

An investigation of preservice teachers' technology acceptance and use intention between the U.S. and Taiwan

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Background

Sudden effect of the COVID-19 pandemic forced countless educational programs worldwide shifted to distance learning, except a few less affected countries (UNESCO, 2021). This change also affected most preservice teachers' academic learning and professional practice from ICT technology-supported teaching and learning environments to a fully technology-based online teaching and learning mode, regardless of their willingness. Such impact include increasing students' workloads via technology use and online learning issues (Aguilera-Hermida, 2020; Simamora, 2020).

Research Questions and Purpose

As we are preparing for preservice teachers' technology use for post-pandemic education, we wonder

1. What has been changed on their technology use intention? and
2. What will predict their future technology use intention?

Therefore, we aimed to investigate the preservice teachers' technology use acceptance factors differed in a COVID-19 severer impacted country and a mildly impacted country.

Factors of technology use intention

This study is built upon the factors of UTAUT II (Venkatesh et al., 2012), namely performance expectancy, effort expectancy, social influence, facilitating conditions, and habit. Previous study suggested these factors have the direct influence on the technology use behavior when investigate preservice teachers' technology use intention.

- **Performance expectancy** refers to the usefulness of technology and the degree of an individual's believe of the use of a technology would help him or her to perform well at work (Venkatesh et al., 2012).
- **Effort expectancy** is defined as the degree of easiness while operating a system or use technology for task performance (Venkatesh et al., 2012). EE is associated with the complexity of the technology usability and particularly for the first-time user.
- **Social influence** is defined as the degree to which an individual perceives that the beliefs of technology from their important others may affect their use of technology. According to Venkatesh et al. (2012), this factor is compliant when the circumstances are mandated and have consequences.
- **Facilitating conditions** are generally defined as the degree to which an individual believes in the technological infrastructure support by the organization and technical resources (Venkatesh et al., 2012; Sherer et al., 2020) and the proxy for actual behavior control of technology (Bervell & Arkorful, 2020; Venkatesh et al., 2008).
- **Habit** is considered as prior behavior and experiences (Kim & Malhotra, 2005) and behavior to be automatic (Limayem, Hirt, & Cheung, 2007). Habit could reflect to user's repeated actions and technology use patterns in a regular daily life routine. It is suggested to measure habit directly and specific rather than too general.

Methods

Participants

- A purposive sampling method was adopted for participant recruitment. Students were recruited from universities that provide teacher education programs and contacted teachers who are teaching preservice teachers after obtained IRB approval from institutes in both U.S. and Taiwan. Students in the U.S. (N=121) were entered in four Amazon Echo Dots drawing. Students in Taiwan (N=117) all received 50NT 7-11 gift card (about 1.5 U.S. dollars)

Instruments:

- *Preservice Teachers' Technology Acceptance Inventory (PST-TAI)*

Research design and procedures:

- All data were collected after granted IRB approval through two websites: Survey Cake for Mandarin Chinese version and Qualtrics from Northern Illinois University domain for English version. Electronic consent was obtained from all participants.

Results

MANOVA Results

One way MANOVA was used to examine the effects of locations on the factors, namely, performance expectancy(PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), habit (HB), and behavior intention(BI).

- The MANOVA results indicated:

1. Significant effects on PE, EE, FC, HB, and BI.
2. The U.S. preservice teachers outperformed in all the constructs, except SI.

Stepwise Regression Results

The stepwise regression results showed:

- **Habit** was the **strongest predictor** of BI on technology use among preservice teachers in **Taiwan**, followed by PE and SI.
- **Social influence** was the **strongest predictor** of behavior intention on technology use among preservice teachers in **the U.S.**, followed by habit, FC, and PE.
- **Effort expectance** was **NOT** able to predict technology use intention in both countries.

Conclusions

1. The first predictor in Taiwan and in the U.S.

- The results from **Taiwan** indicated habit is the strongest predictors among preservice teachers in technology use intention in general. This results is consisted with previous study (El-Masri & Tarhini, 2017) that **habit (HB)** is the strongest predictors among preservice teachers in technology use intention in general without outside force.
- The results from **the U.S.** indicated that **social influence (SI)** is the strongest predictor among preservice teachers in technology use intention among COVID-19 severely effected country. The result conflicted with previous studies (e.g., El-Masri & Tarhini, 2017; Onaolapo & Oyewole, 2018). We believe preservice teachers in the U.S. considered social influence as the strongest predictor is due to the consequences of COVID-19 pandemic and related to school closures and policy changes. In order to continue complete their education, preservice teachers' technology use were influenced by school administration policy change and teachers' technology attitude.

2. Characteristics of preservice teachers and Effort Expectance

- Venkatesh et al. (2012) claimed that effort expectancy, also known as ease of use of technology, is associated with the complexity of the technology usability and particularly for the first-time user. We argued that the preservice teachers is considered as millennial generation who have exposed to technology for a long time. The effect of effort expectancy does not necessarily affect their technology use intention for academic performance and career development, regardless the course delivery methods (i.e., face-to-face or online).

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Table 1:

The Cronbach's α , reliability, and EFA factor loadings of the PST-TAI

items	EFA Factor Loadings			Reliability		items	EFA Factor Loadings			Reliability	
	1	2	3	Corrected Item-Total Correlation	Squared Multiple Correlation		4	5	6	Corrected Item-Total Correlation	Squared Multiple Correlation
PST-TAI ($\alpha=.92.4$)						PST-TAI ($\alpha=.92.4$)					
PE($\alpha=.80$)						FC ($\alpha=.75$)					
PE1	.756			.527	.490	FC1	.705			.545	.476
PE2	.800			.577	.560	FC2	.444			.654	.629
PE3	.735			.545	.473	FC3	.743			.507	.359
EE($\alpha=.89$)						HB ($\alpha=.77$)					
EE1		.790		.691	.666	HB1		.680		.646	.546
EE2		.790		.608	.581	HB2		.844		.409	.390
EE3		.786		.649	.640	HB4		.626		.700	.658
EE4		.817		.665	.673	BI ($\alpha=.84$)					
SI ($\alpha=.90$)						BI1			.765	.617	.588
SI1			.781	.686	.700	BI2			.787	.601	.596
SI2			.843	.659	.734	BI3			.791	.641	.621
SI3			.846	.619	.659	% of variance explanation	8.214	10.152	13.150		
% of variance explanation	12.606	18.859	13.488								

Table 2

One way MANOVA results between DV and factors by location

Source	DV	MS	F	p	η^2_p
location	PE	2.286	4.668*	.032	.019
	EE	7.601	7.671*	.006	.031
	SI	.536	.410	.522	.002
	FC	7.060	11.122*	.001	.045
	HB	6.610	4.701*	.031	.020
	BI	14.965	18.223*	.000	.072

Table 3

Stepwise Multiple Regression Models and Regression Coefficients for Predicting Technology Use Behavior Intention Between Taiwan and the U.S.

Location	Model	IVs	R	R ²	F	Beta	t	p
Taiwan	3	HB	.622	.387	23.731*	.380	4.650*	.000
		PE				.248	3.156*	.002
		SI				.200	2.491*	.014
U.S.	4	SI	.726	.527	32.346*	.238	2.507*	.014
		HB				.273	3.158*	.002
		FC				.191	2.468*	.015
		PE				.192	2.169*	.032