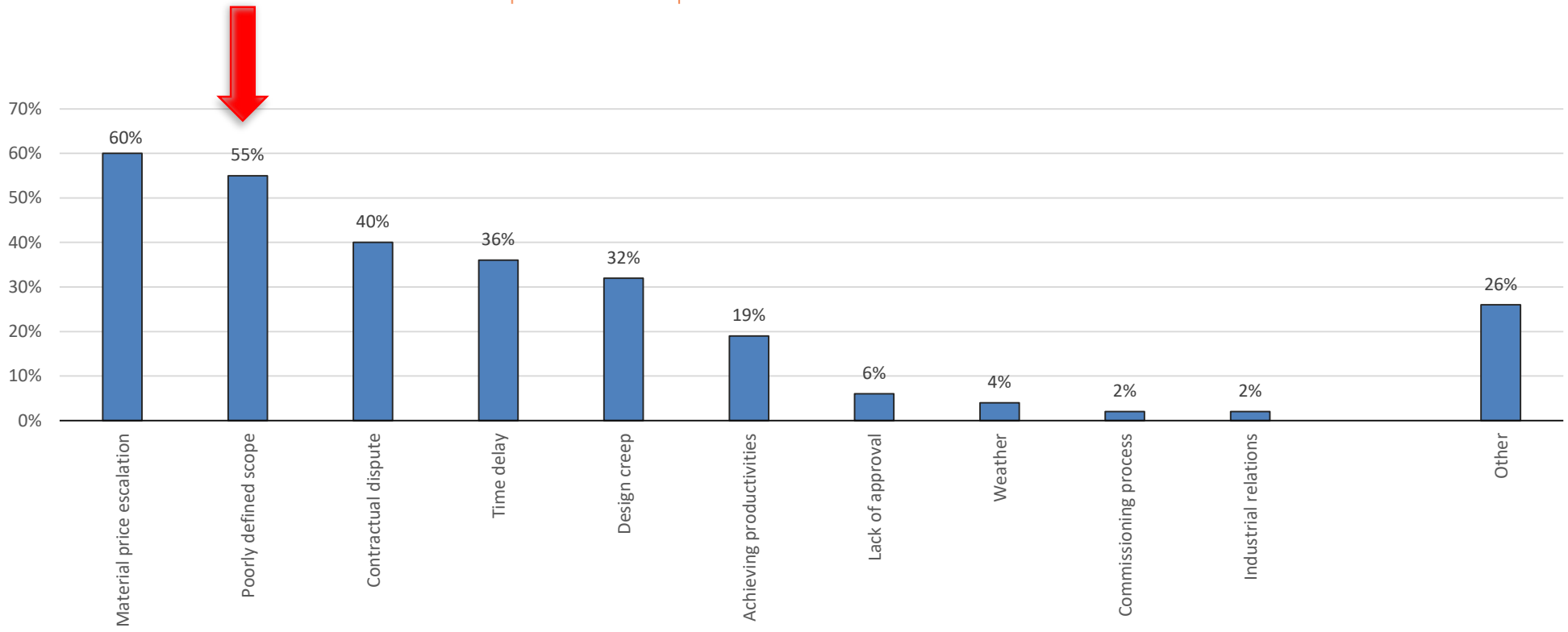
IGLC IRELAND 2019
INTERNATIONAL GROUP FOR LEAN CONSTRUCTION
DUBLIN | IRELAND | 1ST - 7TH JULY 2019

Development and Testing of an Innovative Architectural Programming Simulation as a Precursor to Target Value Design

