Chapter 3

The Early Childhood Educators' Attitudes Towards Innovative Instructional Applications about Digital Learning Activities for Young Children

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Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.70998

Abstract

The innovative value and practices of digital learning activities assist early childhood educators in employing effective instruction to improve young children's performance as well as advance their own professional autonomy to implement digital learning activities for young children. This study examined the factors and relationships about early childhood educators' attitudes towards the integration and behavioral intention of digital learning tools into young children's innovative pedagogical activities using a questionnaire survey. The questionnaire consisted of five factors, including digital innovative value (DIV), digital innovative practices (DIP), perception of instructional use (PIU), instructional professional autonomy (IPA), and behavioral intention to use (BIU). The researcher used structural equation modeling to analyze the survey data. The results showed that early childhood educators' perceptions about innovative value and applications of digital learning activities play a key role in the success of young children's performance and competence in preschool. The early childhood educators with positive attitudes towards the innovative consideration and practical instructional applications of digital learning activities had more behavioral intention to plan and design instructional activities with innovative applications of digital learning tools.

Keywords: attitudes towards innovative instructional applications, digital learning activities, early childhood educator, young children, structural equation modeling

1. Introduction

The innovative application of digital learning activities help young children with special needs or multiple learning styles to have more meaningful channels and opportunities to

access appropriate digital instruction to improve their physical and mental development [1, 2]. Digital learning activities help young children access and understand the world in meaningful and unlimited ways to explore their lives or society using digital applications [3]. Kartal and Terziyan [4] noted that digital learning activities help young children quickly improve their reading skills and develop complex cognitive performances. Korat and Shamir [5] argue that young children can engage in digital learning activities to improve their reading, easily focusing on the understanding of letters and sentences through amusing digital learning models.

In addition, digital learning activities provide young children with innovative social interaction opportunities and help them learn prosocial attitudes [6]. Vandermeer et al. [7] noted that the content of social interaction stories constructed by digital learning tools can help young children improve their interaction with their peers and resolve tasks cooperatively. Early childhood educators construct innovative and meaningful ways or learning pathways via digital learning activities to enlighten and assist young children to develop their social empowerment in line with everyday life experiences and social praxis [8, 9]. Early childhood educators use friendly and joyful digital learning tools to design instructional activities to help young children strengthen their learning motivation and resolve learning tasks to achieve appropriate learning performance [10–12].

Innovative digital learning activities open up young children's real learning opportunities so they can engage in the appropriate learning paths. Most early childhood educators agree with the positive value of digital learning activities, although they may feel insufficiently equipped with innovative perceptions or professional expertise to improve their instructional effectiveness and continuous behavioral intention to use (BIU). This study examines innovative teaching and learning characteristics embedded in digital learning activities. The researcher wants to consider how early childhood educators use innovative digital learning activities to learn with young children and to think about the professional autonomy and practical behaviors of digital instruction for young children.

1.1. The relationship between digital innovative value and digital innovative practices

Through the innovative integration of digital learning models and objects, teachers use such tools to establish appropriate instructional models to enhance the innovative meanings of their pedagogy [13]. The innovative digital value of such learning activities presents new integrated interfaces to highlight the innovative diffusion of digital technology. Teachers use innovative digital learning tools to build friendly learning environments that encourage students to strengthen and improve their learning effectiveness [14, 15]. Castek and Beach [16] note that teachers employ innovative learning tools to design playful pedagogy to support students' scientific performance. They use apps to assist students in constructing ideas with which to interact or navigating corresponding learning content.

Innovative applications of digital learning activities effectively play a critical role in early childhood education and develop young children's competence in understanding and problem-solving. Early childhood educators use digital learning tools to construct innovative and playful learning activities [17]. Early childhood educators help young children learn, through

http://dx.doi.org/10.5772/intechopen.70998

the use of digital learning tools, to engage in learning activities and enhance their cognitive understanding and subject knowledge to reach the established educational goals [18]. In this regard, the technical expertise in the instructional value and practices of digital learning tools, the basic knowledge of the teaching profession, and the pedagogy of young children's learning activities can be key pedagogical factors for early childhood educators.

Their intentions about the digital innovative value (DIV) and digital innovative practices (DIP) influence their pedagogical expertise and professional considerations. It is helpful to recognize early childhood educators' attitudes towards innovative digital values and to explore their willingness to implement innovative instructional activities. Based on the foregoing, the researcher proposes the following assumption:

Hypothesis 1:"Digital Innovative Value" is positively related to "Digital Innovative Practices".

1.2. The impacts of digital innovative value on perception of instructional use and instructional professional autonomy

Teachers use innovative and approachable digital tools to establish their meaningful pedagogy in the learning context for students [19]. When teachers are willing to use digital learning tools to design and construct learning processes to improve students' motivation and performance, they can take action with innovative practices to form instructional experiences with appropriate innovative pedagogy [20]. Teachers employ the application of such tools to reveal the digital innovative value of perceived usefulness and innovative instructional intention, as well as to form a feasible model and apply flexible integration to advance students' learning efficiency [21, 22].

Early childhood educators employ innovative consideration to integrate digital learning tools into young children's learning activities. They make use of digital learning activities to help young children engage in the learning process and establish a meaningful link with learning effectiveness [23]. More importantly, they help young children link their daily life experience and digital learning situations to support young children in achieving their learning potential and promote learning performance based on schema.

