The Mediated Effects of Intention behind Internet Use and Online Interaction on the Relationship between Perceived Usefulness and Professional Development

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Abstract: Preschool teachers' attitudes toward the advantages and practical usefulness of Internet instruction and administration influence their perceptions of the development of Internet-based professional knowledge and pedagogical skills. This study examined the impacting factors and mediated effects of their attitudes toward the intention of online professional communications in preschools. This study focuses on preschool teachers' attitudes toward Internet-related applications for professional development based on a survey conducted in Taiwan. The questionnaire comprised four factors, including perceived usefulness, professional development, intention behind Internet use, and online interaction. The sample data was analyzed through partial least squaring, testing indirect effects with the mediated variables. The findings show that preschool teachers feel positively about the usefulness of Internet-related applications in preschools and employ the Internet to advance their instructional knowledge and practical competences. Their preferences about using the Internet and communicating with others about early childhood educational practices play an important mediating role in the impact of the perceived usefulness of the Internet on professional development. The researcher discussed the results and traced the implications derived from this study.

Keywords: Internet, online interaction, perceived usefulness, professional development, intention behind Internet use

1. Introduction

The innovative applications of the Internet help preschool teachers to improve their instructional skills to support young children's learning and development appropriately. Preschool teachers integrate the Internet into their professional practices to strengthen their performance regarding their construction and development of pedagogical knowledge and abilities (Liang, Chai, Koh, Yang, & Tsai, 2013; Thorpe, et al., 2015). More Internet-related opportunities and friendly tools of Internet use assist preschool teachers as they positively engage in online communities through interactive dialogue and exchange about early childhood educational practices (Downer, Kraft-Sayre, & Pianta, 2009). In Taiwan, many preschool teachers use Internet-related applications to interact with others about their lives or working situations. However, most of them ignore possible opportunities to develop professional dialogues within online communities. This results in preschool teachers seldom benefiting from the professional advantages of Internet-related interactions. It is important to clarify the role of preschool teachers' attitudes toward the use of Internet-related applications to share or correspond about early childhood educational issues. Therefore, the researcher explores preschool teachers' attitudes toward Internet application in Taiwanese preschools and online exchanges of professional knowledge and skills.

1.1 The impact of perceived Internet usefulness on professional development

Preschool teachers use the Internet and recognize its usefulness in various situations in preschool. Furthermore, they view the Internet as a tool for enhancing their instructional performance and career advancement (Gialamas & Nikolopoulou, 2010; Vrinioti, 2013). They use Internet-related applications to work efficiently and achieve early childhood educational goals, such as enhancing their management performance, improving the quality of instructional programs, and increasing the development of teaching competence. The Internet provides preschool teachers with more useful pedagogical knowledge and promotes their quality of instruction (Holmes, 2013; Matzat, 2013). Preschool teachers' perceptions of Internet-related interactions are often influenced by the intention behind of Internet use. Their perceptions of the usefulness of the Internet influence their expectations of professional development through online communities. They see the Internet as an important tool to facilitate their attendance of e-seminars to advance their professional development, search for multiple instructional materials, interact with colleagues to resolve teaching questions, and discussion or reflection on professional development. Therefore, the researcher formed the following hypothesis:

Hypothesis 1: Perceived usefulness will positively influence professional development.

1.2 The mediating role of intention behind Internet use

Accessing, searching, and using the Internet helps preschool teachers to develop positive attitudes toward Internet-related assisted teaching and learning activities for young children. Preschool teachers' behavioral intentions regarding engagement of and interaction in online communities influence their preferences about professional development practices. Online communities are an important tool to help preschool teachers communicate with others and exchange their instructional information for young children. Furthermore, they use the Internet to discuss pedagogical and administrative programs and engage a friendly atmosphere to support their professional development (Teo, 2010; Teo, Ursavas, & Bahcekapili, 2012). Preschool teachers with more positive attitudes toward Internet use easily share and discuss professional practices (Liang & Tsai, 2008). They use the Internet to design instructional activities for young children, digitize young children's learning materials, learn additional pedagogical beliefs and ethics for better performance, and promote interpersonal interactions and shared feelings in their classrooms. Preschool teachers' behavioral intentions via the Internet improve their preferences and employment for professional development. Therefore, the researcher formed the following hypothesis:

Hypothesis 2: Intention behind Internet use will mediate the relationship between perceived Internet usefulness and professional development.

