

A COMPARATIVE STUDY OF NEED SATISFACTIONS IN ONLINE AND FACE-TO-FACE ENVIRONMENTS

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IMPACT PROJECT

INSTRUCTION MATTERS: PURDUE ACADEMIC COURSE TRANSFORMATION

For faculty to redesign a course they are already teaching so to promote a more student-centered learning climate.

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SELF-DETERMINATION THEORY

Self-Determination Theory (SDT; Deci & Ryan, 1985; 2000)

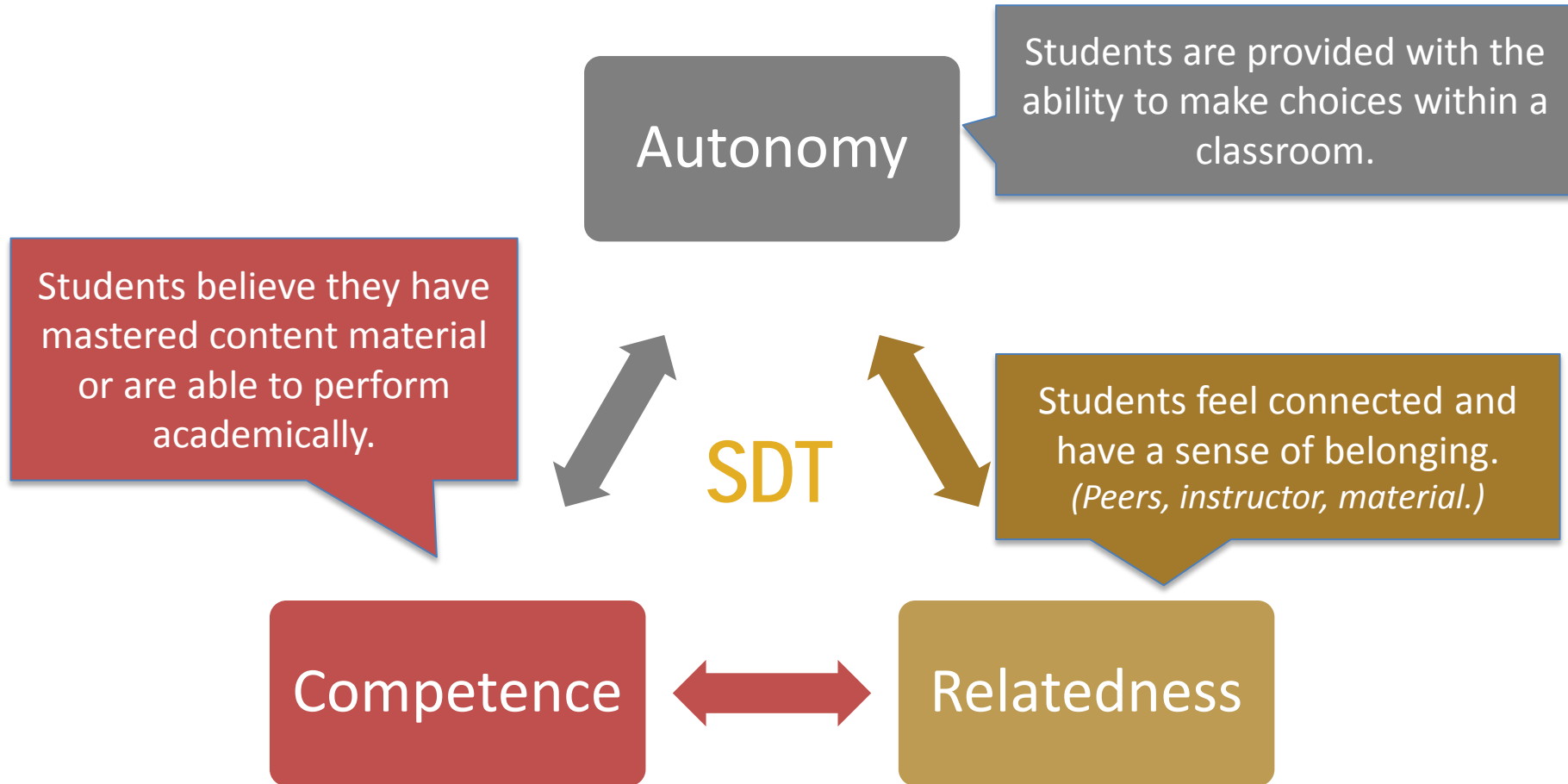


Figure 1. Constructs of Basic Psychological Needs

WHY DO WE WANT TO STUDY SDT ?

