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Exploring the Relationship Among Teacher Transparency, Self-Efficacy, and Digital Adaptation of English Teachers*

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The study explores the relationship among teacher identity, teacher transparency, teacher self-efficacy, and teachers' adaptation to digital change. Eighty-four English teachers participated in the study. For comparison between English and other subject teachers, 38 survey results of different subject teachers were included in the analysis. The results showed that English teachers' scores were lower across all the constructs in terms of both transparency and self-efficacy compared to the scores of teachers in other subjects. For further analysis, the Structural Equation Modeling was run, and the results revealed that teacher transparency influences teacher self-efficacy, facilitating digital adaptation. Instructional Transparency and Peer Transparency were significant predictors of self-efficacy, directly influencing digital adaptation. This result illustrates the dynamic interplay between evolving teacher identity and self-efficacy in relation to digital adaptation through the relationship between teacher transparency and teacher self-efficacy. The findings indicate the need for targeted programs to enhance English teachers' transparency and self-efficacy as a pathway to their digital adaptation.

Key words: teacher transparency, digital era, teacher self-efficacy, teacher identity

*This work is part of the first author's doctoral dissertation and has been revised to fit the journal format.

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1. INTRODUCTION

Recent advancements in technology have significantly transformed the educational landscape, affecting teachers' professional identities and roles (Aboud, 2020; Lai & Jin, 2021). Teachers have transitioned from being mere dispensers of knowledge to becoming dynamic facilitators of learning (Kwon et al., 2021). This shift necessitates that teachers cultivate collaborative environments, actively engaging students, and colleagues as partners in the learning process. As a result, transparent communication has become essential and is linked to the successful implementation of new teaching methods (Aranyi, Tóth, & Veisz, 2022). In language education, transparency is particularly crucial for developing communicative competence (Anderson, Hunt, Powell, & Dollar, 2013; Liu, 2022). For Korean English as a foreign language (EFL) teachers, however, practicing transparent teaching can present challenges, particularly due to concerns about their English proficiency. This situation highlights the strong connection between teachers' self-efficacy, an integral aspect of teacher identity (Richter, Brunner, & Richter, 2021), and their capacity for transparent teaching. Examining the relationship between teacher transparency, self-efficacy, and digital adaptation is crucial. This analysis will guide Korean EFL educators to adapt to the evolving educational landscape effectively.

Some studies address the similarities between teacher identity and teacher self-efficacy (Norton, 1997; Pennington & Richards, 2016; Varghese, Morgan, Johnston, & Johnson, 2005). Moreover, some studies consider teacher self-efficacy as one aspect of the multidimensional construct of teacher identity (Berger & Lê Van, 2019; Lamote & Engels, 2010), and some emphasize teacher self-efficacy as a core component (Berger & Lê Van, 2019; Parks, 2017; Richter et al., 2021). Though the definitions of teacher identity and teacher efficacy vary depending on different subject specialisms, scholars agree that both terms are constantly formed and reformed in response to the context (Varghese et al., 2005). Thus, change in the teaching environment caused by digital technology will ultimately change identity, requiring new roles that align with their evolving identities.

As digital technology significantly impacts teachers' professional identity, new teacher roles due to a redefined professional identity emerge (Aboud, 2020; Avidov-Ungar & Forkosh-Baruch, 2018; Heuer & King, 2004; Lai & Jin, 2021; Park, 2011). As teachers navigate these new roles, their sense of efficacy could either be enhanced by successes in these digital platforms or hindered by challenges they face. However, research dealing with technological advancement in education hardly discusses its effect on teachers. Considering the significant role of teachers, more research is needed on how technological advancements affect teacher identity and self-efficacy. This study aims to gain a deeper understanding of how teachers adapt to the transformed educational environment by exploring the relationship between newly shifted teacher identity and teacher self-efficacy in relation to digital

adaptation. Teacher transparency was used as a measurable attribute to operationalize the teacher identity. This attribute reflects the new role of teachers as co-partners in the teaching and learning process with students rather than merely didactic transmitters of knowledge (Kwon et al., 2021; Winkelmes et al., 2016). In addition, several researchers have identified the positive effect of transparent teaching on transitioning from traditional to technology-based teaching (Aranyi et al., 2022; Lee, 2022).

