

Evaluating Instructors' Motivations to Participate in CURE Professional Development

2023 ConnectUR Annual Conference

Co-Presenters: Craig Zywicki, Amy Childress, &
Stephanie M. Gardner



Key Takeaways

Through engaging in this session, participants will:

- *Learn about the theoretical framework used in our research and evaluation of CURE—Purdue.*
- *Obtain the implications of our research, which emphasize continuous program improvement.*



This QR code will take you to the website:

(<https://purdue.edu/undergrad-research/conferences/CUR2023.php>)

that contains information from multiple ConnectUR presentations by staff in the Purdue University Office of Undergraduate Research.

Presentation Outline

- Barriers to Course-based Undergraduate Research Experiences (CUREs)
- The CURE—Purdue professional development program
 - AER models
 - Data collection plan
- Evaluating Instructors' Motivations
 - Theoretical framework (& barriers)
 - Study design
 - Results
 - Take aways and recommendations

How do the tasks to prepare to teach a CURE, plus the tasks to teach a CURE, impact my motivation to invest time in teaching a CURE?

Sample mindset of a CURE—Purdue participant

Barriers to CUREs

What we Observed/Observe

Systemic:

- Instructors underprepared to integrate authentic research into a course
- Instructors undersupported to teach a CURE. (ex: departmental or college-level support)

Rationale to create the professional
development program
CURE—Purdue

Individual: Barriers that demotivate instructors:

- *Does (my) research belong in a course?*
- *Do I prioritize teaching and mentoring?*
- *Do I value teaching and mentoring?*
- *Do I have the knowledge/skill to facilitate research/learning within a CURE?*
- *Is teaching the CURE good for me? Good for the students?*
- *Do I have time for the effort required?*

Rationale to study instructors' motivations to teach a CURE

CURE—Purdue Professional Development Program

What is CURE—Purdue?

Instructor development through:

- Workshop-style training of instructors from a range of disciplines.
- On-going mentoring from peer instructors
- On-going collaborative support via Communities of Practice
- Evaluation and assessment of instructor and student participants
- Consultation and ongoing support for additional course-specific assessment
- Engagement with OUR infrastructure

Institutional outcomes:

- Lowering barriers to student participation in the high impact experiential learning experience of research
- Enabling instructors to involve large(r) numbers of students to experience research
- Cheap(er) solution than the apprenticeship model
- Strengthened connection between teaching and research
- Broader adoption of effective teaching strategies and practices



ConnectUR 6/26 @ 2:00pm Presentation:

Fo(u)r More Years! Evolving Dynamics of a CURE Professional Development Program

Assessment, Evaluation, & Research Models

Model	Broad Questions
I: CURE—Purdue Participant Research	<i>What are the experiences and perceptions of instructors who design/teach CUREs?</i>
II: CURE—Purdue Student Research	<i>What are the experiences, perceptions, and outcomes of students in undergraduate research experiences?</i> <i>What are the differences between students who participate in an undergraduate research experience, versus those who do not?</i>
III: Institutional Reporting	<i>What count of [subgroup] did [something]?</i>
IV: Faculty Research for their CUREs	<i>[Questions vary by faculty and their CURE]</i>

Data Collection Sample Timeline

When	CURE—Purdue Activities	Data Collected
Spring 2022	Promotion and Selection Process	- Application - Institutional Course & Employment Data
May-June 2022	Pre-Workshop assignments	- Survey for workshop content/logistics - Reflection Instructor motivations, T1 (pre-workshop)
June 2022	2-day Workshop	- Worksheets, observations and notes - End of day reflections; end of workshop evaluation Instructor motivations, T2 (post-workshop)
Summer 2022 (some into fall 2022)	- CURE Prep - One-on-one mentoring	- Worksheets, observations and notes - Other course documents
Fall 2022 or Spring 2023	CURE Implementation	- Course artifacts and other data for individualized CUREs - Observations and notes Instructor motivations, T3 (after teaching first time)
May 2023	CURE Closure	- Institutional student data - Survey of students (t2; some also t1)
August 2022 to May 2023	Monthly Community of Practice	Worksheets, observations and notes
Long-term		- Follow Fellows' on-going mentoring - Follow students' on-going UR experiences - Interviews of focus groups with students