Providing a student-centered learning environment could satisfy students' basic psychological needs, which in turn enhance students' learning outcomes (Deci, Vallerand, Pelletier, & Ryan, 1991; Jang, Kim, & Reeve, 2012; Reeve, 2002; Williams & Deci, 1996).

Levesque-Bristol and colleagues (2006): integrative model for learning and motivation (IMLM)

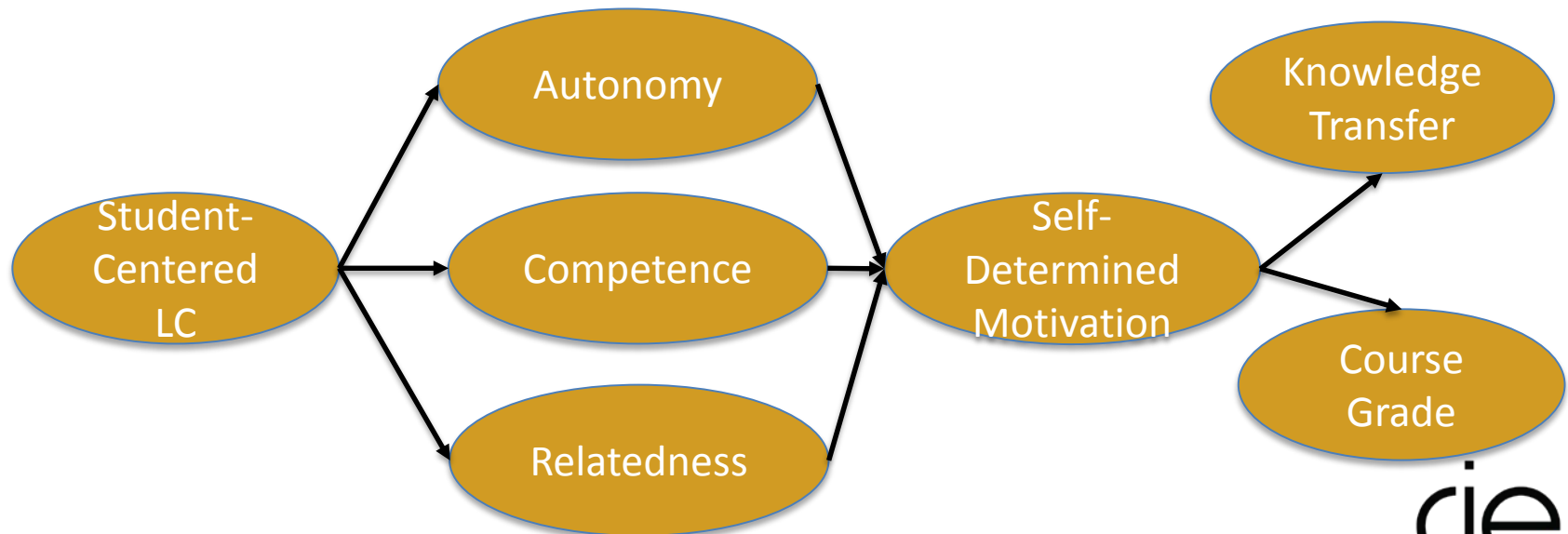


Figure 2. Integrative model for learning and motivation (IMLM)

ONLINE LEARNING

Strengths:

- Anywhere
- Anytime
- Any Pace

Weaknesses:

- A lack of immediate interactions
- Feelings of isolation (Brown, 1996), frustration, anxiety, and confusion (Hara & King, 2000, Piccoli, Ahmad, & Lves, 2001)

Online courses require learners to demonstrate self-regulation, self-motivation, and time commitment (Golladay, Prybutok, & Huff, 2000; Serwatka, 2003).