1.3 The mediating role of online interaction

The Internet provides preschool teachers with an alternative and friendly tool for social interaction with professional preschool pedagogical groups. They use the Internet to connect with others, to share information, and to resolve problems in online communities (Duncan-Howell, 2010; Reeves & Li, 2012). The Internet helps preschool teachers to work collaboratively and acquire more emotional and professional support to improve their professional identity. They engage in online communities to exchange information and develop the trustworthiness to advance professional literacy (Pianta, Mashburn, Downer, Hamre, & Justice, 2008). Online interactions provide preschool teachers with more access to participate in synchronous or asynchronous discussion activities and to improve sustainable professional development (Kyzar, Chiu, Kemp, Aldersey, Turnbull, & Lindeman, 2014). Preschool teachers use the online interaction to construct social cohesion and enhance their professional reciprocity and exchangeability. Therefore, the researcher formed the following hypothesis:

Hypothesis 3: Online interaction will mediate the relationship between perceived Internet usefulness and professional development.

2. Methods

2.1 Sample characteristics

The sample comprises 341 preschool teachers working in Northern Taiwan. All respondents were informed about the purposes of this study and the procedures for informed consent, and their privacy and confidentiality was protected. The respondents were composed of preschool teachers with various education levels, school types, jobs, years of service, and durations of Internet use. In Taiwan, the preschool teachers are predominantly female and employed in the private sector.

2.2 Measurement Instrument

This study is focused on preschool teachers' attitudes toward perceived Internet usefulness and its effect on their professional development. It also investigates the mediating roles of intention behind Internet use and online interaction in this relationship. A Chinese questionnaire, the "Internet Usefulness and Professional Development (IUPD) Attitude Survey," was administered. Based on the literature review and the theoretical assumptions of this study, the researcher developed the observed variables of the IUPD and consulted and assessed with scholars or experts in the field of Internet-related applications and early childhood education.

The IUPD comprised four factors, including perceived usefulness, professional development, intention behind Internet use, and online interaction. The original survey instrument comprised 20 observed variables (five variables for each latent construct) presented with statements for which the respondents indicate their degree of agreement/disagreement on a 5-point Likert scale (1 = most strongly disagree and 5 = most strongly agree). A description of the four latent constructs is presented as follows:

1. Perceived Usefulness (PU): assessing attitudes on the extent to which preschool teachers believe Internet applications are useful for their early childhood educational practices.
2. Professional Development (PD): investigating the extent of preschool teachers' perceptions of Internet-related applications' capacities to develop their professional knowledge and competence.
3. Intention behind Internet Use (UI): assessing attitudes on the extent to which preschool teachers use the Internet for their daily life activities or work-related practices.
4. Online Interaction (OI): investigating the extent of preschool teachers' perceptions of dialogue and discussion with others in online communities.

2.3 Data analysis

Partial least squares (PLS) combine the statistics techniques with principal component analysis and multiple regression analysis. PLS provides the robust estimation of non-normal data and does so for theory testing and development (Hair, Hult, Ringle, & Sarstedt, 2013). The researcher used the SmartPLS 2.0.M3 to analyze the survey data (Ringle, Wende, & Will, 2005) and evaluated the measurement model and the structural model on the IUPD.

In the measurement, this study estimated observed variables' factor loadings and calculated the statistical significance. The researcher tested the extent to which the sample data supports the hypothesized pattern of relationships between observed variables and latent constructs. Average variance extracted (AVE), Composite reliability (CR), and Cronbach's alpha were used to examine convergent validity and discriminate validity of the latent constructs of the IUPD.