Expectancy-Value Theory

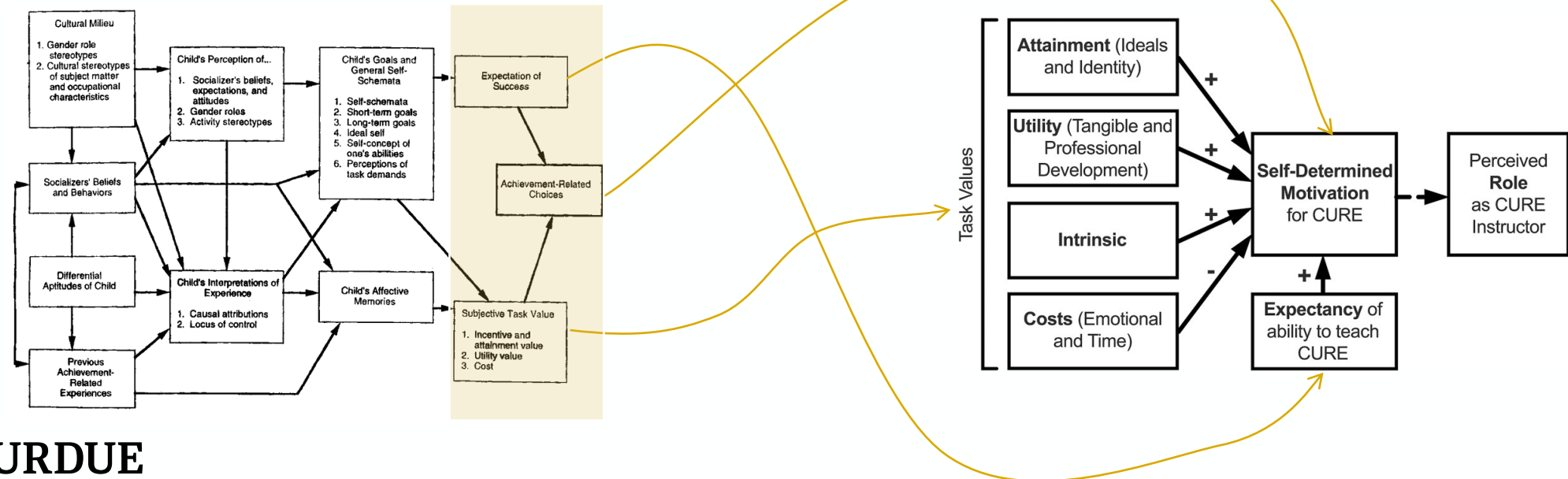
Lit Review: What existing motivation theory might explain the barriers we see?

Wigfield & Eccles (2000)

- Designed EVT to address facets of human motivation, based on:
 - expectancy of success, and
 - subjective task values.

