As shape grammar makes its beginning first in education, is it still wise to take the slow by hand approach to teaching or say for example speed up the program at rigorous design schools to get people involved quicker and in quality numbers?
"Rules do not circumvent intuition, inspiration and so forth" - I agree with the argument that "the designs of rules involve intelligence and intuition, imagination, etc.", however can it not be considered that this type of design requires a different set of skills (more mathematical perhaps) than creating purely from / in an original kind of way?
It seems to me that architecture, art, and design are only minimally about shape, so how can a shape grammar take into consideration other design issues, including program and structure and even intention or message?
rule

\[ X \rightarrow Y \]
shape rule: \( X \rightarrow Y \)

design

A rule applies to a design:
whenever there is a transformation \( t \) that makes the left-side \( X \) a part of the design: \( t(X) \leq \text{design} \)

To apply the rule:
first subtract the transformation \( t \) of the left-side \( X \) from the design, and then add the same transformation \( t \) of the right-side \( Y \) to the design.

The result of applying the rule is a new design:
new design \( = [\text{design} - t(X)] + t(Y) \)
rule

\[ X \rightarrow Y \]

addition rule: \( X \leq Y \)

subtraction rule: \( Y \leq X \)

add/subtract rule: \( X \not\leq Y \) and \( Y \not\leq X \)
fellow
rule

computation
tumbling shapes
rule 1

rule 2

computation
rule

computation
nondeterminism
choices of ways to apply rules

which rule to apply
↓
where to apply a rule
↓
how to apply a rule
rule 1

rule 2

RULE 1

RULE 2

RULE 1

RULE 2

RULE 1

computation
labels

control rule applications
state labels
which rule to apply
(when to apply a rule)

spatial labels
where to apply a rule
how to apply a rule
rule?
erasing rule

computation
state labels

which rule to apply
(when to apply a rule)

• sequence of rule applications
• repetition of rule applications
rules

computation
state labels: sequence
state labels: repetition
state labels: repetition
state labels: repetition
initial shape

starting condition
rule

initial shape

designs?

initial shape

designs?
rule

initial shape

designs?

initial shape

designs?
(optional) final state

stopping condition
rules

final state: 1
final state: 2

designs?
designs?
shape grammar

initial shape

rules

(final state)
initial shape

rules

final states: 1 or 2
parametric design

schema or type of design

some properties fixed
some properties vary
parametric schema

parameters:
x
y
z

values assigned to variables

$x = 5$
$y = 15$
$z = 1.45$

design
Figure 2. The room layouts of size (a) $3 \times 3$, and (b) $5 \times 5$ corresponding to Palladio's villa ground plans.
parametric design with CATIA
(Reading Room: Barrios, Kilian, Morshead)
parametric shape grammars

rules and initial shape are
parametric shapes
parametric rule

parameters: \( d_1, d_2, d_3, d_4 \)

conditions on parameters:
\( d_1 \) and \( d_2 \) are the sides of a rectangle
\( d_3 + d_4 = d_2 \)
parametric shape rule: \( X \rightarrow Y \) design

A parametric rule applies to a design:
whenever there is an assignment \( g \) of values to variables in the rule
and a transformation \( t \) that makes the left-side \( X \) a part of the design:
\( t(g(X)) \leq \text{design} \)

To apply the rule:
first subtract \( t(g(X)) \) from the design, and then add \( t(g(Y)) \)

The result of applying the rule is a new design:
new design = [design - \( t(g(X)) \)] + \( t(g(Y)) \)