In the structural model, the path coefficients and the measures of explained variances were evaluated. Examinations of the total, direct, indirect effects of the hypothesized relationships between the various latent constructs were used. According to MacKinnon (2008) and Preacher and Hayes (2008), the researcher used the Baron and Kenny approach and the Sobel test to calculate the significances of multiple mediators to test the research hypotheses.

3. Results

3.1 Measurement Model

According to the results of factor loadings per latent construct, the researcher retained a reflective variable only when its loading was greater than 0.700 on the relevant construct. The initial 20 observed

variables were reduced to 16 variables. The standardized factor loadings on each variable ranged from 0.737 to 0.888. The researcher used the bootstrapping method based on 5,000 samples to test the level of significance of the standardized factor loadings. The *p* values of statistical significance on the IUPD for all selected variables are less than 0.001.

The AVE, CR, and Cronbach's alpha values of each latent construct of the IUPD range from 0.641 to 0.742, from 0.877 to 0.920, and from 0.812 to 0.883, respectively, as shown in Table 1. The correlation of two latent constructs ranges from 0.290 to 0.505. The correlation coefficient between each construct pair was less than the respective square root of the AVE. These measurements depict the reasonable degree of reliability, convergent validity, and discriminant validity of the latent constructs. The results suggest that the IUPD measurement model has a high degree of internal consistency.

Table 1: The AVE, CR, Cronbach's alpha, and correlation matrix.

	AVE	CR	Cronbach's alpha	(1)	(2)	(3)	(4)
PU (1)	0.671	0.891	0.837	0.819			
PD (2)	0.742	0.920	0.883	0.290	0.861		
UI (3)	0.693	0.900	0.852	0.403	0.473	0.832	
OI (4)	0.641	0.877	0.812	0.505	0.436	0.480	0.800

Note: The square root of the AVE of two latent constructs is given on the diagonal, and the correlation coefficient is given on the below diagonal.

3.2 Structural model

Figure 1 shows the path coefficients and measures of the explained variance in the structural model of the IUPD with the standardized parameter estimates. The PU construct explains 16.3% of variance in the UI construct, corresponding to a standardized regression coefficient of 0.403. The PU construct explains 25.5% of the variance in the OI construct, corresponding to a standardized regression coefficient of 0.505. The UI, PU, and OI constructs jointly explain 28.1% of the variance in the PD construct, corresponding to standardized regression coefficients of 0.338, 0.061, and 0.263, respectively. Except the path from the PU to PD (*t* value = 0.381), all other path coefficients were highly statistically significant ($p < 0.001$) by performing a bootstrap with 5,000 resamplings. The goodness-of-fit (GoF) index is crucial for assessing the acceptable level for the structural model. The GoF value is 0.395, which exceeds the cut-off value of 0.36 for large (Wetzels, Odekerken-Schroder, & Van Oppen, 2009).

