March 16 – April 5
Running Tools Through Matrix	March 25-30
Backtracking on core thinking skill: systems thinking	March 16 –April 10
Repositioning sustainable development as a	April 5-10

vision	
Inserting tools into <i>CPS: The Thinking Skills Model Matrix</i>	April 6-9
Sections 1-3	March 15 - April 15
Sections 4-6	April 10 - 25
Final Drafting	April 20 - 25
Prepare project presentation	April 30 – May 5
Submit hard copy of project presentation	May 7
Present project	May 7
Submit CD copy of project	May 8
Submit bound final project	May 14 th

Identify Pertinent Literature or Resources: (14 Point Bold--red if you have color)

- Benyus, J. (1998). *Biomimicry: Innovation inspired by nature*. San Francisco: Harper Collins.
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Appendix B: Appendix of Key Literature

Benyus, J. (1998). *Biomimicry: Innovation inspired by nature*. San Francisco: Harper Collins.

Geminal book. Introduces the concept of biomimicry, its importance, and its application. Provides answers to several questions of how biomimicry can be applied in different aspects of business and everyday life. Demonstrates that biomimicry is a front-end approach to solving design problems. The focus of the book is on product and process development.

Brundtland Commission. (1987). *Our Common Future: World Commission on Environment and Development*. New York: Oxford University Press.

Seminal book. Provides the scientific basis for the need for sustainable development and the resulting definition originating from its findings. It discusses the implications of the findings on numerous global issues such as the role of the international economy, the need for food security, the dangers of a rising global population with scarce resources, the management of the commons, and provides policy recommendations. Provides facts and figures to support findings. Primary focus of the book was the global population.

Gunderson, L., & Holling, C. S. (2002). *Panarchy: Understanding transitions in human and natural ecosystems*. Washington D.C.: Island Press.

Geminal book. Presents a theory that introduces how systems operate within larger systems, or panarchies. The process is described as an adaptive cycle that follows exploitation, conservation, collapse, and reorganization. If a hierarchical system descends or transcends in this view, the systems on lower and higher levels are said to remember or revolt the interactions of one level of a system with another. Focus is on ecological economics.

Hammond, A. (1998). *Which world?: Scenarios for the 21st century*. London: Earthscan.

Seminal book. Develops three world scenarios based upon the use of resources and population level increases. Considers examples of three main policy positions and their outcomes in different regions of the world. Establishes the future study basis for the vision of sustainable development.

Hawkins, P., Lovins, A., & Lovins, H. (2008). *Natural capitalism*. New York: Back Bay Books.

Seminal Book. Identifies major gap in economic theory and its implications that are currently being demonstrated in the global realm. Provides foundational theory of the concept of natural capitalism and introduces a framework for examining four types of capital: human, natural, financial, and manufactured. The focus of the book is in business economics.

International Standards Organization. (2006). ISO 14044. Geneva: ISO Copyright Office.

International Lifecycle Analysis Standard. Presents production process framework to meet one of the major criteria for ISO 14000 certification. Includes glossary of key terms, methodology, inventory analysis, and lifecycle impact analysis. Process flow is similar to hierarchical process mapping. The focus is in product development.

McDonough, W. (2002). *Cradle to cradle*. New York: North Point Press.

Seminal book. Presents the concept of closed loop thinking, a sub-skill in systems thinking, in design. Discusses importance of the thinking skill, demonstrates how thinking is executed in various forms, and presents examples comparing event based thinking to closed loop. In the end raises the question of “What is the intent of design?” The focus is on the design process, but applicable to manufacturing and product development.

Meadows, D. (1971). *The limits of growth*. New York: Universe Books.

Seminal book. Presents the concepts of limits of boundaries associated with systems. Provides examples of system limits being breached and explains what results. This book focuses specifically on one type of system pattern that has been identified. The focus of the book is global population studies.

Natrass, B., & Altomare, M. (1999). *The Natural Step for business*. Gabriola Island, BC: New Society Publishers.