Through the integration of digital learning tools, early childhood educators develop instructional empowerment, pedagogical social participation, teaching engagement, and instructional professional autonomy (IPA) [24]. Digital learning tools promote their professional courage to challenge the traditional teaching framework and fight against established rigid or one-dimensional teaching models. They attain professional autonomy to expand the breadth of their thinking regarding digital learning practices and make use of different methods to improve their teaching potential and professional literacy.

This study focused on how early childhood educators view the digital innovative value of such learning activities regarding instructional practices and innovative applications. It also examines the impact factor of their perception of instructional use (PIU) and instructional professional autonomy via digital learning activities. Based on the foregoing, the researcher proposes the following assumptions:

Hypothesis 2:"Digital Innovation Value" positively affects "Perception of Instructional Use".

Hypothesis 3:"Digital Innovation Value" positively affects "Instructional Professional Autonomy".

1.3. The impacts of digital innovative practices on perception of instructional use and instructional professional autonomy

The integration of competencies and application of practices for digital learning tools has a long and well developed history. We are still concerned and focused on the continuous efforts regarding the professional practices of the digital innovative practices and integration resources for such tools [25]. The changes in digital learning activities in teachers' innovation include not only the desire to use digital innovative practices and related applications in contemporary society but also the access to and use of innovative tools to enhance their implementation of multi-learning resources and sharing community platforms [26]. Teachers use such tools to construct their perception of instructional use and present instructional professional autonomy.

With the integrations of playfulness and encouragement, teachers can implement digital learning activities to stimulate students to achieve a predetermined learning goal and perform positively [27, 28]. They renew and update their instructional content according to social trends and pedagogical needs to help students improve their social networking learning and constructive ability [29]. With the learning scaffolding of ubiquitous learning resources and friendly feedback via digital learning activities, teachers help students to enhance their learning effectiveness and improve their competencies.

Innovative digital learning tools change the power relationship between knowledge subjectivity and mentoring traditional pedagogical structure, and early childhood educators can use digital innovative practices to educate and develop young children's learning potential [30, 31]. Digital learning activities help early childhood educators check their perception of instructional use in the process of young children's learning [32]. When early childhood educators agree with the innovative value of digital learning tools, they are willing to focus on the perception of instructional use about instructional strategies and pedagogical construction to reveal their instructional professional autonomy in such activities. Based on the foregoing, the researcher proposes the following assumptions:

Hypothesis 4:"Digital Innovative Practices" positively affects "Perception of Instructional Use".

Hypothesis 5:"Digital Innovative Practices" positively affects "Instructional Professional Autonomy".

1.4. The impacts of perception of instructional use on instructional professional autonomy and behavioral intention to use

Teachers' perception of instruction with digital learning activities affects their considerations of curriculum and instructional practices and shapes students' learning process and appropriate development [33, 34]. Teachers provide appropriate and diverse digital learning access in

accordance with the different characteristics of students and focus on their instructional and professional effectiveness to support students' learning performance.

Teachers with rich technical intention to use and a background in instructional experiences will demonstrate a positive and practical attitude towards the teaching value of such tools. They can draw upon their instructional professional autonomy to consider students' access and use of learning effectiveness and to engage students in the integration process, thereby improving their learning performance [35]. Based on their past instructional practices and behavioral experiences via digital learning activities, teachers design and plan instructional strategies with digital innovative practices to implement a multimodal and integrated learning model.

Masoumi [36] noted that most early childhood educators agree with the advantages and practicality of digital learning activities, but they show a different behavioral intention to use. Early childhood educators employ different digital learning activities to connect diversified integrations with actual and virtual learning situations and use the meaningful linkages of scientific and technological innovation with the instructional model to help young children improve their language literacy and learning performance [37, 38]. Based on professional judgment and subject-learning needs, they can choose the appropriate digital learning tools to plan and design technology applications. Based on the foregoing, the researcher proposes the following assumptions:

Hypothesis 6:"Perception of Instructional Use" positively affects "Instructional Professional Autonomy".

Hypothesis 7:"Perception of Instructional Use" positively affects "Behavioral Intention to Use".

1.5. The relationship between instructional professional autonomy and behavioral intention to use

Teachers use digital learning activities to effectively assist students in performing individualized and appropriate instructional strategies [39]. Their experiences in the use of assisted aids via digital learning tools enhance their competencies to design multiple methods to improve students' learning motivation and effectiveness.

Early childhood educators' perception of using digital learning activities mainly related with the full support of instructional professional autonomy [40]. They have professional autonomy to implement multiple access practices with digital learning activities. They are more confident in using digital learning resources to construct innovative instructional practices and learning environments to enhance the learning effectiveness of young children [41, 42]. With the professional autonomy of scaffolding and the support of self-learning characteristics and learning rhythms to engage in learning activities, early childhood educators can continuously implement digital learning activities to help young children independently engage in the learning process.

On the basis of instructional professional autonomy of digital learning activities, early childhood educators construct multi-sensory digital contexts with virtual reality integration

into learning situations to encourage young children to be curious and explore the actual world [43]. They employ professional thinking about the construction of multidimensional instructional applications with digital learning activities and improve their self-efficacy in the instructional profession and behavioral intention to use such tools. Based on the foregoing, the researcher proposes the following assumption:

Hypothesis 8:"Instructional Professional Autonomy" positively affects "Behavioral Intention to Use".