STUDIES OF SDT IN ONLINE LEARNING

- Participants' acceptance of the e-learning system could be promoted by the increases of the three SDT constructs (Roca & Gagné, 2007) .
- Chen and Jang (2010) found that the SDT-based model failed to predict the learning outcomes including engagement, achievement, perceived learning, and course satisfaction in two online certificate programs.
- Autonomy-oriented learners outperformed their control-oriented classmates in both task-related and non-task-related discourses (Rienties, Tempelaar, Giesbers, Segers, & Gijselaers, 2012).
- Hsu, Wang, and Levesque-Bristol (2016) confirmed the IMLM model with an online sample (N=330). The results indicated that a student-centered learning climate would foster the satisfaction of students' basic psychological needs, which would in turn enhance self-regulated motivation, and more gains on learning outcomes.

BASIC PSYCHOLOGICAL NEEDS SCALE

BPNS

Autonomy (7 items)

I am free to express my ideas and opinions in this course.

There is not much opportunity for me to decide for myself how to go about my coursework. (R)

Competence (6 items)

People in this course tell me I am good at what I do.

I often do not feel very capable in this course. (R)

Relatedness (8 items)

I get along with people in this course.

The people in this course do not seem to like me much. (R)

(Baard et al. 2004; Deci et al. 2001; Gagne, 2003; Levesque-Bristol et al., 2010; Sheldon & Hilpert, 2012)

RESEARCH QUESTION

1. Can BPNS be used in online learning environment?

We tested the 3 latent need factors and 2 latent method factors model, which was confirmed by Sheldon and Hilpert (2012).