Geminal book. Provides case studies of evolutionary corporations IKEA, McDonald’s Sweden, Interface Inc., and other examples of the process towards sustainable development. Introduces tools and a process of change through education and influence. The focus is on business development. Presents one of two perspectives discussed in Section 2.

Savitz, A., & Weber, K. (2006). *The Triple Bottom Line*. New York: Jossey Bass.

Provides examples of the issues facing businesses today in relation to sustainability, specifically accountability. Provides a generic framework for the introduction of a sustainability initiative into a corporation. Presents the second of two perspectives discussed in Section 2.

Vallero, D., & Braiser, C. (2008). *Sustainable design: Scientific principles to guide sustainable design decisions*. New York: John Wiley & Sons.

Provides an overview of sustainability based upon scientific principles. Covers the essential qualities found within the vision of sustainability including collaboration with relevant parties and the scientific principles underlying different design considerations, including time, place, and different forms of justice. Overviews a model of sustainable design called the synthesis-regeneration model. Focuses on engineering sciences.

Appendix C: Tools Identified for Inclusion with Instructions

Table C.1: *Identifying Relationships: Biotechniques* (Ritter & Brassard, 1998)

Tool:	Identifying Relationships: Biotechniques (Ritter & Brassard, 1998)
Purpose:	to develop ideational thinking and stimulate perspectives inspired by nature.
Impact:	Unusual connections can be made and related back to an original problem. It spurs new thinking based from a tangible item or visual. It gives brainstorming a growth spurt when it becomes stunted
Use when:	Examples exist in nature that are better than those made by humans. When seeking to understand the function of living things in mechanical terms.
Cautions:	When using models or pictures, it is important to have highly detailed items that are to scale and can be viewed from different angles.
Execution:	Provide resource group members an item to generate ideas from. Ask questions to receive ideas that are <i>associations</i> or <i>analogies</i> : How does the living thing function? How does it perform that function? What special problems or challenges does it solve? What special or unique features does this thing possess? How does it use them? Tie responses from these questions back to the problem: Which of these ideas can be applied to the problem as stated? Which ideas can be applied with some modification to the problem? Is it novel? Is it useful?

Table C.2: *Hierarchal Process Mapping* (EPA, 2009 ; Pojasek, 2005)

Tool:	Hierarchal Process Maps (EPA, 2009 ; Pojasek, 2005)
Purpose:	to collect data on resources and areas of concern associated with a specific process.
Impact:	clarifies steps that are undertaken as a part of a specific process. Identifies specific resources and dynamics associated with a process.
Use when:	A specific process is being targeted for investigation. Clarity is needed on what specific dynamics and resources are part of a process.
Cautions:	When using this tool, a simple 4 stage process can take ten minutes. Time is needed to execute this tool. Do not stop the tool without getting to the specific identification of the resources and dynamics associated with the process being investigated. Once this level of specificity is reached, the tool is complete.
Execution:	Define system to be mapped Identify steps to the system Draw the steps into a box as seen in Figure C.1, keep a single step in a single box Identify abstracted steps in the system Ask, "What steps are required for us to get this far?" Repeat until an adequate level of specificity is reached.

Figure C.1: *Hierarchical Process Map Example* (adapted from EPA, 2009)