1.6. Study purposes

Therefore, it is important for early childhood educators to deeply explore their attitudes towards the innovative value and practices of digital learning activities, as well as their behavioral intention to use these tools in preschool. In this study, the researcher examined the factors and relationships about early childhood educators' attitudes towards the innovative value and practices with their professional autonomy and behavioral intention to use digital learning activities. The attitudes include digital innovative value, digital innovative practices, perception of instructional use, instructional professional autonomy, and behavioral intention to use involved in the considerations of early childhood educators on digital innovative pedagogical development and practices. The research model is shown in **Figure 1**.

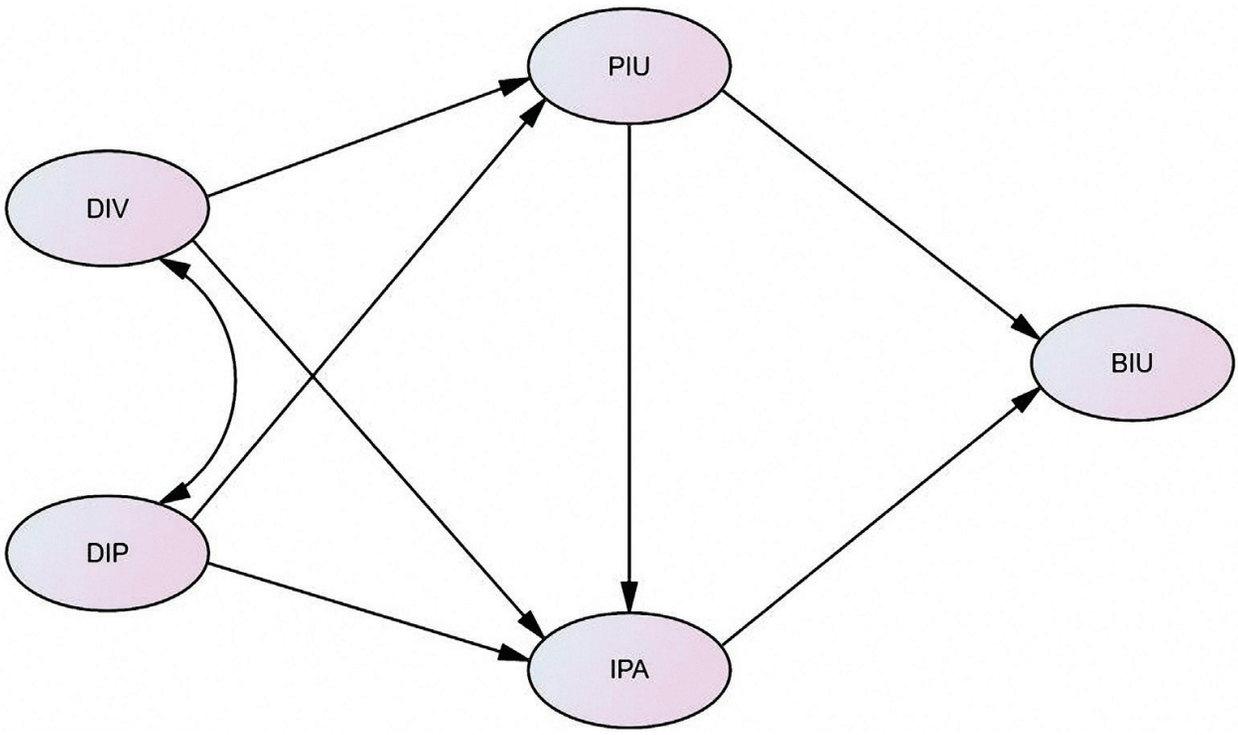

Figure 1. Research model.

http://dx.doi.org/10.5772/intechopen.70998

2. Methods

This study developed a questionnaire to survey early childhood educators in Taiwan regarding their attitudes towards innovative instruction and the integration of the digital learning activities for young children. The researcher used structural equation modeling to analyze the survey data and employed a two-stage approach to test the measurement and structural models of a theoretical model hypothesized in previous studies. Finally, the researcher examined the total effects of the hypothesized relationships between latent constructs in the responses.

2.1. Sample characteristics

A questionnaire was distributed to early childhood educators working in Taiwan to examine their behavioral intention to use digital learning activities to implement their innovative instruction and professional development. Based on the descriptive statistical from the Ministry of Education in Taiwan, there were 42,956 early childhood educators in the period of 2016–2017. The researcher estimated the number of sample based on empirical considerations and budgetary principles. This study had surveyed a random sample of early childhood educators in Taiwan. According to the suggestions of structural equation modeling, 600 questionnaires were distributed. The researcher used the telephone or email to contact the preschool to ask the early childhood educators to fill the questionnaire. After excluding early childhood educators with non-responses or missing values, the valid number of anonymous samples was 500, for a response rate of 83.33%. All respondents were informed about the purposes of this study and the procedures for informed consent, and their privacy and confidentiality were protected. The respondents in this reasonable sample size were composed of early childhood educators with divergent education levels and years of service. **Table 1** presents a summary of the sample demographics.