Based on the rationale secured by previous research findings, the study explored the relationship between teacher transparency, teacher self-efficacy, and digital adaptation. It provided insights into how the new English teacher identity can be successfully manifested. The two research questions that guided the present study are as follows:

1) What theoretical model represents the relationship between teacher transparency, teacher self-efficacy, and digital adaptation?
2) What are the relationships among teacher transparency, teacher self-efficacy, and digital adaptation?

2. LITERATURE REVIEW

2.1. Teacher Identity and the Digital Era

Recent studies have pointed out the significance of teacher identity in implementing new technology in education and emphasized the necessity for identity adaptation in response to evolving educational contexts (Aboud, 2020; Lai & Jin, 2021; Park, 2011). Lai and Jin (2021), for example, analyzed the survey data collected from 280 English language educators in China and examined how their professional identities intersect with using technology in language teaching. The findings show that several key factors significantly influence technology usage, such as teachers' alignment with educational objectives, didactic and pedagogical orientation toward a professional knowledge base, and a learner-centric approach. Based on the study results, the authors insist that a teacher's professional identity plays a crucial role in integrating and applying technology in educational settings.

Kwon et al. (2021) compared university course evaluations reliant on traditional residential teaching methods and those using a web-based learning management system (LMS) as an additive tool. Minimal difference was identified across most course sites, and the authors suggest repositioning instructors and learners as co-participants in the learning process. Park (2011) also insisted that an identity shift should happen in teachers and learners using more LMSs; teachers should turn from information deliverers to interactive instructors, and learners should turn from passive recipients to active participants.

For language teachers, Colliander (2019) conducted a study to examine the societal changes that significantly affect the professional identity of second language teachers. The data analysis of a semi-structured interview with 13 second language teachers for adults revealed that digitalization, migration, and marketization profoundly affected the teachers' professional identity. Specifically, digitalization emerged as a critical factor influencing the teachers' identity and practice.

Aboud (2020) explored the impact of e-learning on EFL teachers' identity through semi-structured interviews, showing significant changes influenced by internal factors like motivation and external factors such as the school environment. The study mentioned that the shift from traditional roles to facilitators in the learning process was particularly notable, which should bring about an identity shift.

2.2. Teacher Transparency: Effects on Teaching and Learning

Transparency in teaching and learning involves a teaching style that clearly explains the instructor's decision for choosing lesson plans and how they relate to the course goals (Anderson et al., 2013). A discussion between teachers and students about the learning processes and the reasons behind the required activities is needed to implement transparent teaching and learning activities (Winkelmes, 2013). Winkelmes (2016) outlined three key aspects that could be established through discussions between teachers and students before starting assignments: purpose, task, and criteria. This transparent teaching approach gives students a clear understanding of why their teacher assigns certain tasks, which ultimately enhances their self-awareness of their learning processes (Winkelmes, Boye, & Tapp, 2019).

The significance of transparent instruction has become apparent in adjusting to new teaching methods and technology, especially during the swift transition to online learning amid the COVID-19 pandemic. Teachers faced immense pressure to switch to online teaching, hastily embracing diverse information technologies without adequate preparation. The study by Means and Neisler (2021) involving 1,008 U.S. undergraduates highlighted the difficulties that arose from the abrupt transition to online classes and the impact of a transparent teaching approach on the learning process. Students from various backgrounds found it challenging to remain motivated and needed immediate feedback from instructors in the online-only classes. Despite these obstacles, students generally reported satisfaction with their learning experience when they received personalized progress updates, were provided with assignments that allowed them to demonstrate their learning and areas for improvement, and were given opportunities to ask questions and participate in discussions. Transparency about tasks and challenges and teachers' availability to communicate with students were the most significant predictors of student satisfaction (Aranyi et al., 2022).

In the context of language learning, transparency can positively influence students'

motivation, confidence, and anxiety levels (Porshnev, Cera, Sinclair, & Antonietti, 2021; Winkelmes et al., 2016). Active participation is essential for developing communicative competence in language education. According to research, students generally respond positively to transparent teaching in active learning and find it a valuable addition to the course (Anderson et al., 2013). Students believe that transparency effectively creates more meaningful learning experiences and enhances their learning in student-centered settings. They also report that transparent coursework helps them better understand their goals, increases their motivation, provides clarity, and strengthens their connection to the course objectives. Liu (2022) also reported the advantages of integrating transparent assignments into a college composition course for English for Academic Purposes (EAP). The results showed that students felt more driven to complete their assignments because they could see real-world as well as academic value in completing their assignments. Additionally, students experienced reduced anxiety and confusion regarding the assignments.