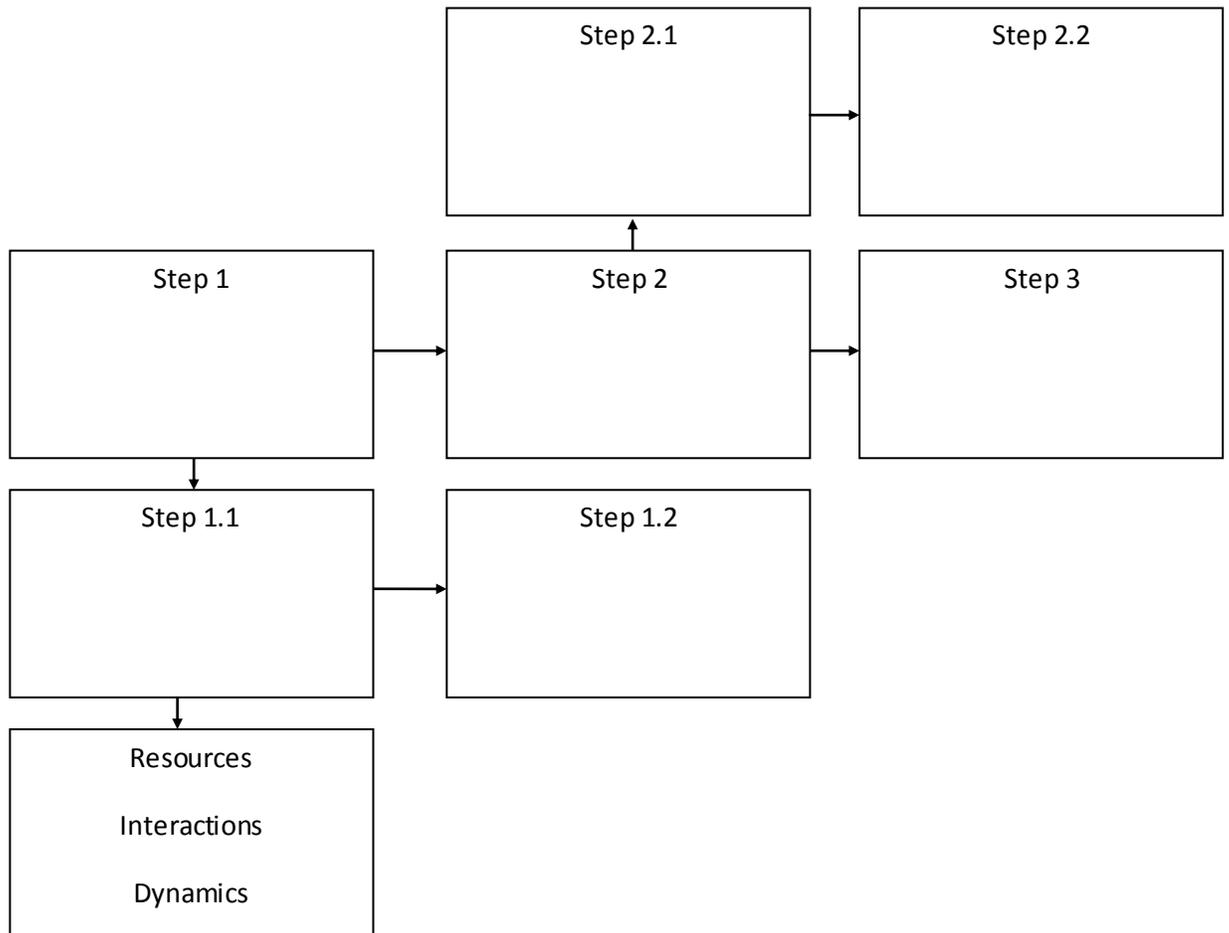


Table C.3: *Resource Flow Mapping* (adapted from Anderson, 1998)

Tool:	Resource Flow Mapping (adapted from Anderson, 1998)
Purpose:	to identify the flow of resources and materials existing within a system.
Impact:	how different processes link up and how decisions work within the system.
Use when:	A simplified version can be used for visual communication. A specific process is being targeted for investigation. Understanding is needed around a series of complicated processes. Clarity is needed on what specific dynamics and resources are part of a process.
Cautions:	This tool is a complicated when trying to name the clusters accurately. Take your time in its development.
Execution:	Refer to <i>Guidelines for Drawing Systems</i> After identifying the direction of the flow between two parts, identify the resources that flow between them

Table C.4: *Waste Management Hierarchy* (adapted from Rasmussen & Vigsø, 2002)