2.2. Measurement instrument

To assess the attitudes of early childhood educators towards innovative values and implementation of digital learning activities, instructional practices and professional autonomy, and behavioral intention to use digital learning activities for young children, the researcher implemented a Chinese questionnaire, the attitude survey of digital innovative instructional applications (DIIA), in this study. Based on the literature review and theoretical assumptions of this study, the researcher developed observed variables of the DIIA.

The researcher proposed the following five latent constructs for digital innovative practices and professional autonomy about digital learning activities in preschool: digital innovative value (DIV), digital innovative practices (DIP), perception of instructional use (PIU), instructional professional autonomy (IPA), and behavioral intention to use (BIU). The original surveying instrument included 25 observed variables (5 variables for each latent construct). The DIIA presented bipolar agree/disagree statements on a 5-point Likert scale (1 for most strongly disagree and 5 for most strongly agree). A detailed description of the five latent constructs is presented as follows:

1. Digital innovative value (DIV): assessing attitudes on the extent to which early childhood educators believe the value of digital learning activities for young children is an innovative pedagogy and provides more advantages in instructional practice.
2. Digital innovative practices (DIP): exploring attitudes on the extent to which early childhood educators employ digital learning activities to provide young children with multiple and meaningful instructional practices.
3. Perception of instructional use (PIU): investigating the extent of early childhood educators' perceptions of the instructional practices and pedagogical experiences to implement digital learning activities for young children.
4. Instructional professional autonomy (IPA): assessing the attitudes on the extent to which early childhood educators' present professional autonomy to design digital learning activities and choose appropriate instructional resources for young children.
5. Behavioral intention to use (BIU): assessing attitudes on the extent to which early childhood educators' present behavioral intention to use digital learning tools to implement instructional activities for young children.

Respondent characteristic	Number	Percentage
Gender		
Male	35	7.0
Female	465	93.0
Age		
Under 30	153	30.6
31–40	182	36.4
Over 41	165	33.0
Education level		
High school	28	5.6
University	455	91.0
Graduate school	17	3.4
School type		
Public	159	31.8
Private	341	68.2
Job		
Principle	14	2.8
Director	65	13.0
Teacher	363	72.6
Assistant	58	11.6

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Respondent characteristic	Number	Percentage
Years of service		
Under 5	115	23.0
6–10	127	25.4
11–15	185	37.0
16–20	62	12.4
Over 21	11	2.2
Duration of digital instructional use		
Under 5	113	22.6
6–10	169	33.8
11–15	153	30.6
16–20	40	8.0
Over 21	25	5.0

Table 1. Sample demographics.

2.3. Data analysis

The researcher employed a two-stage approach to test the measurement model and structural model of a theoretical model hypothesized in previous studies [44–46]. In the first stage, the measurement model was analyzed using Amos 20.0 with the raw data as the input. The CFA of the observed variables and latent constructs were tested in the measurement model. The researcher used the estimations of individual variables' factor loadings, statistical significances, and measurement errors to test the hypothesized pattern of relationships between observed variables and latent constructs. The fit indices reported in this study were χ^2, χ^2/df, RMSEA, SRMR, CFI, NFI, GFI, TLI, and IFI. CR and AVE were used to estimate reliability and convergent validity of the latent constructs. In the second stage, the researcher assessed the estimations of model fit, path coefficients, and measures of explained variances in structural model. Examinations of the total effects of hypothesized relationships between the latent constructs were used to test the research hypotheses.

3. Results

3.1. Measurement model

According to the results of factor loadings and model fit indices per latent construct, a reflective variable was retained only when it loaded greater than 0.70 on the relevant construct, suggesting an acceptable model fit. Thus, the initial 25 observed variables were reduced to 20 variables (**Table 2**).

Latent construct	No.	Observed variables
Digital innovative value (DIV)	V1	I think it is an innovative idea to implement digital learning activities for young children
DIV	V2	I think digital learning activities are an interesting instructional model for young children
DIV	V3	I think there are more advantages of digital learning activities for young children
DIV	V4	I think digital learning activities for young children can change the traditional instructional model
Digital innovative practices (DIP)	V5	I employ digital learning activities for young children to implement new instructional ideas.
DIP	V6	I employ digital learning activities for young children to try multidimensional instructional models
DIP	V7	I share my innovative experiences of implementing digital learning activities for young children with my colleagues
DIP	V8	I integrate multiple learning resources into digital learning activities for young children
Perception of instructional use (PIU)	V9	I agree with the instructional objectives of digital learning activities for young children
PIU	V10	I am willing to plan the instructional design of digital learning activities for young children
PIU	V11	I like to prepare the relevant resources for digital learning activities for young children
PIU	V12	I will try to implement digital learning activities for young children
Instructional professional autonomy (IPA)	V13	I have the professional autonomy to design digital learning activities for young children
IPA	V14	I have the professional autonomy to implement digital learning activities for young children
IPA	V15	I have the professional autonomy to choose appropriate resources for digital learning activities for young children
IPA	V16	I have multiple instructional opportunities to implement digital learning activities for young children
Behavioral intention to use (BIU)	V17	I have a good experience of implementing digital learning activities for young children
BIU	V18	I would like to continue to share my experience with digital learning activities for young children
BIU	V19	I am willing to continue to implement digital learning activities for young children
BIU	V20	I am willing to continue to design digital learning activities for young children

Table 2. Retained variables on the questionnaire.