2.3. Teacher Self-Efficacy and Teacher Identity

Bandura (1977) introduced self-efficacy as a psychological construct that reflects an individual's belief in their ability to succeed in specific tasks. Self-efficacy refers to having confidence in one's capability to execute certain actions. Research has consistently shown that teacher self-efficacy plays a crucial role in various educational outcomes, including a positive correlation with student achievement (Mok & Moore, 2019). Teacher self-efficacy is closely connected to teaching performance (Klassen & Tze, 2014) and influences patterns of teacher behavior and practices (Zee & Koomen, 2016). Teachers with high self-efficacy tend to demonstrate better planning and organization (Allinder, 1994), and they are more open to adopting innovative, diverse, and tailored teaching methods (Wertheim & Leyser, 2002).

Previous research highlights the pivotal role of teachers' self-efficacy in shaping their professional identity. Pennington and Richards (2016) review the literature on the concepts of identity and teacher identity, particularly in the context of language teaching. They suggest that teacher identity in language teaching involves both foundational and advanced competencies necessary for the role, emphasizing the importance of self-knowledge—being aware of one's strengths and weaknesses—as a fundamental component. Beauchamp and Thomas (2009) further stress the importance of reflection in developing and refining teacher identity. They propose that reflection enables teachers to understand themselves better and how they fit into the broader educational landscape; it is a crucial tool for shaping identity. This reflective process leads teachers to form beliefs about their abilities to perform effectively in specific contexts, which defines their self-efficacy.

Teacher identity and self-efficacy share several commonalities. Both are context-specific

and influenced by a situation's time, place, and demands (Gee, 2000). Like identity, teacher self-efficacy is less about actual capability and more about how teachers perceive their abilities (Tschannen-Moran, Hoy, & Hoy, 1998). Moreover, a teacher's self-efficacy is not a single aspect of their identity but is multifaceted, changing and manifesting differently depending on the context and required skills (Parks, 2017). While often overlapping, these multiple facets of self-efficacy are distinct and can lead to varying feelings of efficacy that coexist within a teacher's identity.

Further research supports the notion that teacher efficacy is critical to teacher identity. In a study on student teachers' professional identity development, questionnaires measured aspects like commitment to teaching, professional orientation, task orientation, and self-efficacy (Lamote & Engels, 2010). Berger and Lê Van (2019) described teacher professional identity as multidimensional, examining the relationship between components of teacher identity and general pedagogical beliefs, including self-efficacy.

As for language teachers, the concept of 'second language teacher efficacy-identity' was introduced by Parks (2017), who asserted that teachers' efficacy regarding their linguistic proficiency is one of the critical components of teacher identity. Hiver's (2013) study on the 'possible teacher selves' of Korean English teachers strengthens Parks' assertion and argues that a lack of language self-efficacy is almost equivalent to a lack of teaching self-efficacy. Given that high teacher self-efficacy promotes openness to innovative teaching methods and acts as a catalyst for changes in teaching practices (Pajares, 1992; Wertheim & Leyser, 2002), this unique aspect of language teacher efficacy can lead to different outcomes.

3. METHODOLOGY

3.1. Participants

One hundred twenty-two in-service teachers from eight subject areas participated in the study; 84 were English teachers and 38 were other subject teachers. Table 1 shows the demographic information of the participants.

TABLE 1

Teachers' Backgrounds

Background		Number	Percentage (%)
Gender	Male	42	34.4
	Female	80	65.6
Teaching experience	Under 1 year	6	4.9
	1 to 3 years	16	13.1
	3 to 5 years	18	14.8
	5 to 10 years	26	21.3
	Over 10 years	56	45.9
School level	High school	60	49.2
	Middle school	62	50.8
School location	Large city [1]	38	31.1
	Medium-small city	64	52.5
	Rural area	20	16.4
Education	Bachelor's degree	74	60.7
	Either hold or are working towards a higher degree	48	39.3
Teaching subject	English	84	68.9
	Korean	2	1.6
	Math	5	4.1
	Science	18	14.8
	Social Studies/History	6	4.9
	Computer	3	2.5
	Music/Art/Physical Education	2	1.6
	Special Education/School Counselor	2	1.6

