1. Definitions
A system can be defined as “elements in interaction.” Systems’ thinking is a theoretical approach to understanding phenomena. Systems’ thinking is characterized by:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Traditional thinking</th>
<th>Systems thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall view</td>
<td>Reductionistic, focus is on the parts</td>
<td>Holistic, focus is on the whole</td>
</tr>
<tr>
<td>Key processes</td>
<td>Analysis</td>
<td>Synthesis</td>
</tr>
<tr>
<td>Type of analysis</td>
<td>Deduction</td>
<td>Induction</td>
</tr>
<tr>
<td>Focus of investigation</td>
<td>Attributes of objects</td>
<td>Interdependence of objects</td>
</tr>
<tr>
<td>State during investigation</td>
<td>Static</td>
<td>Dynamic</td>
</tr>
<tr>
<td>Basic assumption</td>
<td>Cause and effect</td>
<td>Multiple, probabilistic causality</td>
</tr>
<tr>
<td>Problem resolution</td>
<td>A static solution</td>
<td>An adaptive system or modeling</td>
</tr>
<tr>
<td>Operation of parts</td>
<td>Optimal</td>
<td>Suboptimal</td>
</tr>
</tbody>
</table>

2. Systems concepts and propositions
- Systems have generalizeable characteristics. All systems tend to follow basic rules whether they are natural system such as the solar system, biological systems such as the body’s immune system, or human systems such as an organization.
- Systems are nested in a hierarchy, that is, systems consist of subsystems and systems operate within environments.
- Boundaries are the interface between a system and its subsystems or a system and its environment. Friction occurs at the boundaries of a system, e.g., where rubber hits the road, when planes take off and land, between an agency and its client. By examining the boundaries of a system, we can often isolate the friction and its causes.
- All systems have inputs, processes, and output. By identifying and mapping the cycles of inputs, processes and outputs, we can define a system better and learn a lot about how it behaves.
- Systems tend to be goal seeking, that is, they move in the direction of goal achievement. Systems without well-defined goals often go in many different directions.
- The primary goal of a system is survival. All goals will be sacrificed in order for a system to survive.
- For a system to work properly, it must have control mechanisms that accept information about system outputs, evaluate that information based on some criteria related to the goals of the system, and feed back the evaluated information to be used as additional inputs.
- Systems have different levels of being open or closed. A closed system receives no inputs from its environment and thus entropy or decay sets in. Thus, varieties of inputs from the environment are necessary to help a system to remain an open system.
- Systems tend toward a state of non-change called homeostasis or equilibrium. Thus, we should assume that no system would change unless it receives new inputs. Systems that are most amenable to change are those that are failing (survival is threatened) and those that are achieving very well and can take risks without threatening survival.
- When systems change, they tend to move in the direction of differentiation and elaboration. That is, they tend to grow into larger entities of themselves.
- Systems working well experience synergy where the total system outputs are greater than the sum of all inputs. In other words, system outputs are greater than subsystem outputs. For synergy to occur, subsystems must not maximize, but sacrifice and cooperate for the good of the overall system, e.g., teamwork.
### Key inputs, process, outputs in a human service delivery system

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Process</th>
<th>Outputs</th>
<th>Feedback &amp; control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community Level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public opinion and values</td>
<td>Representation, lobbying, legislative action</td>
<td>Legislation</td>
<td>Opinion polls showing guilt relieved and values adhered to</td>
</tr>
<tr>
<td>Law and precedent</td>
<td>Legal action</td>
<td>Court rulings</td>
<td>Lawsuits avoided or won</td>
</tr>
<tr>
<td>Citizens in need</td>
<td>Assessment, eligibility determination</td>
<td>Eligible clients</td>
<td>Clients waiting to receive services</td>
</tr>
<tr>
<td>Information from other agencies</td>
<td>Cooperation, coordination</td>
<td>Working relationships, joint ventures</td>
<td>Cooperative agreements, services coordinated</td>
</tr>
<tr>
<td><strong>Policy Level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legislation and laws</td>
<td>Interpretation, policy formulation, rule making</td>
<td>Policies, rules, and regulations</td>
<td>Legislative intent fulfilled, satisfied legislators</td>
</tr>
<tr>
<td><strong>Management Level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td>Purchasing and contracting</td>
<td>Services paid for</td>
<td>Accounting, audits</td>
</tr>
<tr>
<td>People and organizational structure</td>
<td>Staffing, coordinating, and directing</td>
<td>Trained and motivated staff</td>
<td>Performance evaluations</td>
</tr>
<tr>
<td>Charters, regulations, grant guidelines</td>
<td>Planning, organizing and reporting</td>
<td>Accountable and lawful services</td>
<td>Goals achieved</td>
</tr>
<tr>
<td><strong>Practitioner Level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clients with problems and practitioners with expertise</td>
<td>Talking, assessing, listening, advising, counseling</td>
<td>Behavior changes, status changes, problems solved</td>
<td>Change according to treatment plans</td>
</tr>
<tr>
<td>Treatment plans</td>
<td>Coordinating and organizing</td>
<td>Service goals achieved</td>
<td>Plans reviewed and revised</td>
</tr>
<tr>
<td>Theory, technology, professional values and ethics</td>
<td>Application of theory, etc.</td>
<td>Effective and ethical services</td>
<td>Professional certification and licensing</td>
</tr>
</tbody>
</table>

U. of TX at Arlington School of Social Work, Dr. Schoech, 18-Aug-04, Page 2 of 5
### Analyzing the UTA SSW as a system (Hypothetical)