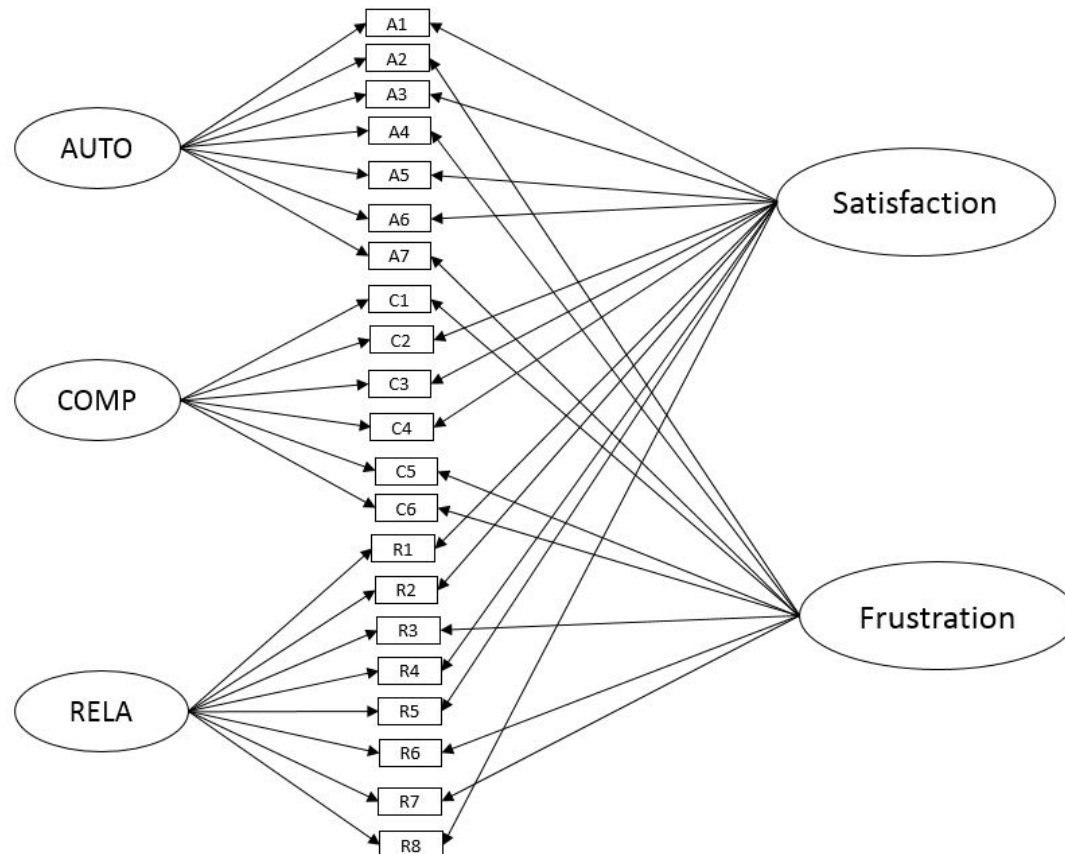


Figure 3. CFA model of BPNS

Q1: CAN BPNS BE USED IN ONLINE LEARNING?

METHOD

- Participants:

693 undergraduate students (273 males, 415 females, 5 unknown) from online courses

- Procedure:

All participants were contacted via email and asked to complete the BPNS. Participants responded to the items on a seven-point, Likert-type scale anchored by strongly disagree (1) and strongly agree (7).

- Data analysis:

Confirmatory Factor Analysis (CFA)

Specifically, a Multi-Trait Multi-Method approach was used to test the 3-need factors and 2-method factors model.

Goodness-of-fit indices: chi-square, RMSEA, NFI, IFI, CFI.

Q1: CAN BPNS BE USED IN ONLINE LEARNING?

RESULT

Results of CFA indicated that the model fit was good, $\chi^2(169) = 1160.80$, $p < .001$; NFI=0.93; IFI = .94; CFI = .94; RMSEA = .100.

LAMBDA-X					
	auto	comp	rela	sati	frus
auto1	0.52	---	---	---	---
auto2	0.42	---	---	---	---
auto3	0.69	---	---	---	---
auto4	-0.26	---	---	0.47	0.45
auto5	0.61	---	---	---	0.53
auto6	0.57	---	---	---	0.51
auto7	0.30	---	---	0.61	---
comp1	---	0.60	---	0.57	---
comp2	---	0.11	---	---	0.71
comp3	---	0.53	---	---	0.64
comp4	---	0.60	---	---	0.56
comp5	---	0.37	---	0.63	---
comp6	---	0.49	---	0.61	---
rela1	---	---	0.65	---	0.52
rela2	---	---	0.32	---	---
rela3	---	---	-0.40	0.44	---
rela4	---	---	0.26	---	0.73
rela5	---	---	0.35	---	0.76
rela6	---	---	-0.09	0.45	---
rela7	---	---	0.34	0.72	---
rela8	---	---	0.42	---	0.70

When I am in this course, I have to do what I am told.

I pretty much keep to myself when in this course.

Figure 4. Factor loadings of BPNS

We further tested a CFA model without these two items. The model fit was better, $\chi^2(134) = 895.00$, $p < .001$; NFI=0.94; IFI = .95; CFI = .95; RMSEA = .095.

RESEARCH QUESTION

2. Can SDT be successfully applied to online learning environment?

We examined the mediating effects of need satisfaction with structural equation modeling.