Tool:	Waste Management Hierarchy (adapted from Rasmussen & Vigsø, 2002)
Purpose:	to offer generalized strategic guidelines that can be used to align efforts towards the vision of sustainable development. to maximize waste avoidance, waste reduction, re-use and recycling in order to reduce the amount of waste disposed to landfill
Impact:	these strategies provide directions to guide the development of tactics. The order in which the five strategies are laid out reflect generic thinking of which strategy provides the most return on use. Can be used to spur new thinking.
Use when:	N/A
Cautions:	Studies have demonstrated the waste management hierarchy is not always aligned to be the most optimum method to guide decisions and the development of policy. Sometimes, composting is the best strategy for a given situation. Also, this is an adapted tool.
Execution:	Ask basic questions tied to a problem using the phrasing How to... (strategy listed below)...
5 Strategies:	Avoid Reduce-Minimize Recycle Compost Dispose

Table C.5: *Guidelines for Drawing Systems* (adapted from O’Conner & McDermott, 1997)

Tool:	Guidelines for Drawing Systems (adapted from O’Conner & McDermott, 1997)
Purpose:	to identify the basic steps to establishing a system.
Impact:	tool links up to other tools within this project.
Use when:	A specific process is being targeted for investigation. Understanding is needed around a series of complicated processes. Clarity is needed on what specific dynamics and resources are part of a process.
Cautions:	This tool is a highly abstract baseline for other systems maps. Keep in mind that no system is fully accurate and can capture everything because of the limitations of human experience.
Execution:	Understand that a system is a process (p. 166) Start just drawing with a goal in mind On sticky notes, write down responses to these questions What events are associated with the process? Who is involved? What patterns or relationships do you notice? Keep answering 5 Ws and Hs related to the problem Define the system boundaries (time, people, place, etc) Align responses into their corresponding relationships Highlight only those relationships that increase and decrease If a change leads to one element leads to change in another, label it + if the relationship ends in an increase of another, - if it is a decrease

Table C.6: *Generalized Biomimicry Process* (adapted from Vakili & Shu, 2001)

Tool:	Generalized Biomimicry Process (adapted from Vakili & Shu, 2001)
Purpose:	To generate a solution to a problem that has a strategy already attached.
Impact:	The development of a solution to a given problem.
Use when:	A solution is not readily available, and nature offers a design strategy that is more effective than what is already available.
Cautions:	Be aware of word use when using this approach. For example, a search on the verb “seal” can result in the animal known as a seal.
Execution:	Identify the action keywords associated with a problem. Conduct a search in biological literature on the keyword, preferably use a verb. Extract a strategy from a biological system within the results. If the strategy, does not appear, try another keyword until a strategy emerges. Apply strategy to problem.

Table C.7: *Bubble Up-Bubble Down* (Pojasek, 2005)

Tool:	Bubble Up-Bubble Down (Pojasek, 2005)
Purpose:	to directly compare a list of options To encourage discussion between two options directly
Impact:	results in a prioritization of options
Use when:	one on one comparison between two like solutions
Cautions:	This is a tool that is similar to Paired Comparison Analysis. It is recommended that a person become aware of the issues that might affect the results of a prioritization.
Execution:	A resource begins with a list of generated alternatives from brainstorming. The two options compared at the top of the list are compared directly and then discuss among a team. The least favored option bubbles down the list to be compared with the next item. The process ends when the prioritization is reached consensus.

Table C.8: *The Natural Step Framework* (TNS, 2009)

Tool:	The Natural Step Framework (TNS, 2009)	
Purpose:	to align focus of decisions to the vision of sustainable development	
Impact:	To provide an understandable “compass” in general decision making when used, directs general strategies to align with the vision of the Brundtland Commission	
Use when:	quick introduction to sustainability is needed; sustainability guidelines need to be introduced into an organization; as a source of a customized sustainable education tool for a general or specific audience	
Cautions:	This is a persuasive tool that is based upon a consensual agreement, not hard science (Upton, 2000). Be cautious trying to apply all four system conditions as they will limit decision making maneuverability.	
The Four System Conditions...	The Four Principles	
In a sustainable society, nature is not subject to systematically increasing:	To become a sustainable society we must...	
1. concentrations of substances extracted from the earth's crust	1. eliminate our contribution to the progressive buildup of substances extracted from the Earth's crust (for example, heavy metals and fossil fuels)	
2. concentrations of substances produced by society	2. eliminate our contribution to the progressive buildup of chemicals and compounds produced by society (for example, dioxins, PCBs, and DDT)	
3. degradation by physical means	3. eliminate our contribution to the progressive physical degradation and destruction of nature and natural processes (for example, over harvesting forests and paving over critical wildlife habitat); and	
4. and, in that society, people are not subject to conditions that systemically undermine their capacity to meet their needs	4. eliminate our contribution to conditions that undermine people’s capacity to meet their basic human needs (for example, unsafe working conditions and not enough pay to live on).	