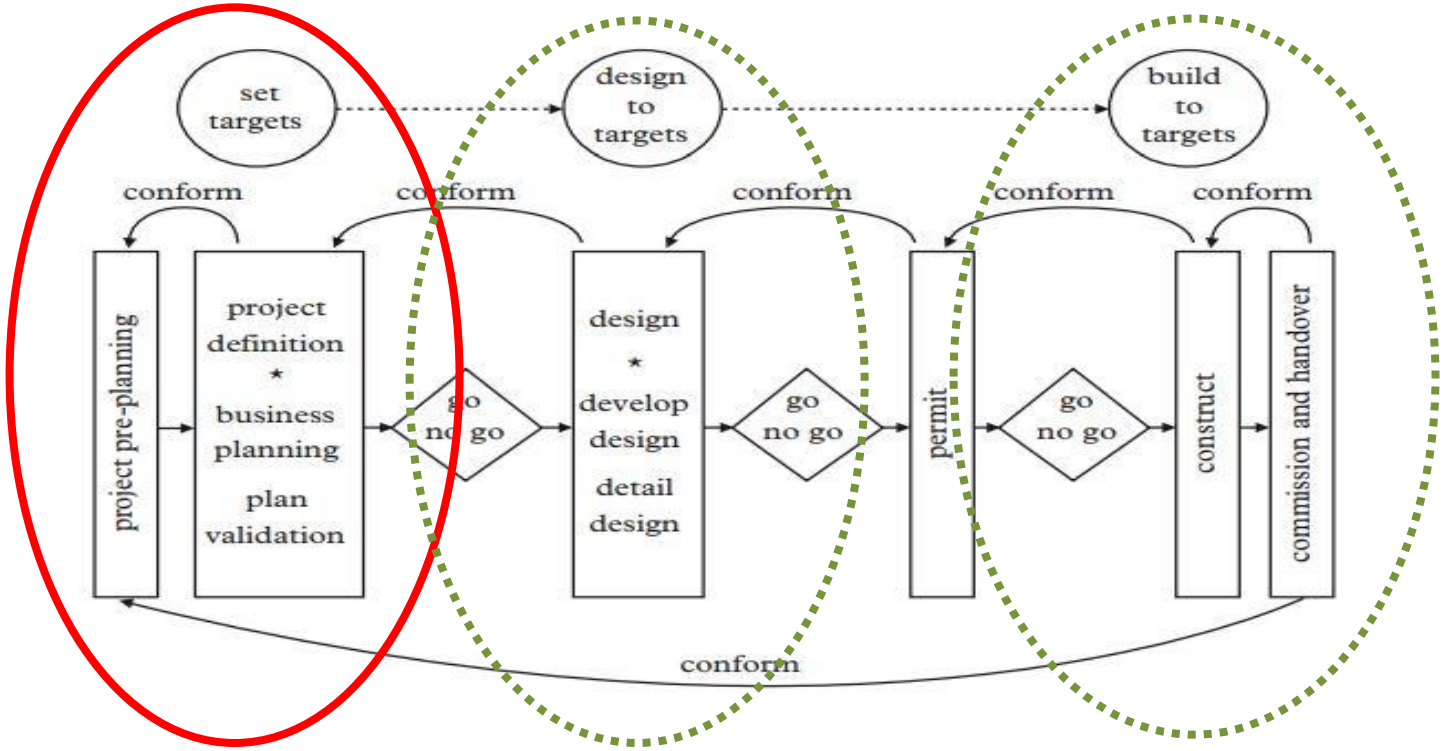
Fatemeh Solhjou Khah,[1] Zofia K. Rybkowski,[1] A. Ray Pentecost,[1] James P. Smith,[2] Robert Muir[3]

[1]Texas A&M
[2]Brigham Young University
[3]Virginia Polytechnic Institute and State University



Reasons for cost overrun in construction projects worldwide

A poorly implemented phase in the construction industry (Morêda Neto et al. 2016), architectural programming has been defined as the research and decision-making process that identifies the scope of work to be designed (WDBG 2016).



Target Value Design

TVD demonstrates continuous design procedures, and their assessment in order to meet or exceed owners' value and expectations in addition to maintaining projects within or under their target cost (TC) (Pishdad-Bozorgi et al. 2013). Target Value Design process scheme (Figure 4 in Zimina et al. 2012).

Although some research studies have been devoted to Target Value Design (TVD) the amount of information regarding the application of **architectural programming** to TVD is sparse.

IGLC IRELAND 2019

INTERNATIONAL GROUP FOR LEAN CONSTRUCTION

DUBLIN | IRELAND | 1ST - 7TH JULY 2019

Enter the

Architectural Programming (AP) Lean Simulation

Template for scenarios

Variables	RND I (Pick 2 Variables to ask)	RND II
1 # of bedrooms		
2 Ability / Disability		
3 Solar Orientation		
4 Open vs. closed kitchen		
5 Cost of Finishes		