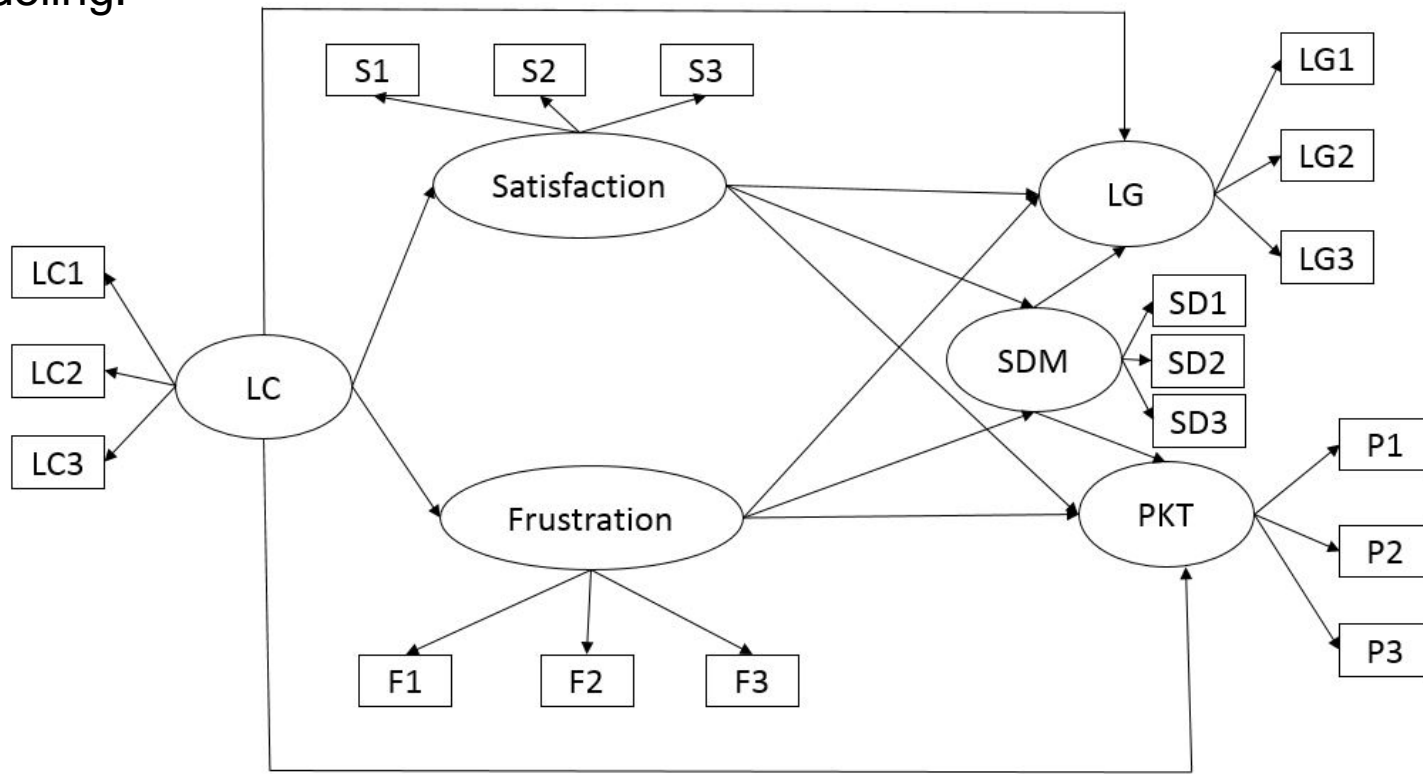


Figure 5. Hypothesized SEM model

Q2: CAN SDT BE APPLIED TO ONLINE LEARNING?

METHOD

- Participants:
1,014 undergraduate students

	Online (N=495)	Face-to-face (N=519)
Male	163	264
Female	332	255

- Measures:

Learning Climate scale (Williams & Deci, 1996), BPNS (Kasser, Davey, & Ryan, 1992), Situational Motivation scale (Guay & Vallerand, 1997), and Perceived Knowledge Transfer scale (Levesque-Bristol, C. et al., 2016). Another three questions were used to measure students' gains on the specific learning objectives.

- Data analysis:

Structural Equation Modeling (SEM)

In addition, an invariance analysis approach was used to examine the equivalence of the model across face-to-face and online learning environments.

Goodness-of-fit indices: chi-square, RMSEA, NFI, IFI, CFI.

Q2: CAN SDT BE APPLIED TO ONLINE LEARNING?