The means of the retained 20 observed variables range from 3.81 to 3.99, and SD range from 0.67 to 0.82. Skewness measures range from −0.71 to −0.37 for these variables, and kurtosis measures range from −0.21 to 1.18. The standardized factor loadings on each variable range from 0.80 to 0.94, and measurement errors range from 0.11 to 0.36. All observed variables had positive values of measurement error variances, and no standard errors greater than 1.0 were observed. The researchers used the bootstrapping method based on 5000 samples to test the level of significance of the standardized factor loadings. The p values of statistical significance on the DIIA for all selected variables are less than 0.05. These statistics showed that the measurement model had a reasonable degree and did not violate the model identification rules.

Figure 2 shows the structure of latent constructs for the measurement model with the standardized parameter estimates. This model was supported by the model fit statistics: $\chi^2 = 396.64$ ($p < 0.001$), $\chi^2/df = 2.48$, RMSEA = 0.05, SRMR = 0.03, CFI = 0.98, NFI = 0.96, GFI = 0.93, TLI = 0.97, and IFI = 0.98. The fit indices by CFA indicate that the measurement model was acceptable.

The Cronbach's alpha, CR, and AVE values of each latent construct of the DIIA ranged from 0.94 to 0.95, from 0.94 to 0.96, and from 0.78 to 0.84, respectively, as shown in **Table 3**. The correlation of the two latent constructs ranges from 0.54 to 0.74. 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 with internal consistency. The results showed that the DIIA measurement model has a high reliability of internal consistency.

3.2. Structural model

Based on the good fit of the hypothesized measurement model to the sample data, the researcher used path analysis to test the research hypotheses. **Figure 3** presents the structural path of latent constructs and path coefficients with the standardized parameter estimates. The model fit indices also obtain an acceptable fit with the sample data: $\chi^2 = 463.44$ ($p < 0.001$), $\chi^2/df = 2.86$, RMSEA = 0.06, SRMR = 0.06, CFI = 0.97, NFI = 0.96, GFI = 0.91, TLI = 0.97, and IFI = 0.97. The model fit statistics also support the structural model. The researcher then proceeded with testing the study hypotheses.

The standardized regression coefficients and the direct effects and measures of the explained variance are shown in **Figure 3**. The DIV and DIP constructs jointly explain 38% of variance in the PIU construct, corresponding to a standardized regression coefficient of 0.33 and 0.36, respectively. The DIV, DIP, and PIU constructs jointly explain 64% of the variance in the IPA construct, corresponding to standardized regression coefficients of 0.23, 0.48, and 0.23, respectively. The PIU and IPA constructs explain 55% of the variance in the BIU construct, corresponding to a standardized regression coefficient of 0.38 and 0.44, respectively. All path coefficients were highly statistically significant ($p < 0.05$) by performing a bootstrap with 5000 resamplings.

According to the results, early childhood educators with positive attitudes towards the innovative value of digital learning activities for young children had positive perceptions about the innovative practices of digital learning applications in preschool. They considered the digital learning activities as an interesting and innovative pedagogy and employed this model