RNDI - Plan Number_____ Cost of Finishes_____

RNDII - Plan Number_____ Cost of Finishes_____

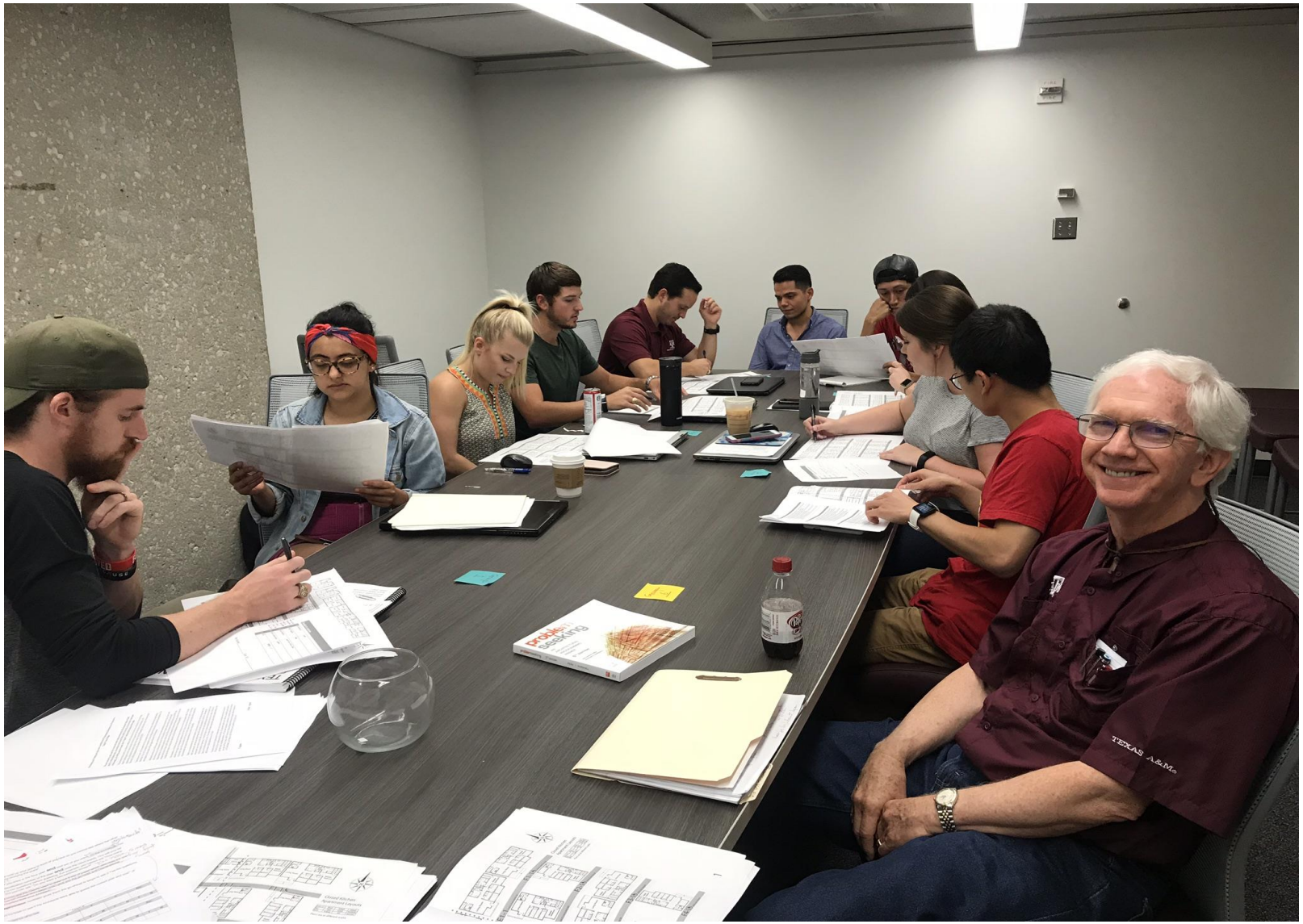
Some of the AP Simulation Materials

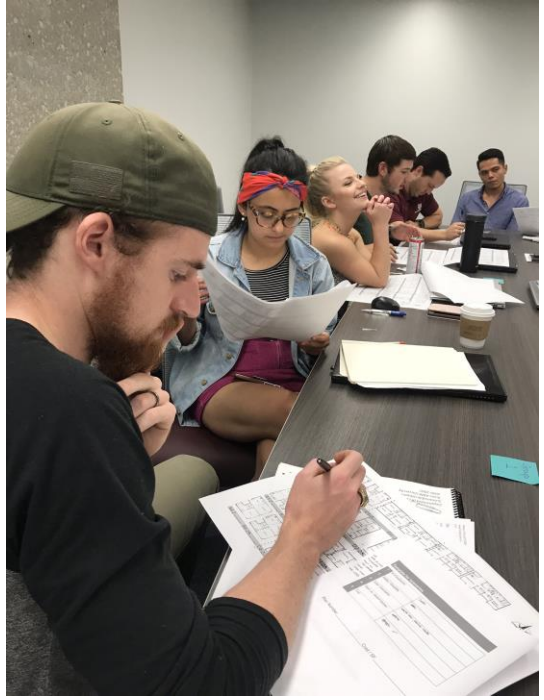
Architects must guess which of 144 floor plans best fulfill the owner's values.