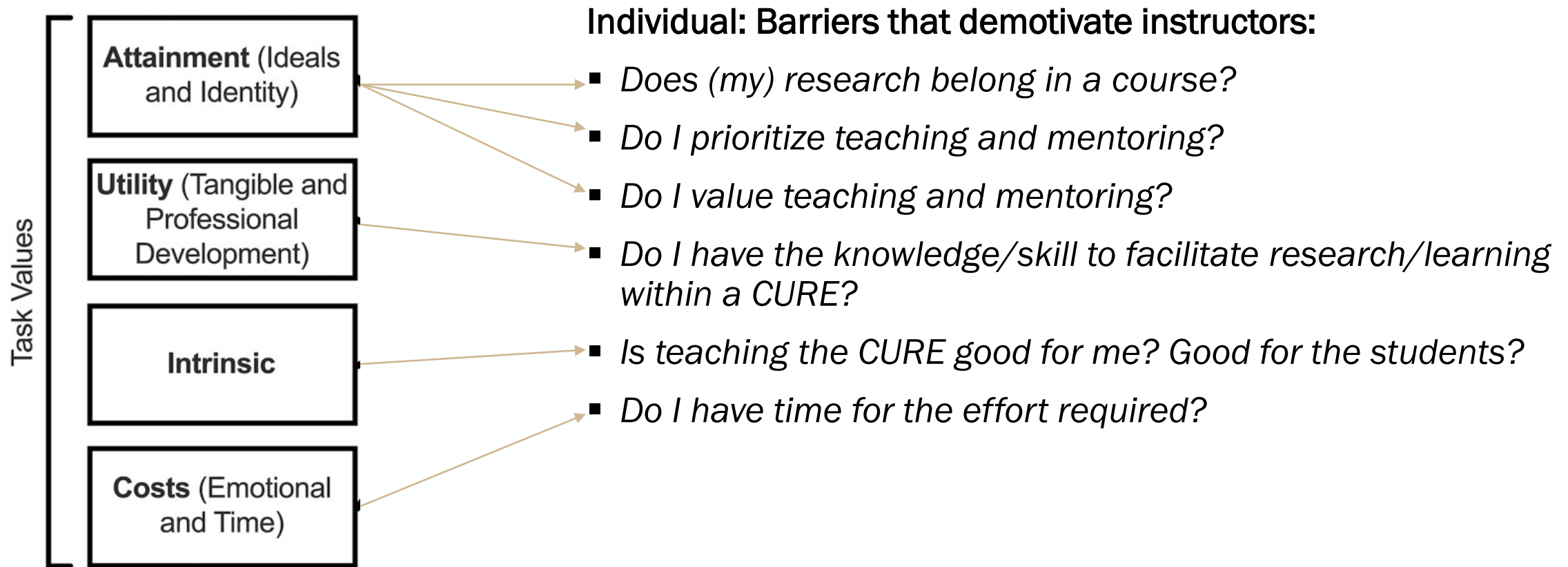
Goodwin, Cary, & Shortlidge (2021):

- Applied EVT to higher education context.
- Study of graduate students' subjective task values for teaching of a CURE.



Barriers to CUREs

Fit of observations to EVT



Expectancy-Value Theory in CURE—Purdue

Design/Methods

Adaptations from Goodwin, et al.:

- Qualitative (interviews) → Quantitative (survey)
- Card sort statements → Survey prompts

