Starting in the early 1960’s and continuing through to the present time, Joseph Scandura has been relentlessly developing his study/theme of Structural Learning Theory (SLT). The central focus of SLT is to select a problem domain (narrow or comprehensive in width) and select the structures that the learners must know. The rules for those problems are broken down into their basic components; the fundamental parts of a rule are referred to as atomic components (essentially, chunks of material) and are the lowest level; those elemental parts are absolutely what the learner must know as part of the domain competency. The rules that are made up of these atomic components are rolled up to become higher-level rule(s) that are used to solve complete problems across the entire domain. Please note that the domain may be either well-defined or ill-defined; an ill-defined domain could be the study of chess (rules of play are easy but there are no direct end-point solutions), the construction of creative literature (such as a poem), or a mathematical proof (which could lead in many directions).

SLT is generally known for its applicability to mathematics, but the ideas can be extended to other areas. Although most SLT examples shown ideas of simple arithmetic (specifically, subtraction), geometry, and mathematical proofs, Scandura has given examples of how SLT could apply in the instruction of language (examples: learning the usage of –ed in English, learning German sentence structure) and has indicated that SLT could be extended to moral behavior (however, there are no references that appear to indicate any examples of this).

SLT is a cognitive-based theory that addresses specific, direct problems within a domain; the nature of rule derivation precludes SLT from generally being an interdisciplinary theory. However, SLT is not an isolated learning technique; within a “wide” domain, the rule-set would be revisited within the instruction. Three “persons” make up the learning process: the “analyst” (instructional designer), the “tutor” (the teacher, who could also be the “analyst”) and “learner” (the target performer); within that triad, the first two control the learning environment, while the student’s only influence in the process is their prerequisite knowledge (or lack thereof).

Although SLT can apply to a classroom filled with students, the emphasis is on the learner; Scandura has stated that SLT is useful in individualized instruction. SLT finds out (via pre-testing) what gaps are present within the learner and then to attack only those areas that the student needs “filling”. Given the individual nature of the rules-based instruction, there is no direct interpersonal or emotional dimension involved.

SLT is different from many of the other theories studied in that SLT emphasizes rule sets within the problem well- or ill-defined domains and the continuity of learning within sections of those domains. For example, General Problem Solver Theory (A. Newell & H. Simon) is similar to SLT, but is only applied to well-defined domains and
divides goals into sub-goals (rather than building them back up). Scandura has examined Piaget’s theories and the latter’s stages of development; Scandura indicates that the ability to move between stages is based on the mastery of domains and that mastery makes it feasible to learn “…qualitatively different domains”.

Scandura’s theory is applicable in certain instructional design models (such as Dick & Carey) where chunks of definable instruction are broken into their constituent parts. However, many of our case study (and real world) situations need a blending of objective and subjective approaches; thus, SLT could be part of our toolkit consideration, but unlikely the primary solution due to its reductionist intent.

A final point of interest (and debate!): Scandura mentions studies that show that individuals have a fixed processing capability (e.g. the number of “rules” that can be present at a time) and has likened this to Miller’s hypothesis that people can only process 7 (+/− 2) chunks of information at a time. However, he has indicated that processing speed is a topic still up for debate (due to behavioral characteristics). One interesting conjecture is that people with seemingly faster processing allow more rules to flow through “working memory” while more people with more deliberate characteristics may have more general higher-order rules.

Selected References

### Structural Learning Theory

**Joseph M. Scandura**

#### Type of Learning

<table>
<thead>
<tr>
<th>Memorize Information</th>
<th>Apply Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand Relationships</td>
<td>Apply Generic Skills</td>
</tr>
</tbody>
</table>

#### Control of Learning

- **Teacher Centered**
- **Student**

#### Focus of Learning

- **Interdisciplinary**
- **Problem**
- **Domain**

#### Grouping for Learning

- **Individuals**
- **Pairs**
- **Teams (3-6)**
- **Groups (7+)**

#### Interactions for Learning

<table>
<thead>
<tr>
<th>Human</th>
<th>Nonhuman</th>
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</thead>
<tbody>
<tr>
<td>Student-Teacher</td>
<td>Student-Student</td>
</tr>
<tr>
<td><strong>Student</strong></td>
<td><strong>Nonhuman</strong></td>
</tr>
<tr>
<td><strong>Teacher</strong></td>
<td><strong>Tools</strong></td>
</tr>
<tr>
<td><strong>Student</strong></td>
<td><strong>Information</strong></td>
</tr>
<tr>
<td><strong>Student</strong></td>
<td><strong>Environments</strong></td>
</tr>
</tbody>
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#### Support for Learning

- **Cognitive Support**
- **Emotional Support**