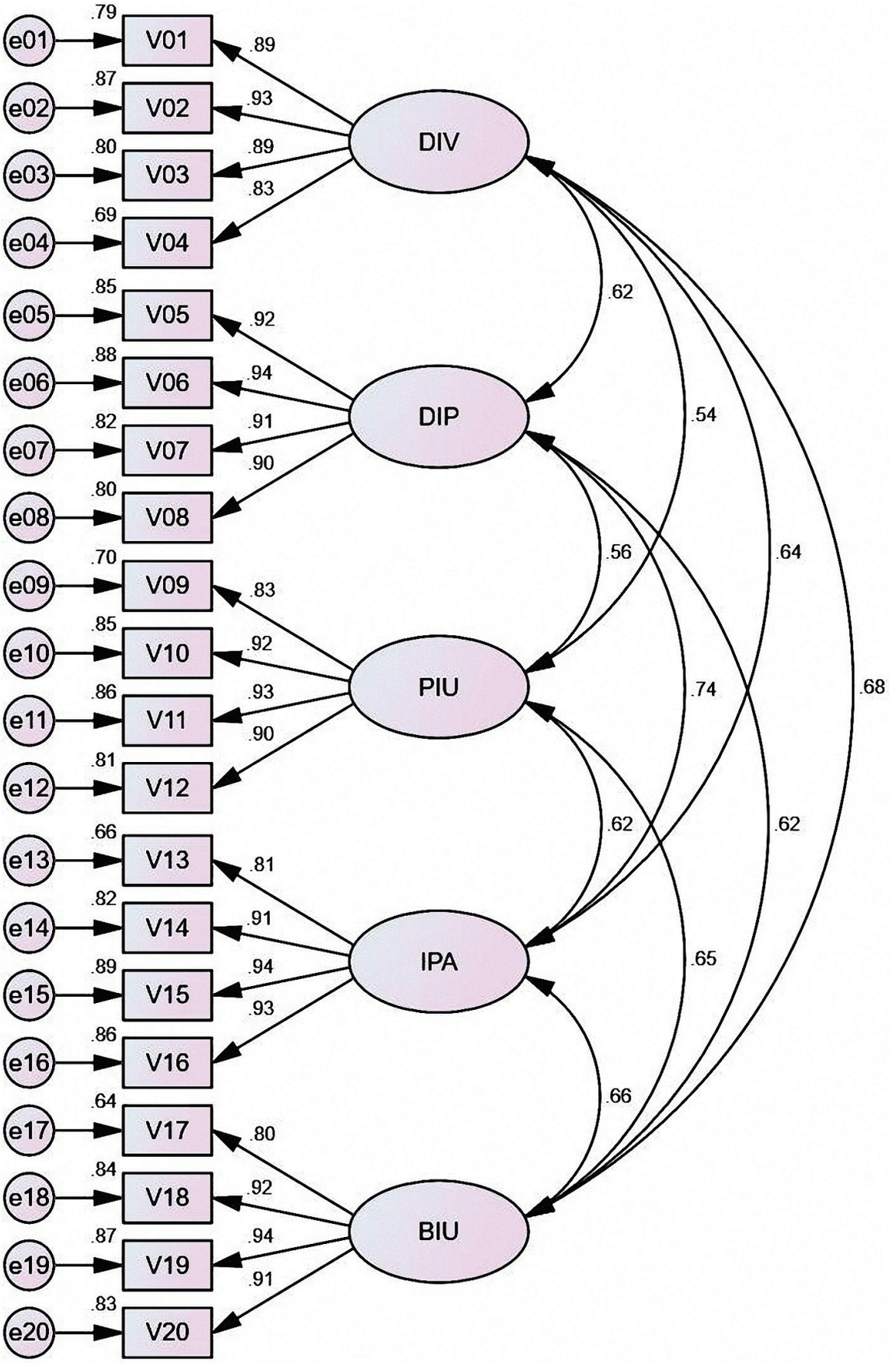

Figure 2. Measurement model.

Latent construct	Cronbach's alpha	CR	AVE	(1)	(2)	(3)	(4)	(5)
DIV (1)	0.94	0.94	0.78	0.88				
DIP (2)	0.95	0.96	0.84	0.62	0.92			
PIU (3)	0.94	0.94	0.80	0.54	0.56	0.89		
IPA (4)	0.94	0.94	0.81	0.64	0.74	0.62	0.90	
BIU (5)	0.94	0.94	0.80	0.68	0.62	0.65	0.66	0.89

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.

Table 3. The Cronbach's alpha, CR, AVE, and correlation matrix.

to implement innovative digital practices for young children's learning activities (H1, the correlation of the DIV and DIP is 0.62). Early childhood educators with positive attitudes towards the innovative values of digital learning activities had more willingness and preferences about such models to plan and use digital learning activities to help young children advance their learning efficiency and improvement in preschool (H2, a standardized total effect of DIV on PIU is 0.33). When they had more experiences with innovative practices of digital learning activities for young children, they had positive intentions to access or adopt this model to design and implement young children's instruction (H3, a standardized total effect of DIP on PIU is 0.30). These hypotheses showed positive relationships among DIV, DIP, and PIU, providing support for H1, H2, and H3.

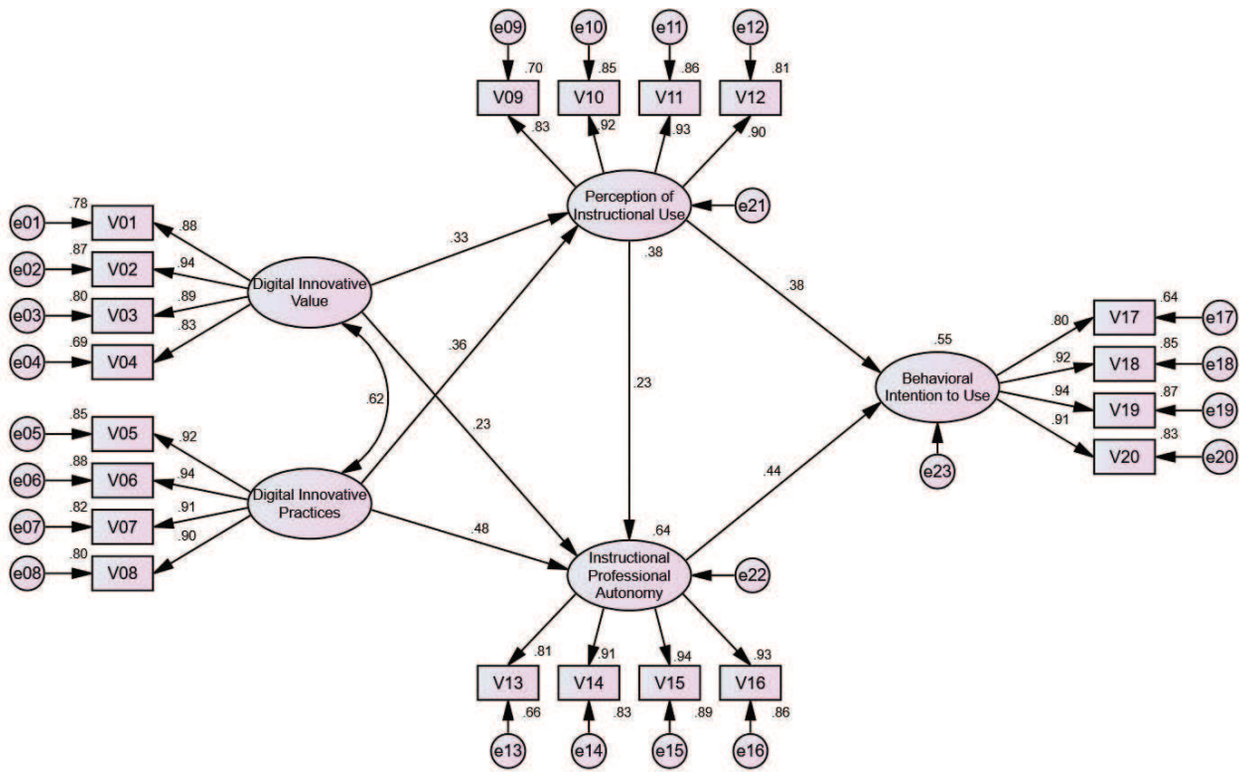

Figure 3. Structural model.