3.2. The Survey and Data Collection

The survey employed in this study is structured into three sections: Part 1 collects background and demographic data, Part 2 assesses teachers' perceptions of their transparency, and Part 3 evaluates their self-perceived efficacy. Additionally, two questions were included to explore teachers' adaptation to the digital era. The first question assesses the effectiveness of teachers' adaptation to the unexpected transition to online teaching prompted by the pandemic. The second question examines their readiness to accept the integration of advanced technology in education. Appendixes A, B, and C present item details and descriptive statistics for Part 2, Part 3, and additional digital adaptation questions, respectively. All questions, except those in Part 1, were evaluated using a 5-point Likert Scale that ranges from 1 (strongly disagree) to 5 (strongly agree).

The survey questions were initially developed in English and then translated into Korean. The translation was then cross-checked for accuracy and consistency of meaning in both languages. Before administering the survey, a pilot test was conducted to identify any

[1] A large city has a population of over 1 million, a medium-sized city between 300,000 and 1 million, and a rural area has a population of fewer than 300,000.

potential problems with the questions and responses. Any questions that were unclear or could be misinterpreted were rephrased upon careful consideration. Three English education experts, one professor and two doctoral students, participated in the pilot test and cross-checked the translations.

Survey responses were collected using two methods to ensure a broad and randomized sample. First, participants accessed the survey via a Google Form, distributed through email and platforms like Kakao, enabling diverse participation from different regions and backgrounds. Second, the commercial platform Opensurvey, used by companies such as Samsung and SK Telecom, provided a mobile link for easy access. Opensurvey's extensive network ensured additional randomness by reaching participants not included in the initial Google Form distribution. Data collection was carried out from September 2023 to April 2024.

3.2.1. Teacher transparency survey

A measurement tool developed by the authors (Lee & Lee, 2023) was employed for the teacher transparency survey. With reference to Porshnev et al. (2021) and Winkelmes et al., 2016), the survey was composed of three measurement dimensions: Instructional Transparency, Self Transparency, and Peer Transparency. The questions were modified to suit the nature of the study and the context of Korean secondary English teachers. Instructional transparency, consisting of eight questions (Cronbach's $\alpha = 0.797$), measures self-reflected transparency teachers perceive in instructional processes, and Self Transparency, which measures self-reflected transparency towards their peers, consists of four items (Cronbach's $\alpha = 0.745$).

To establish the construct validity of the Instructional and Self Transparency scale items, which measure teachers' behaviors—unlike the Peer Transparency scale that assesses peers' behaviors—Exploratory Factor Analysis (EFA) was conducted, as shown in Table 2. The EFA identified Self Transparency as distinct from Instructional Transparency, with the latter further divided into two sub-dimensions: Instructional Transparency in Planning and Instructional Transparency in Action. This categorization implies that the questions under Instructional Transparency ask teachers whether they transparently share pre-instructional decisions and whether they provide necessary information during their instruction. Both sub-dimensions demonstrated acceptable internal consistency, achieving Cronbach's alpha values of 0.683 for Transparency in Planning and 0.737 for Transparency in Action

Lastly, question items in Peer Transparency ask teachers how transparent their peers are with them. Internal consistency was highly reliable, with a Cronbach's α value of 0.862.

TABLE 2

Exploratory Factor Analysis of Instructional and Self Transparency

KMO measure of Sampling Adequacy		0.763	
Bartlett's Test of Sphericity	Approx x^2		486.852
	df		66
	p		0.000***

***p<.001

Items	Communalities	Factor		
		1	2	3
3	0.570	**0.695**	0.062	0.288
8	0.546	**0.685**	0.240	0.136
4	0.651	**0.670**	0.039	0.447
2	0.496	**0.667**	0.057	0.220
12	0.800	0.112	**0.868**	0.183
11	0.674	0.384	**0.726**	-0.007
10	0.701	-0.246	**0.716**	0.358
9	0.527	0.466	**0.555**	0.042
5	0.509	0.182	0.123	**0.679**
7	0.573	0.110	0.330	**0.672**
6	0.481	0.242	-0.015	**0.649**
1	0.496	0.305	0.129	**0.622**
Factor name		IT in Action	ST	IT in Planning
Total		4.322	1.600	1.100
% of variance		36.019	13.332	9.167
Cumulative %		36.019	49.352	58.518