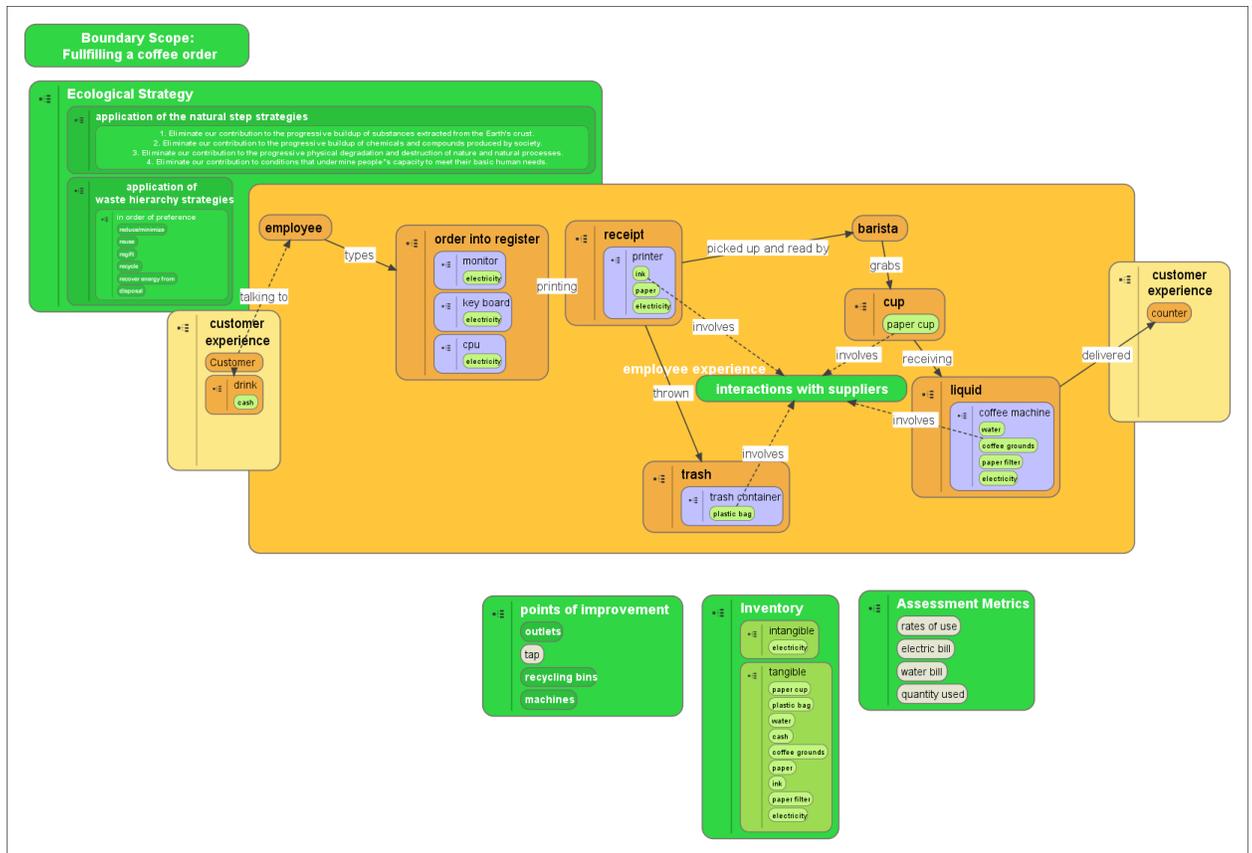
Table C.9: *Factor X* (Robert, et al., 2002)