Early childhood educators' perceptions of the professional autonomy when designing instructions and choosing appropriate learning resources through digital learning activities for young children were determined by their attitudes towards innovative ideas and interesting instructional applications of digital learning activities in preschool (H4, a standardized total effect of DIV on IPA is 0.36). Their preferences about digital innovative practices and experiences were viewed as predictors to explain their professional autonomy in the implementation of digital learning activities for young children (H5, a standardized total effect of DIP on IPA is 0.56). These relationships were positive and significant, providing support for H4 and H5.

Early childhood educators' positive perceptions about the planning and implementation of digital learning activities for young children affected their attitudes towards their professional autonomy about multiple instructional access and pedagogical design (H6, a standardized total effect of PIU on IPA is 0.23). They also suggested that the perceptions of instructional use in digital learning activities for young children enhanced their behavioral intention to use and willingness to continuous implement such digital pedagogy (H7, a standardized total effect of PIU on BIU is 0.48). In addition, early childhood educators' perceptions about instructional professional autonomy positively affected their behaviors and experiences with digital learning activities for young children. This suggested that early childhood educators' attitudes towards the instructional usefulness and professional autonomy of digital learning activities could increase their continuous behavioral intention to use such a model to develop young children's learning performance (H8, a standardized total effect of IPA on BIU is 0.44). The results of path coefficients and hypothesis testing supported H6, H7, and H8. The statistical significance tests are reported at $p < 0.05$ for all measures by performing a bootstrap with 5000 resamplings.

The value of the total effect of DIP on IPA was the highest among the study hypotheses (standardized total effect of 0.56), suggesting that they generally agreed upon the value of instructional innovations and innovative applications of digital learning activities for young children and that the implementation of digital learning activities improved their professional autonomy in instructional practices to represent their integration competencies and professional pedagogical practices. They also believed that innovative instructional practices with digital learning tools could encourage their professional instructional approach to enhance their pedagogical performance and professional literacy.

A high measure of total effect was the relationship between PIU and BIU (standardized total effect of 0.48). This result implied that early childhood educators not only considered the practical applications of the digital learning activities on instructional design and pedagogical practices for young children but also preferred presenting continuous behavioral intention to try or employ such a model to construct innovative preschool pedagogy to articulate their instructional experiences.

The total effect of PIU on IPA remained relatively low compared to the other hypotheses (standardized total effect of 0.23). The researcher proposed a lower relationship between PIU and IPA through the digital learning activities compared to the innovative instructional advantages and appropriate learning practices. Early childhood educators presented relatively less

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engagement on instructional effectiveness and professional autonomy with digital learning activities for young children in preschool. They perceived the usefulness and opportunities for practical instruction with digital learning activities and were less concerned about professional autonomy of digital instructional practices.

4. Discussion and conclusion

The innovative practices of digital learning applications help early childhood educators provide young children with multiple learning opportunities to understand instructional materials and develop their appropriate cognitions. They employ such tools with innovative values and practices to design multiple supporting pedagogies to advance young children's learning development. Early childhood educators use digital learning tools to design innovative instructive practices for young children to improve their learning competence. They implement meaningful innovative pedagogy to expand young children's learning experiences and performance with digital instruction and developmentally appropriate practices.

The integration of digital learning tools into innovative instructional activities helps early childhood educators effectively represent their professional autonomy to design and implement such pedagogy to improve young children's learning motivations by providing access to learning opportunities to advance their learning awareness and social interactive literacy. When early childhood educators agree with the innovative value of digital learning activities and useful experiences of implementing such digital instructions, they have positive preferences for professional construction to educate young children with appropriate instructional strategies. They also have more positive attitudes towards implementing innovative digital learning activities for young children with the continuous behavioral intention to use. The contribution of this study is the examination of hypothesized relationships between the latent constructs and early childhood educators' attitudes towards the innovative value and practices of integration of digital learning tools into young children's instructional activities using a questionnaire survey.

4.1. Theoretical implications

This study explored early childhood educators' perceptions of innovative pedagogy using digital instructional activities for young children. The researcher found significant relationships between latent constructs on the DIIA by structural equation modeling. The researcher found that early childhood educators' attitudes towards the innovative values, practical practices, and professional autonomy via digital learning activities affected their behavioral intention to use such tools. Though some early childhood educators are interested in the applications of digital learning tools, they do not completely apply or embed digital learning tools into their instructional practices. The reason is that early childhood educators' perceptions of instructional use, technology literacy, and instructional experiences of digital learning activities affect their professional competence and their behavioral intention to use. This result is notable because it corresponds to most studies on the hypothesized relationship among the latent constructs.