Extraction Method: PCA (Principal Component Analysis), Rotation Method: Varimax, IT = Instructional Transparency, ST = Self Transparency

3.2.2. Teacher self-efficacy survey

The foundation of our measurement framework is based on the Ohio State Teacher Efficacy Scale from the study by Tschannen-Moran and Hoy (2001), which identifies three core constructs of teacher self-efficacy. These constructs include efficacy for instructional strategies (IS), efficacy for student engagement (SE), and efficacy for classroom management (CM). The questionnaire items were modified based on Choi and Lee's (2018) research to adapt the scale specifically for English teachers in Korea and ensure clarity and relevance.

As shown in Table 3, Confirmatory Factor Analysis (CFA) was conducted to assess convergent and discriminant validity. The Average Variance Extracted (AVE) is above 0.5, and the Composite Reliability (CR) is above 0.7, showing that the teacher self-efficacy questionnaires' unidimensionality is checked. Also, all three dimensions of Chronbach's α are above the recommended level.

To assess discriminant validity, each construct's AVE was compared with the correlation coefficients between constructs. As shown in Table 4, the square root of the AVE for each

construct was greater than the correlations with other constructs. This confirms that each construct shares more variance with its indicators than with other constructs, supporting discriminant validity.

TABLE 3

Convergent Validity and Reliability of Teacher Self-Efficacy Questionnaires

Construct	No.	FL	SMC	CR	AVE	Cronbach's α
Instructional Strategies	1	0.618	0.382	0.93	0.654	0.869
	2	0.638	0.407			
	3	0.684	0.468			
	4	0.756	0.572			
	5	0.785	0.616			
	6	0.775	0.601			
	7	0.659	0.434			
Student Engagement	8	0.697	0.486	0.935	0.674	0.896
	9	0.772	0.596			
	10	0.841	0.708			
	11	0.773	0.597			
	12	0.820	0.673			
	13	0.651	0.424			
	14	0.716	0.512			
Classroom Management	15	0.699	0.489	0.880	0.597	0.818
	16	0.755	0.569			
	17	0.592	0.350			
	18	0.691	0.478			
	19	0.700	0.490			

FL = Factor Loading, SMC = Squared Multiple Correlations, CR = Composite Reliability, AVE = Average Variance Extracted

TABLE 4

Discriminant Validity of Teacher Self-Efficacy Questionnaires

	IS	SE	CM	AVE
IS	1			0.654
SE	0.777**	1		0.674
CM	0.743**	0.771**	1	0.597

**p<.01

IS = Instructional Strategies, SE = Student Engagement, CM = Classroom Engagement

3.3. Data Analysis

Data analysis was conducted using SPSS 27.0 and AMOS 21.0. Using SPSS, frequency and descriptive statistics for the participants' background and demographic information were calculated, as well as overall mean scores and standard deviations. The reliability of each measurement tool for teacher transparency and self-efficacy was assessed using Cronbach's alpha. An EFA was also performed to validate the teacher transparency measurement tool, utilizing the Principal Component Analysis extraction method and Varimax rotation.

Independent t-tests were conducted to analyze differences in teacher transparency and teacher self-efficacy between English teachers and teachers of other subjects.

The CFA was conducted using AMOS to validate the teacher self-efficacy measurement tool. Subsequently, Structural Equation Modeling (SEM) was applied to identify the best-fit model that explains the relationships among teacher transparency, teacher self-efficacy, and digital adaptation. The interactions between these three elements were then explored based on the final selected model.

4. FINDINGS

4.1. Structural Equation Modeling of Teacher Transparency, Self-Efficacy, and Digital Adaptation

Before analyzing the relationship between teacher transparency, self-efficacy, and digital adaptation, independent t-tests were conducted to determine whether English teachers exhibit different aspects compared to teachers of other subjects regarding teacher transparency and self-efficacy. Regarding teacher transparency, English teachers' mean scores were consistently lower than those of other subjects across all three dimensions, with a significant difference in Instructional Transparency as displayed in Table 5. A plausible explanation would be that English teachers may feel less confident about being transparent in their teaching practice due to their status as non-native speakers.