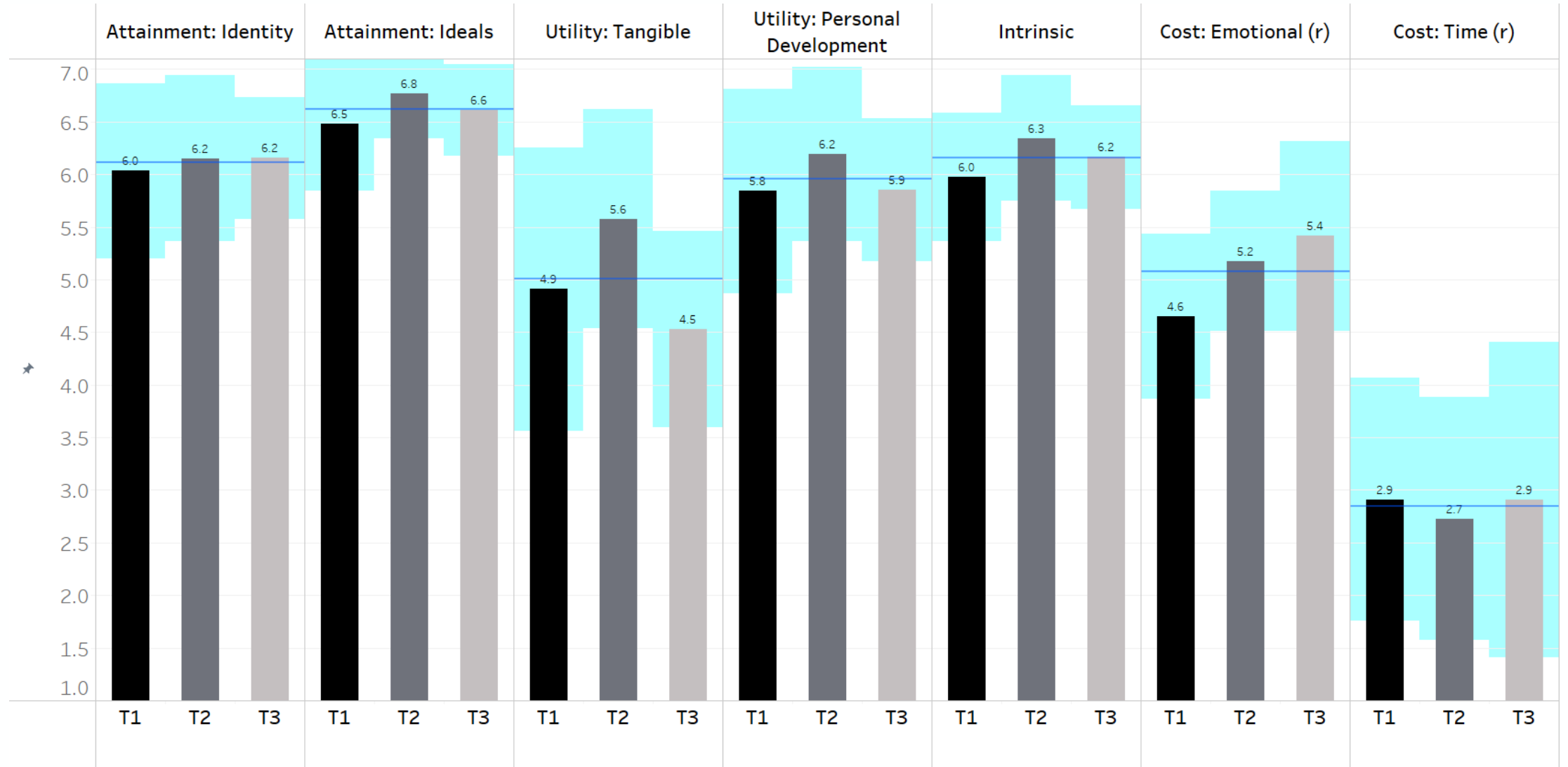
Construct	Sample in Goodwin et al.	Sample in CURE—Purdue Survey
Attainment (ideas & identity)	I think research-based courses like the CURE are valuable because they allow for increased numbers of students to gain research experience.	I think CUREs are valuable because they allow for increased numbers of students to gain research experience.
Utility (tangible & professional development)	Teaching the CURE improves my mentoring skills.	Teaching a CURE [will improve, improved] my mentoring skills.
Intrinsic	It is fulfilling to see students get engaged with their projects in the CURE.	It [will be, was] fulfilling to see students get engaged with their projects in the CURE.
Costs (emotional & time):	The lack of structure makes teaching the CURE challenging.	The lack of structure [will make, made] teaching a CURE challenging.