RESULT

Table 1. Descriptive statistics for all study variables

Variable	Group	N	Mean	SD	t	Sig.	Effect size
Learning Climate	Face-to-face	506	5.30	1.37	6.69	.000	0.43
	Online	489	4.67	1.58			
Need Satisfaction	Face-to-face	487	4.94	1.12	8.56	.000	0.56
	Online	462	4.32	1.09			
Need Frustration	Face-to-face	487	3.68	1.04	-6.24	.000	0.40
	Online	461	4.09	1.00			
Self-determined Motivation	Face-to-face	499	7.05	11.88	6.52	.000	0.42
	Online	470	2.54	9.60			
Perceived Knowledge Transfer	Face-to-face	486	5.00	1.47	5.67	.000	0.37
	Online	460	4.44	1.58			
Learning Gains	Face-to-face	299	3.71	1.12	3.71	.000	0.30
	Online	321	3.39	1.01			

Q2: CAN SDT BE APPLIED TO ONLINE LEARNING?

RESULT

The results of SEM showed that the SEM model fit was excellent, $\chi^2(123) = 395.44$, $p < .001$; NFI=.95; IFI = .97; CFI = .97; RMSEA = .088, which indicated that SDT can be applied to online learning environments.

Table 2. Results of the invariance analysis across the two groups

Model	X ²	df	RMSEA	CFI	IFI	NFI	Δ df	Δ X ²	Sig.
Unconstrained model	637.86	246	0.075	0.98	0.98	0.97			
LX,LY constrained	654.73	258	0.074	0.98	0.98	0.97	12	16.87	
BE(3,1)	655.57	259	0.074	0.98	0.98	0.97	13	17.71	
BE (3,2)	659.39	260	0.074	0.98	0.98	0.97	14	21.66	
GA(5,1)	660.94	261	0.074	0.98	0.98	0.97	15	23.08	
BE(4,3)	665.58	262	0.074	0.98	0.98	0.97	16	27.72	*
BE(5,3)	668.26	263	0.075	0.98	0.98	0.97	17	30.40	*
BE(5,2)	668.73	264	0.075	0.98	0.98	0.97	18	30.87	*
GA(1,1)	683.26	265	0.076	0.98	0.98	0.97	19	45.40	***
BE(5,1)	686.83	266	0.076	0.98	0.98	0.97	20	48.97	***
BE(4,2)	688.71	267	0.076	0.98	0.98	0.97	21	50.85	***
GA(2,1)	709.84	268	0.077	0.98	0.98	0.97	22	71.98	***
BE(4,1)	722.55	269	0.079	0.98	0.98	0.97	23	84.69	***
All constrained model	725.36	270	0.079	0.98	0.98	0.97	24	87.50	***

Q2: CAN SDT BE APPLIED TO ONLINE LEARNING?