TABLE 5

Independent *t*-test of English Teachers and Teachers of Other Subjects on IT/ST/PT

		Descriptive Statistics			*t(p)*
		N	*M*	*SD*	
IT	English	84	4.27	0.50	-2.294 (0.024) *
	Other Subjects	38	4.49	0.43	
ST	English	84	3.70	0.71	-1.698 (0.092)
	Other Subjects	38	3.95	0.82	
PT	English	84	3.59	0.79	-1.487 (0.140)
	Other Subjects	38	3.84	0.94	

*p<.05, IT = Instructional Transparency, ST = Self Transparency, PT = Peer Transparency

As for teacher self-efficacy, English teachers' mean scores were significantly lower across all three dimensions than those of other subjects (see Table 6). From these results, the need for targeted interventions to improve English teachers' self-efficacy should be highlighted.

TABLE 6

Independent *t*-test of English Teachers and Teachers of Other Subjects on IS/SE/CM

		Descriptive Statistics			*t(p)*
		N	*M*	*SD*	
IS	English	84	4.19	0.51	-3.327 (0.001) **
	Other Subjects	38	4.53	0.55	
SE	English	84	3.97	0.58	-2.396 (0.018) *
	Other Subjects	38	4.26	0.72	
CM	English	84	4.07	0.55	-2.534 (0.013) *
	Other Subjects	38	4.36	0.66	

*p<.05, **p<.01

IS = Instructional Strategies, SE = Student Engagement, CM = Classroom Management

For proper intervention, the next step is to examine and find out how these variables relate to each other regarding digital adaptation, which is our first research question. The relationship can be illustrated through three possible pathways. One examines the link between teacher transparency and digital adaptation, while another looks at the connection between teacher self-efficacy and digital adaptation. Then, the final pathway is to explore the relationship between teacher transparency and teacher self-efficacy.

Many of the previous study findings support the pathway between teacher transparency and digital adaption, and teacher transparency is recognized as an effective strategy in online learning (Aranyi et al., 2022; Wengier & Dubuisson, 2023). Several studies also support the pathway between teacher self-efficacy and digital adaptation, whose results show that teachers with high self-efficacy are more proactive in enhancing their digital adaptation (Bandura, 1997; Lemon & Garvis, 2016; Tschannen-Moran & Hoy, 2001). Besides, many scholars (Lailiyah & Cahyono, 2017; Sezen-Gultekin, Hamutoglu, & Topal, 2021) display study results that teachers with high self-efficacy make sustained efforts to integrate new technologies into classroom activities. However, few studies consistently explain the relationship between teacher self-efficacy and teacher transparency.

One perspective among studies examining the relationship between teacher self-efficacy and teacher identity is that the former influences the latter, which, as shown in Figure 1, is measured through teacher transparency in this study. In these studies, teacher self-efficacy is considered an integral part of professional identity (Parks, 2017) and is quantitatively measured to explain the relationship between teacher identity and other factors, such as motivation and teaching practices (Berger & Lê Van, 2018; Lamote & Engels, 2010; Richter et al., 2021)

On the other hand, previous studies employing teacher interviews, narratives, or literature reviews explain that teacher identity (measured through teacher transparency in this study) influences teacher self-efficacy (see Figure 2). These studies suggest that both teacher

identity and teacher self-efficacy are contextually specific, with teacher identity presenting the kind of teacher needed for changed situations and the necessary skills, which can influence a teacher's self-assessment of their abilities (Gee, 2000).

FIGURE 1

Theoretical Model 1

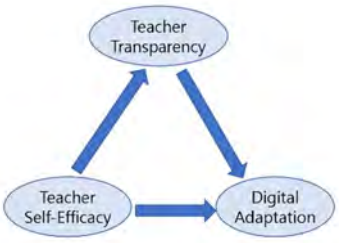


FIGURE 2

Theoretical Model 2

A SEM process was conducted to determine the best-fit model to decide which theoretical model represents the relationship between teacher transparency, teacher self-efficacy, and digital adaptation. The proposed models' suitability was assessed by evaluating their fit using several model fit indices, including CFI (Comparative Fit Index), IFI (Incremental Fit Index), RMR (Root Mean Square Residual), and RMSEA (Root Mean Square Error of Approximation). The acceptable levels for the indices are as follows: CFI and IFI should be 0.90 or higher, RMR should be 0.05 or lower, and RMSEA should be 0.08 or lower (Hu & Bentler, 1999).