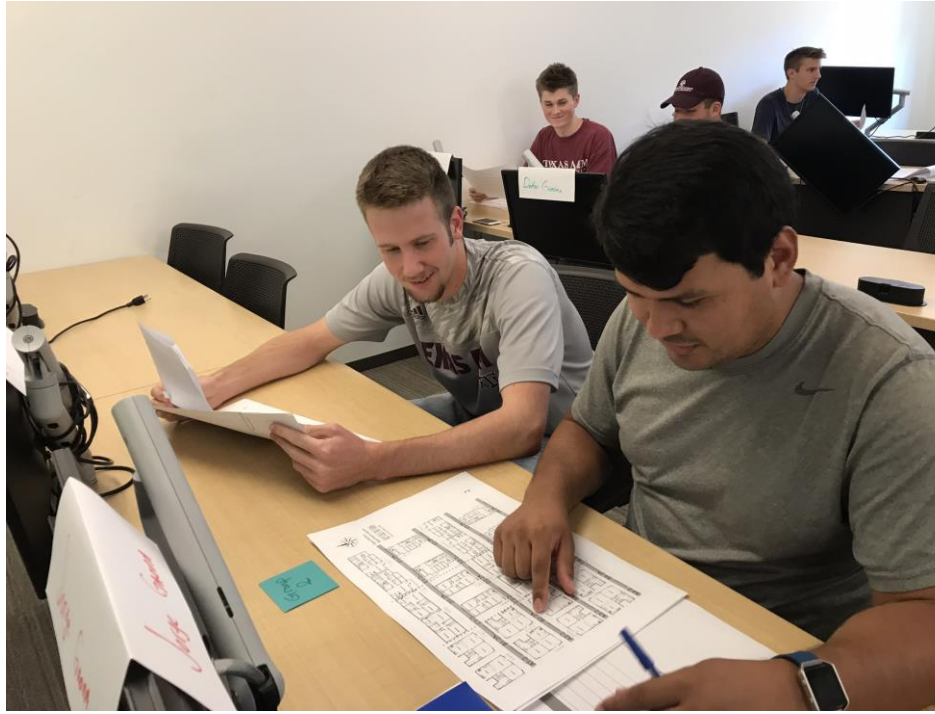
IGLC IRELAND 2019

INTERNATIONAL GROUP FOR LEAN CONSTRUCTION

DUBLIN | IRELAND | 1ST - 7TH JULY 2019







Summarized pilot test results for AP lean simulation from three universities.

Round I	**Percent of Correct Guesses**	**Percent of Incorrect Guesses**
TAMU	4.54%	95.65%
VTech	12.50%	87.50%
BYU	2.94%	97.06%
Round I Total	**4.62%**	**95.38%**
Round II	**Percent of Correct Guesses**	**Percent of Incorrect Guesses**
TAMU	78.26%	21.74%
VTech	37.50%	62.50%*
BYU	88.23%	11.77%
Round II Total	**78.50%**	**21.50%**

* Deviation in game implementation during Round II may be responsible for this number.

	Alternatives					
	Mazda 6		Smart		Toyota Corolla	
FUEL ECONOMY *Higher MPG rating preferred*	30 MPG		38 MPG		34 MPG	
			8 more mpg *	100	4 more mpg	50
PASSENGER CAPACITY *Higher capacity preferred*	5 passngrs		2 passngrs		5 passngrs	
	3 more passngrs	95			3 more passngrs	95
VEHICLE WEIGHT *Lower weight preferred*	4,300 lbs.		2,200 lbs.		3,800 lbs.	
			2,100 lbs. lighter	6	500 lbs. lighter	2
AESTHETIC PREFERENCE *Boxy shape preferred*	Typical sedan shape		Stubby, blowfish-like		Typical sedan shape	
			Much more boxy	20		
		95		**126**		**147**

Determine & mark the most critical advantage *

Credit: Todd Henderson, AIA, Boulder Associates, thenderson@boulderassociates.com

One purpose of the AP Simulation is to help stakeholders grasp the importance of **first identifying *attributes of value*** to owners, needed to engage in Choosing by Advantages (CBA) during TVD exercises.

IGLC IRELAND 2019
INTERNATIONAL GROUP FOR LEAN CONSTRUCTION
DUBLIN | IRELAND | 1ST - 7TH JULY 2019

Want to know the results?

Join us tomorrow morning (Thurs, 7/4)
from 8:30 am – 9:20 am
Location: Stream 2

to **play the Architectural Programming Simulation in person** !

First come, first served !

IGLC IRELAND 2019

INTERNATIONAL GROUP FOR LEAN CONSTRUCTION

DUBLIN | IRELAND | 1ST - 7TH JULY 2019

Zofia Rybkowski, Texas A&M

James Smith, BYU