Tool:	Factor X (Robert, et al., 2002)
Purpose:	to stretch the imagination linked to matrices (Robert, et al., 2002, p. 205) To cut wastes
Impact:	this tool provides a quick method to direct energy towards making a process more efficient
Use when:	thinking needs spurred to cut costs and inefficiencies associated with a process; can be targeted at dynamic and qualitative aspects of a process
Cautions:	the question's use must be linked to a process.
Execution:	Ask "By what factor can — or should — certain flows, or material flows in _____ be reduced?" (Robert, et al., 2002, p. 205) Then ask goal, wish, or challenge statements

References for Appendix C

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- Vakili, V., & Shu, L. (2001). Towards biomimetic concept generation. *Design Engineering Technical Conferences* (pp. 2-9). Pittsburgh, Pennsylvania, : American Society for Mechanical Engineering.

Appendix D: Example of Products that can be Developed with the Tools Found in This
Project



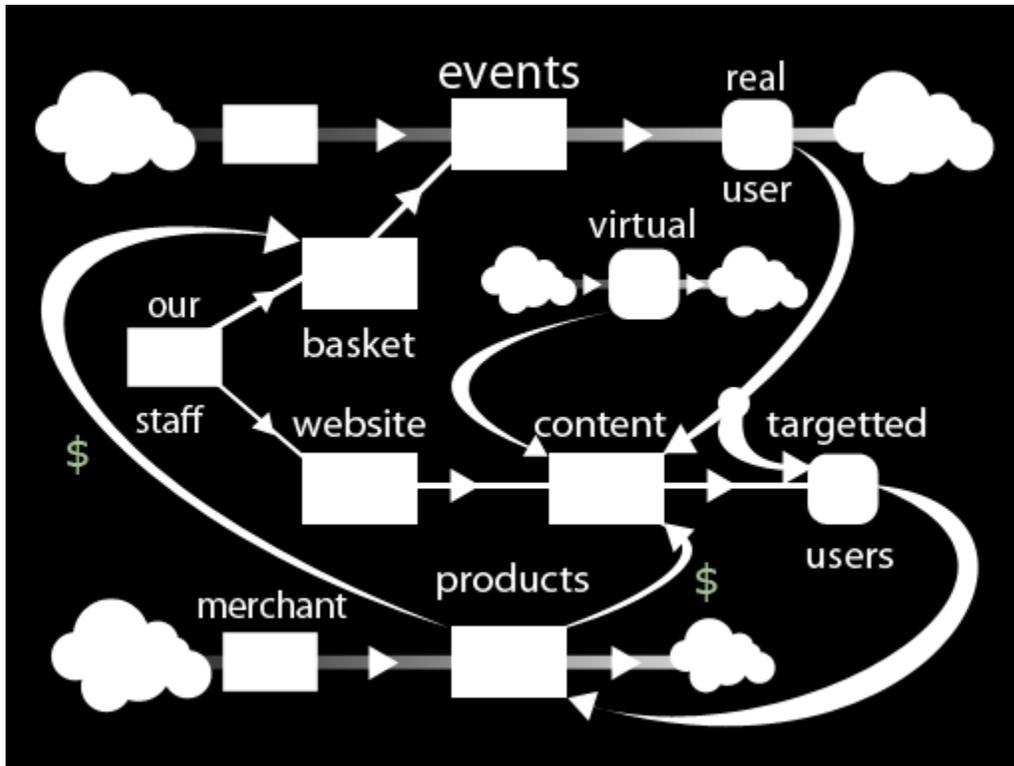
The image above is an example from observation practice at SPOT coffee aimed towards identifying a system associated with the fulfilling of a regular coffee order. The boundaries of this diagram were defined by the moment the customer placed an order and ended when the barista left the drink on the counter. The diagram of this process took 90 minutes. If interviews were conducted, the process could be shortened and hold a greater accuracy.

2 systems maps developed for same project

A User Based Map used for sales



An Internal Business Resource Map for the same project



A Holistic Resource Process Map