The first model shown in Figure 3 was proposed based on Theoretical Model 1. This model represents the direction in which the three constructs of teacher self-efficacy as latent variables influence another latent variable, teacher transparency, toward the latent variable, digital adaptation. Teacher transparency is measured through observed variables, which include Instructional Transparency in Planning, Instructional Transparency in Action, Self Transparency, and Peer Transparency.

The model fit indices for Proposed Model 1 did not indicate a satisfactory fit (CFI = 0.789, IFI = 0.793, RMR = 0.045, RMSEA = 0.110). Modification indices were utilized to improve model fit by removing unnecessary paths to enhance alignment between the data and the model. However, this approach was ineffective. Subsequently, a different model based on Theoretical Model 2 was proposed in the direction of digital adaptation where teacher transparency influences teacher self-efficacy, contrary to Proposed Model 1.

Proposed Model 2, illustrated in Figure 4, represents the direction in which the four constructs of teacher transparency as latent variables influence another latent variable, teacher self-efficacy, toward the latent variable, digital adaptation. Teacher self-efficacy is

measured through constructs such as efficacy for instructional strategies, student engagement, and classroom management, which serve as observed variables through item parceling.

In Proposed Model 2, the model fit indices improved (CFI = 0.849, IFI = 0.853, RMR = 0.053, RMSEA = 0.096), suggesting that the relationship between teacher transparency and teacher self-efficacy, transparency was determined to influence efficacy.

FIGURE 3

Proposed Model 1

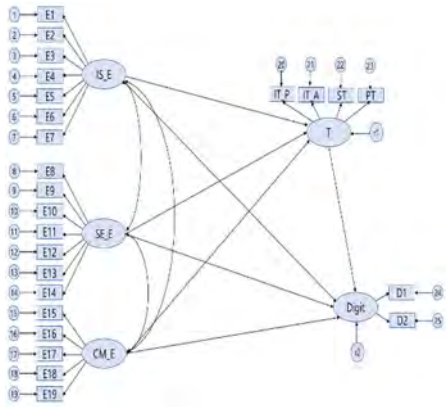


FIGURE 4

Proposed Model 2

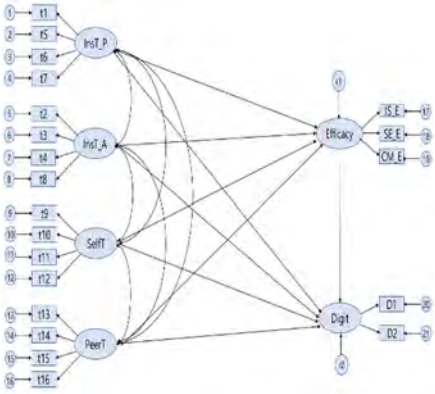


FIGURE 5

Proposed Model 3

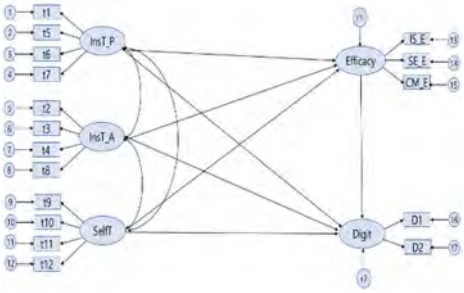
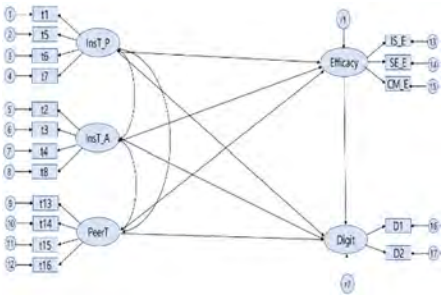


FIGURE 6

Proposed Model 4



IS_E = Efficacy for Instructional Strategies, SE_E = Efficacy for Student Engagement, CM = Efficacy for Classroom Management, T = Transparency, IT_P/InsT_P = Instructional Transparency in Planning, IT_A/InsT_A = Instructional Transparency in Action, ST/SelfT = Self Transparency, PT = Peer Transparency, Digit = Digital Adaptation

In the next modeling step, one construct at a time was removed from Teacher Transparency, specifically Self Transparency and Peer Transparency, and the model fits of the two models were compared. These two constructs represent the teacher's self-perception

of transparency concerning their relationships with teachers, not with students, suggesting that they could function within the model as a single factor.