Expectancy-Value Theory in CURE—Purdue

Design/Methods

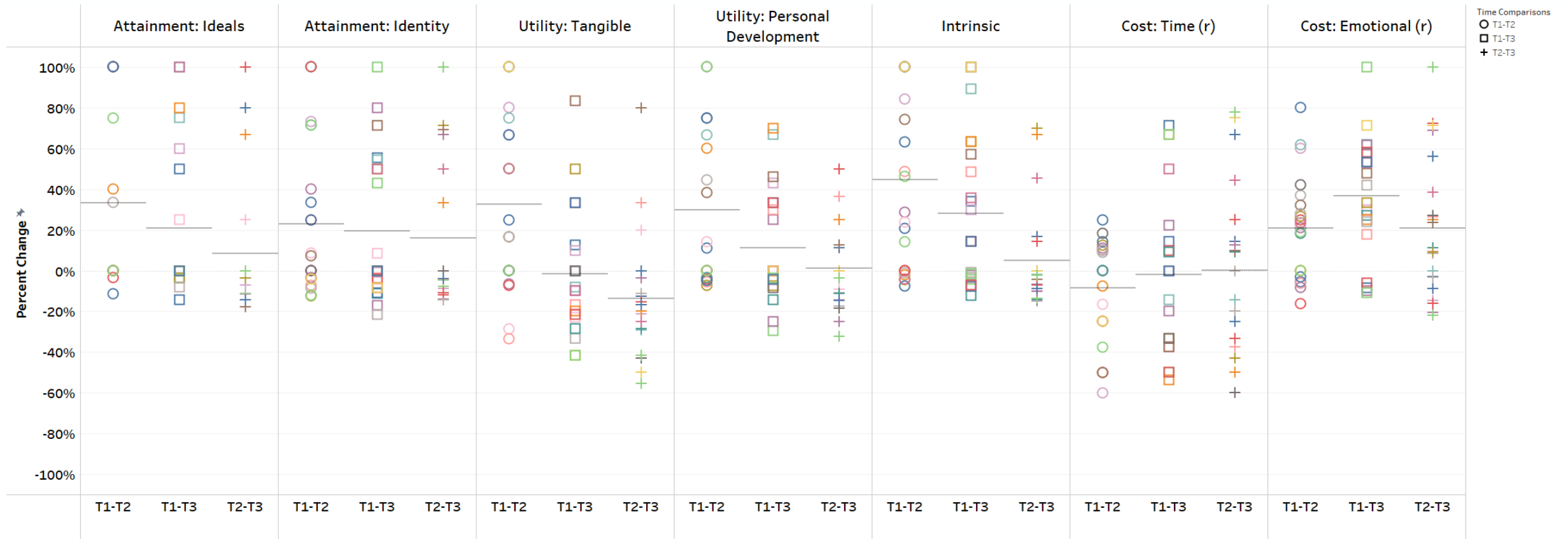
- Three survey times: *Please identify the extent to which you agree with each of the following statements based on your perceptions...*
 - T1: *...prior to participating in the CURE—Purdue workshop.*
 - T2: *...after the workshop (e.g., before teaching).*
 - T3: *...after teaching a CURE for the first time since participating in the CURE—Purdue workshop.*
- 7-point likert agreement scale:
 - 1-Strongly disagree; 2-Disagree; 3-Somewhat disagree; 4-Neither agree nor disagree; 5-Somewhat agree; 6-Agree; 7-Strongly agree.
- Question: ***What is the change in EVT construct scores between T1, T2, and T3?***
- Analysis:
 - Calculated means for each construct within EVT.
 - 1-way repeated measures ANOVA.

Results: EVT Construct Means by Time



Results: EVT Construct Change Over Time

Relative to Change Possible



Results

A one-way repeated measures ANOVA was conducted to compare EVT construct scores at T1 (before the CURE—Purdue workshop), T2 (after the CURE—Purdue workshop), and T3 (after teaching the CURE). Descriptive results are presented on next three slides. In sum, there were significant changes (with effect sizes) for constructs as follows:

EVT Construct	T1 to T2		T2 to T3		T1 to T3	
	Sig	Effect Size	Sig	Effect Size	Sig	Effect Size
Attainment: Ideals		moderate		small		small(-)
Attainment: Identity		small		very small		very small
Cost: Emotional (r)		moderate		small(-)	<.01	moderate(-)
Cost: Time (r)		moderate		very small		small(-)
Intrinsic	<.05	moderate		small		small(-)
Utility: Personal Development	<.01	moderate	<.001	large		small
Utility: Tangible		small(-)		very small		very small

Results: T1 to T2 (change from workshop)

EVT Construct	Timing	Mean	S.D	N	Change in		Cohen's D
					Mean	Sig	
Attainment: Ideals	t1	6.48	0.65	22	0.30	0.053	.55 (moderate)
	t2	6.77	0.44				
Attainment: Identity	t1	6.03	0.85	22	0.12	0.955	.22 (small)
	t2	6.15	0.81				
Utility: Tangible	t1	4.91	1.38	22	0.67	0.074	.52 (moderate)
	t2	5.58	1.07				
Utility: Personal Development	t1	5.84	1.00	22	0.35	0.046	.56 (moderate)
	t2	6.19	0.85				
Intrinsic	t1	5.98	0.62	22	0.37	0.013	.68 (moderate)
	t2	6.35	0.61				
Cost: Emotional (r)	t1	4.65	0.80	22	0.53	0.009	.71 (moderate)
	t2	5.18	0.68				
Cost: Time (r)	t1	2.91	1.18	22	-0.18	0.938	-.22 (small)
	t2	2.73	1.18				

Significant change with moderate effect size

Reporting reversed for Cost constructs; looking for positive changes in construct means

Not significant but negative is a concern.