Based on the above results, early childhood educators' perceptions about the innovative value of digital learning activities and instructional practices, as well as their pedagogical use and professional autonomy of instructional competence, should be the key factors in their behavioral intention to use this instructional model for early childhood educators in preschool. Digital learning activities improved their instructional effectiveness using innovative practices and professional autonomy. They acknowledge the innovative value of such a model when designing meaningful teaching activities to develop young children's learning performance.

Early childhood educators have positive perceptions about the implementation of such teaching models based on the positive learning effectiveness and feedback provided from digital learning activities. Their perceptions of innovative value via digital learning activities affect early childhood educators' preferences for the instructional applications of innovative digital tools. The innovative value of digital learning activities is related not only to the innovative diffusion of information technology in the field of education but also to the thinking model of the innovative application of such activities for early childhood educators. Digital learning activities provide early childhood educators with more possibilities to construct innovative learning practices and multiple instructional alternatives. To improve young children's learning outcomes, the integration of innovative digital practices into the construction of appropriate instructional learning environments is important for young children's learning performance.

The results also showed that early childhood educators with positive attitudes towards the innovative applications and instructional practices via digital learning activities had more professional autonomy to employ appropriate digital learning tools on the basis of pedagogical objectives. When early childhood educators focus on the digital innovative value and perception of instructional use in multiple pedagogical possibilities, they can eliminate the previous unified, surface teaching model and attend to digital access, and multimodal instruction to implement innovative instructional pedagogy. The use of digital learning activities transforms their traditional teaching styles and establishes the newer perception of instructional use with multiple learning activities. They can plan and design the innovative and playful curriculum or learning activities with digital applications to help young children engage in appropriate instruction to advance their learning performance and effectiveness.

4.2. Practical implications

For early childhood educators, the multidimensional approach to the use of digital learning activities in preschool is not only to learn how to use this alternative pedagogical model to present their instructional effectiveness and professional competence but also to open up the possibility of innovative instruction with digital learning activities to develop young children's performance of cognition, affection, and skill.

Early childhood educators must follow and engage with contemporary innovative trends to learn to use digital learning tools and integrate them into instructional activities for young children. Young children interested and engaged in digital learning activities to access a wide range of natural and social resources, and they construct their unique viewpoints on human life and social exploration based on such instructions. Early childhood educators can construct

a digital learning environment through innovative instructional models to help young children independently and efficiently complete their reading tasks.

They can employ the innovative learning functions of digital learning tools to establish a shared learning environment, and cooperate with professional partners to construct appropriate instructional practices and present their pedagogical effectiveness. They can also use an open and diverse pedagogical method to provide friendly and easily accessible environments that attract and motivate young children to learn in a novel and diverse way and assist them engaging and participating in digital learning activities.

Digital learning tools help early childhood educators apply effective and useful methods to use professional development knowledge and share or communicate, using their teaching experience, how to learn from designing high-quality instructional practice, and real-time examination of its pedagogical alternatives. They can also employ such a model to enhance their effectiveness in the instructional process to advance young children's performance using their own professional autonomy.

In the digital space, early childhood educators can share and exchange their innovative teaching ideals and practices to construct their own professional autonomy in using these instructional practices via digital learning tools. They can use digital learning tools to build a virtual community for professional interaction and discuss their innovative instructional experiences. In addition, they can articulate the professional empowerment of such digital applications to implement appropriate instructional and professional pedagogy with the dimension of the digital learning supporting and scaffolding pedagogy.

To provide young children with diverse and appropriate learning environments and enhance the adaptability of the instructional model, early childhood educators can employ professional teaching practice to reflect critically and develop dialectical considerations about the access to and use of digital learning tools. They can use such tools to reflect and share individual professional development and practical experience. They can also collaborate with other educational partners to participate in communities and collectively cooperate to shape their critical pedagogical consciousness and instructional professional autonomy.

Early childhood education can use digital learning tools to construct their instructional community for professional awareness. They can exchange their different ideas regarding the application of such innovative pedagogical tools to develop continuous behavioral intention to use such strategies. They can apply their professional pedagogical knowledge and experiences within the digital learning community to consider more meaningful pedagogy and strengthen their confidence and willingness to use the digital learning tools into the instructional activities.

4.3. Recommendations for further study

The integration of applications of digital innovative practices is not just to replace traditional teaching models or ignore the importance of teachers' role in educating students. More importantly, they can employ the innovative applications of digital learning activities to open up a wide range of multiple instructional perceptions and professional autonomy to develop young children's learning performance with appropriate pedagogical alternatives.

Measuring individuals' attitudes towards digital innovative instructional applications with adequate statistical analysis is an important issue in research on early childhood educators' innovative pedagogy and behavioral intention to use digital learning tools. This study attempts to begin to construct and test the configuration of innovative pedagogy and related instructional practices in preschools. Future studies can use the DIIA developed in this study to test innovative pedagogical perceptions and practices held by various individual demographics, different countries, or cultural groups to find the difference with comparative educational analysis.

The researcher also hopes to further study issues related to using innovative digital learning activities to professionally develop early childhood educators' pedagogical literacy and their behavioral intention to use such innovative models. New latent constructs or observed variables can be added to DIIA to further explore early childhood educators' thoughts on the hypothesized relationships between innovative instructional practices and professional behavioral intent to use and to articulate multiple theoretical or innovative perspectives to explore this issue in preschools.

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