RESULT

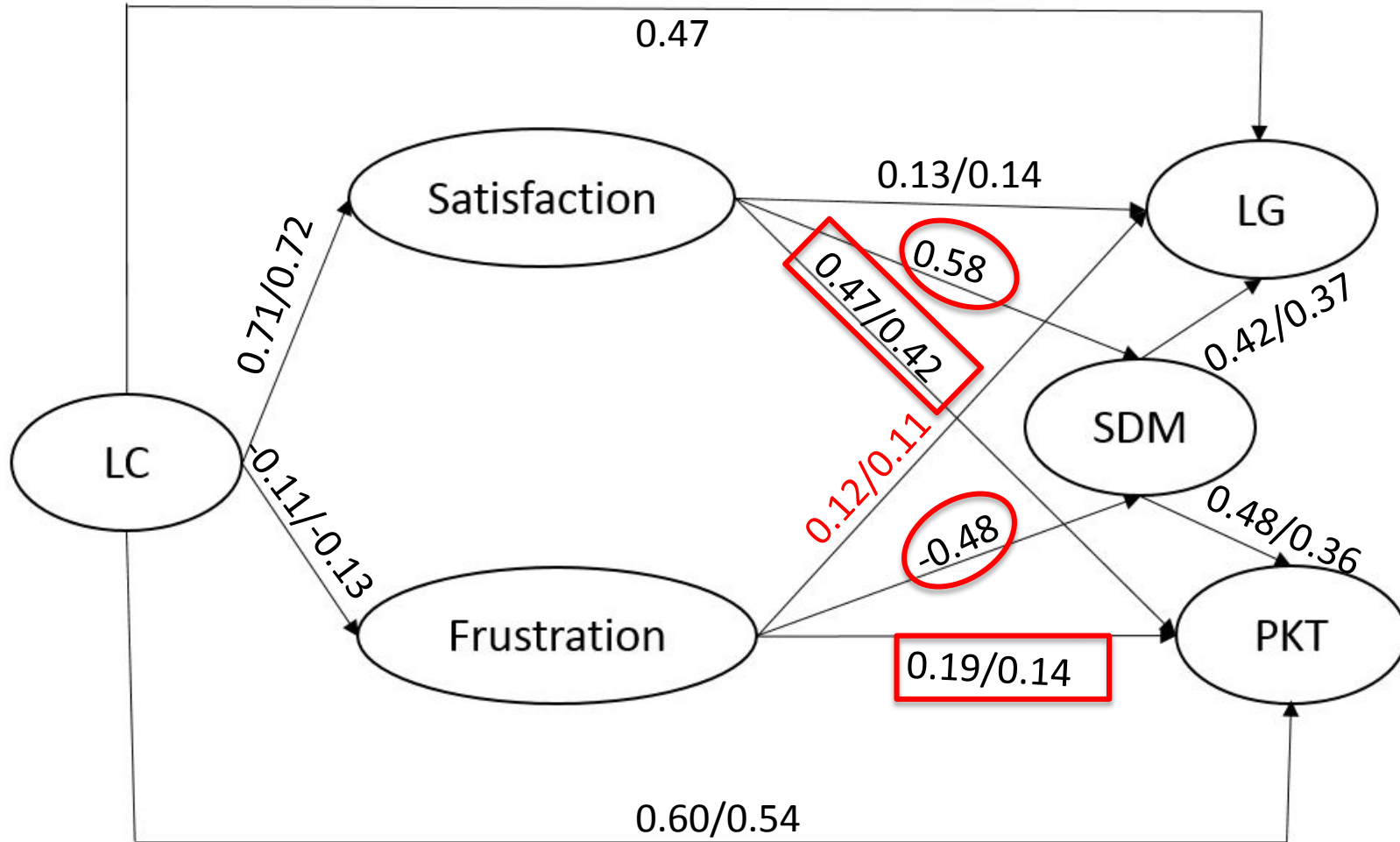


Figure 6. Structural model across the two groups

TAKEAWAYS

1. BPNS can be used in online learning environments, except auto4 and rela3.
2. The effects of need satisfaction and frustration on self-determined motivation were equivalent across face-to-face learning environments and online learning environments.
3. In order to promote students' higher-order thinking abilities and deep learning, we need autonomy-supportive teachers who can satisfy students' Basic Psychological Needs.

DISCUSSION

HOW CAN WE IMPROVE ONLINE LEARNING ENVIRONMENTS BASED ON SDT?

ONLINE WORKSHOP

SDT APPLICATION

CTWI-Syllabus_Group1_SP16

CTWI | College Teaching Workshop Series I
Online | *Making a better learning environment*



Syllabus

Click NEXT to start

< PREV NEXT >

Overview

Length: 2 week

Topic: Creating an effective syllabus

Type:
Asynchronous learning cohort

ONLINE WORKSHOP

SDT APPLICATION

Autonomy

Task options were provided
Learning material preference
Provide rationales for the tasks

Relatedness

Self-introduction using Google Docs
Role-play activity

Competence

Scaffolding
Peer & Instructor Feedback



THANK YOU!

QUESTIONS AND SUGGESTIONS ARE WELCOME.

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