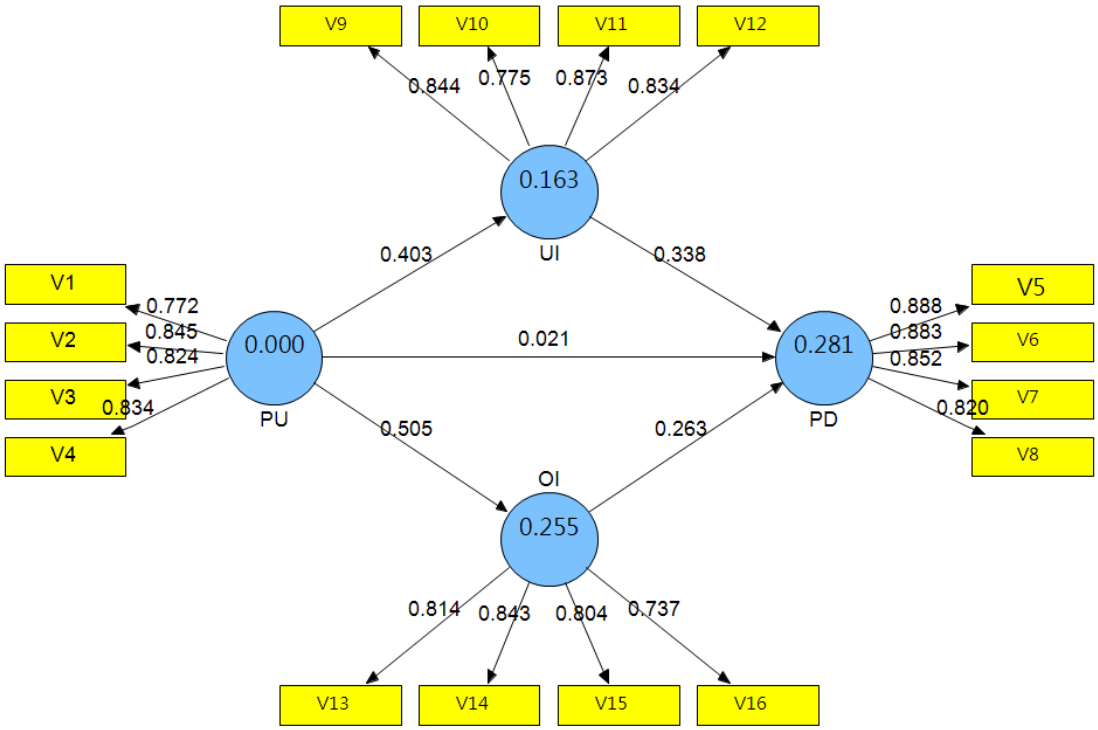

Figure 1. The Structural model.

According to the results, the total effect of PU on PD without the mediators of UI and OI is 0.290 (t value = 5.191, $p < 0.001$), thus supporting H1. After adding the mediators of UI and OI to the relationship between PU and PD, the direct effect of PU on PD decreased to 0.021 and was found to be insignificant (t value = 0.381). The UI and OI completely mediated the relationship between PU and PD. To test the significance of indirect effects in multiple mediator models, the standard error of each path coefficient was calculated by bootstrapping 5,000 resamples. Based on the Sobel test, the indirect effect of UI and OI on the relationship between PU and PD are 0.136 and 0.133, with z values of 4.049 and 3.806 ($p < 0.001$), respectively, thus supporting H2 and H3.

4. Discussion and conclusion

Integrating Internet-related applications into professional development helps preschool teachers to advance their instructional effectiveness and assist young children's learning performance. Considering the trend toward Internet-related development, preschool teachers should focus on usefulness, intention behind Internet use, and connections via the Internet to improve their pedagogical literacy and professional development. This study explored preschool teachers' attitudes toward the usefulness of Internet-related applications for professional development and indicated the important mediated effects of their perceptions of the intention of Internet use and online interactions. The PLS results of the IUPD tested the path coefficients and hypotheses to support H1 to H3.

To effectively employ the Internet-related applications with the development of professional knowledge and instructional competences, preschool teachers should believe in the usefulness of the Internet and take on positive attitudes toward the intention of Internet use and interactive communications in online communities. When they consider that Internet use is an important and friendly tool to effectively improve pedagogical competences, they can present more preferences about Internet self-efficacy and online interaction with other educational partners. These perceptions of Internet-related professional development influence their pedagogical performance, that is, their ability to teach young children by developing appropriate learning activities.

Having positive attitudes toward intentions behind Internet use and social interactions in online communities could help preschool teachers to improve their professional literacy and pedagogical practices. Greater effort is required to improve preschool teachers' perceptions of online professional

development in an efficient and meaningful way. They can use Internet-related applications and engage in online communities to exchange professional thoughts and experiences and to cooperatively improve the quality of instructional activities for young children. Future research could reuse or revise the IUPD developed in this study to test preschool teachers' attitudes toward Internet-related applications for professional development. New latent factors or other mediated effects could also be added to explore their thoughts further.

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