#### Environmental Influences

- People needing education
- SSW managers
- Support staff
- Other instructors
- Alumni
- CSWE
- UTA managers
- Taxpayers
- Legislature

#### Inputs
- Students
- Lab equipment
- SSW management
- Instructor expertise and interests
- SSW structure
- Computers, printers, copier, paper
- Funds
- Buildings
- UTA Management
- Community needs
- Accreditation requirements

#### Processes
- Teaching, advising, mentoring
- Research and publication
- Typing, printing and copying
- Salaries paid
- Building maintained & functional
- Community service, field liaison
- Self study process, program accreditation

#### Outputs
- Educated students
- Equipment used
- SSW goals met
- Knowledge discovered, careers furthered
- Courses delivered
- Papers/outlines typed, printed and copied
- Financially secure instructors
- Building used
- UTA priorities met
- Agencies helped
- Accredited programs

#### Criteria
- Course evaluations
- SSW goals achieved
- Published research
- Merit raise criteria
- Student grades
- ACP exam scores
- Satisfied agencies
- Alumni satisfied and supportive
- Accreditation standards, NASW code
- Reputation of school in community

### Analysis

Applying systems theory mandates that we ask questions such as:

- What does mapping repeated cycles of input-process-output for each entity associated with the system tell us about how the system functions?
- Do outputs focused on client impacts (quality) as well as things done (quantity). For example, are outputs defined as the number of therapy sessions the client receives (quantity) or as the change in client behavior (quality) as a result of x number of therapy sessions?
- Are system boundaries well defined and are boundary-spanning activities satisfactory to relieve the friction caused at system interfaces.
- Do measurable criteria exist for all feedback loops so the feedback can be evaluated?
- Are system goals and objectives congruent and defined well enough to help identify important inputs and guide the criteria for evaluating feedback?
- Do well-defined feedback loops exist for all major internal and environmental inputs and are these feedback loops capable of producing timely, specific, and measurable feedback? That is, do the important environmental influences have ways to get good feedback from the system and vice versa?
Results of the Analysis

1. Examination of the goals revealed that:
   a) **Goals** of SSW are not precise enough to guide practice and to act as good outcome based evaluation criteria
   b) **Goals** are not well agreed upon by the SSW, faculty, alumni, students, etc.
   c) System has goal of teaching, knowledge development, and service which may be in conflict with each other and other administrative goals such as name recognition, size, diversity, etc.

2. Examination of inputs-process-outputs-feedback reveals
   a) Measures of student performance (grades) are not good **feedback** measures; graduates knowledge and proficiency as a social worker are not measured
   b) **Synergy** occurs infrequently; few measures of synergy exist for faculty review, team teaching is not rewarded
   c) **Control** by administrators is limited due to academic freedom and tenure
   d) Instructor **feedback** to UTA administration is weak
   e) **CSWE criteria** for a quality program is not very precise and occurs very infrequently
   f) **Criteria** for evaluating research quality does not exist. The number of publications may not correlate with the quality of the publication content.

3. Examination of the system and its environment reveals
   a) **Interface** between the SSW and the taxpayer is weak; taxpayers give conflicting messages regarding research and teaching. They desire research, but want professors in the classroom teaching core courses.
   b) **Interface** between SSW and Alumni is weak; alumni input is not sought aggressively
   c) **Interface** between SSW and agencies is weak; agency satisfaction with SSW and graduates is not measured well
   d) Etc.

Resulting Strengths and Needs

- Ways to span the boundary between SSW and community (need)
- Some basic structures exist, e.g., course evaluations, alumni association, strategic plan, etc (strength)
- Resources not always tied to productivity (need)
- Etc.

Resulting Intervention Options

- Activate a strong community advisory committee to strengthen ties with the community
- Build on the strength of knowledge development to interface with the community
- Strengthen the alumni’s input into the SSW
- Obtain more agreement on goals and objectives for all stakeholders involved.
- Etc.
New Systems Thinking

There have been some recent refinements or enhancements to systems thinking, stemming from the electronic information revolution, especially the Internet. Some of these more recent system principles are:

Stupid Networks: David Isenberg in his classic telephony paper, "The Rise of the Stupid Network," advanced the principle that under conditions of uncertainty, a network should not be optimized for any set of uses presumed to be definitive. Instead, the network should be as simple as possible, with advanced functionality and intelligence moved out to its edges. An example of this the Howard Dean 2004 presidential campaign. One of the strengths of the Dean campaign is its use of the Internet which helps it become an organized network rather than a traditional army style campaign guided from the top. It is a stupid network in that hundreds of independent groups were organized with very little direction and control from headquarters. Stupid network let things happen without control from the top yet intelligence filters to the top. So, stupid networks grow rapidly and smartly without the required centralized planning.

Leadership is not about a person, but an abiance, e.g., a leader is like a park or a garden. If it's comfortable and cool, people will be attracted and come to stay and build.

Other modifications to systems theory are due to the extensive use of information technology. According to Kevin Kelly, Wired Magazine, Sep 97, p. 140+, IT results in the following impacts.

- Innovation is more importation than optimization
- To discover the unknown, we must abandon the successful known
- Things more plentiful are more valuable (e.g., a few fax machine are almost useless)
- Wealth follows things that are free (shareware)
- In the stock market, abandon a product/occupation/industry when it is best
- Seek sustainable disequilibrium to keep things in "churn"
- It is more important to do the right job than to do the job right
- Seeking opportunities is more important than solving problems