Results: T2 to T3 (change after workshop)

EVT Construct	Timing	Mean	S.D	N	Change in		Cohen's D
					Mean	Sig	
Attainment: Ideals	t2	6.77	0.44	22	-0.16	0.601	-.28 (small)
	t3	6.61	0.45				
Attainment: Identity	t2	6.15	0.81	22	0.00	1.000	.00 (very small)
	t3	6.15	0.60				
Utility: Tangible	t2	5.58	1.07	22	-1.05	0.005	-.76 (moderate)
	t3	4.53	0.95				
Utility: Personal Development	t2	6.19	0.85	22	-0.34	0.173	-.43 (small)
	t3	5.85	0.70				
Intrinsic	t2	6.35	0.61	22	-0.18	0.443	-.32 (small)
	t3	6.17	0.51				
Cost: Emotional (r)	t2	5.18	0.68	22	0.24	0.519	.30 (small)
	t3	5.42	0.93				
Cost: Time (r)	t2	2.73	1.18	22	0.18	1.000	.12 (very small)
	t3	2.91	1.53				

Significant change with moderate effect size

Reporting reversed for Cost constructs; looking for positive changes in construct means

Not significant but negative is a concern. May have overestimated at t2? (not much room for improvement)

Results: T1 to T3 (change over full program)

EVT Construct	Timing	Mean	S.D	N	Change in		Cohen's D
					Mean	Sig	
Attainment: Ideals	t1	6.48	0.65	22	0.14	0.825	.24 (small)
	t3	6.61	0.45				
Attainment: Identity	t1	6.03	0.85	22	0.12	1.000	.14 (very small)
	t3	6.15	0.60				
Utility: Tangible	t1	4.91	1.38	22	-0.38	0.582	-.29 (small)
	t3	4.53	0.95				
Utility: Personal Development	t1	5.84	1.00	22	0.01	1.000	.01 (very small)
	t3	5.85	0.70				
Intrinsic	t1	5.98	0.62	22	0.19	0.327	.36 (small)
	t3	6.17	0.51				
Cost: Emotional (r)	t1	4.65	0.80	22	0.77	<.001	1.13 (large)
	t3	5.42	0.93				
Cost: Time (r)	t1	2.91	1.18	22	0.00	1.000	.00 (very small)
	t3	2.91	1.53				

Significant change with moderate effect size

Reporting reversed for Cost constructs; looking for positive changes in construct means

Not significant but negative is a concern. May have overestimated at t2? (not much room for improvement)

Take Aways & Recommendations

Take Away	Recommendation
Results looked better from t1 to t2 with full cohort (N=43)	Improve response rates; repeat for more cohorts.
- Most measurable change happens during workshop (2-days). - Change more variable while teaching the CURE (4 months).	- Continue workshop with minor changes. - Provide more/different support while teaching the CURE.
After T2, little room left to “improve” within Likert scale.	- Modify design to study change relative to change possible. - Explore whether people are overestimating their motivations at t2.
Is EVT the best theory?	Annually revisit literature: which theory best explain the motivations we see?
Costs always a concern.	Continual efforts to address barriers to CUREs.

What are your questions...

Possibly...

- *What other motivation theories could be used?*
- *We do not have the resources (funding, staff time, etc) to offer a faculty development program; what do you recommend?*
- *Have you considered ____? (Why or why not?)*



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Craig Zywicki, czywicki@purdue.edu

Amy Childress, childres@purdue.edu

Stephanie M Gardner, sgardne@purdue.edu

Key References

For more information about CURE—Purdue, see: <https://www.purdue.edu/undergrad-research/faculty/cure/index.php>

For more information about CUREnet, see: <https://serc.carleton.edu/curenet/about.html>

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