Figure 5 presents Proposed Model 3, which includes the constructs of Instructional Transparency in Planning, Instructional Transparency in Action, and Self Transparency from teacher transparency constructs, excluding Peer Transparency as a latent variable. The fit indices for the Proposed Model 3 showed an improvement compared to the previous Proposed Model 2, yet they still did not meet the recommended levels (CFI = 0.856, IFI = 0.860, RMR = 0.048, RMSEA = 0.098).

In the subsequent modeling, presented in Figure 6, Self-Transparency was removed as a latent variable for teacher transparency, and Peer Transparency was incorporated. In this model, not only did the fit indices improve compared to the previous model, but they also met the model fit criteria (CFI = 0.913, IFI = 0.916, RMR = 0.041, RMSEA = 0.078). Consequently, Proposed Model 4 is selected as a theoretical model that represents the relationship between teacher transparency, teacher self-efficacy, and digital adaptation. Proposed model 4 illustrates that Instructional Transparency and Peer Transparency influence teacher self-efficacy, leading to digital adaptation. Table 7 summarizes the fit indices for each proposed model.

TABLE 7

Fit Indices of Proposed Models

Model	CFI	IFI	RMR	RMSEA
Proposed Model 1	0.789	0.793	0.045	0.110
Proposed Model 2	0.849	0.853	0.053	0.096
Proposed Model 3	0.856	0.860	0.048	0.098
Proposed Model 4	0.913	0.916	0.041	0.078

CFI = Comparative Fit Index, IFI = Incremental Fit Index, RMR = Root Mean Square Residual, RMSEA = Root Mean Square Error of Approximation

4.2. Exploring the Relationship Among Teacher Transparency, Teacher Self-Efficacy, and Digital Adaptation

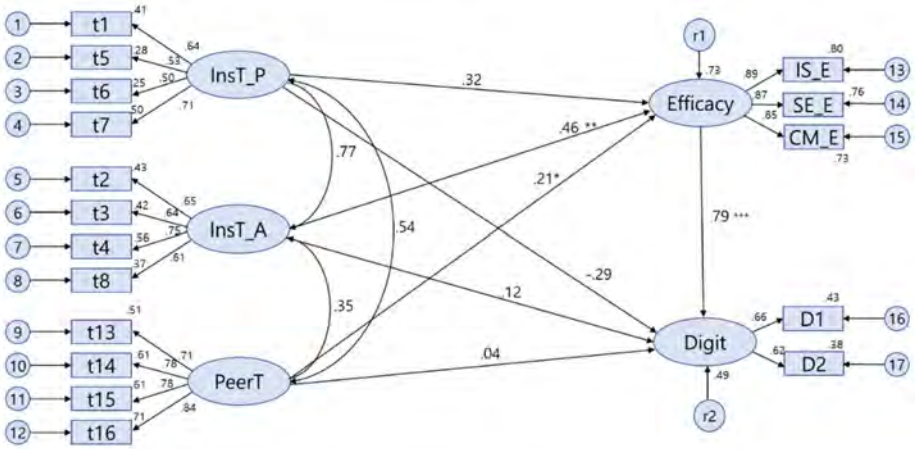
For research question 2, using the selected model, the significance of the paths between the components was analyzed to understand the relationships between teacher transparency, teacher self-efficacy, and digital adaptation. Figure 7 presents the research model adopted in this study as a result of SEM, illustrating each path with its standardized coefficients.

Table 8 provides an overview of the paths tested within the study's SEM, highlighting the influences of various aspects of instructional and peer transparency, teacher self-efficacy, and digital adaptation. The paths from Instructional Transparency in Planning (InsT_P) and Instructional Transparency in Action (InsT_A) to teacher self-efficacy (Efficacy) show differing levels of statistical significance and effect sizes. Notably, the path from InsT_A to

Efficacy is quite solid and statistically significant (coefficient = 0.462, $p = 0.008$), suggesting an influence of active instructional transparency on teacher self-efficacy.

FIGURE 7

Selected Model for the Study



InsT_P = Instructional Transparency in Planning, InsT_A = Instructional Transparency in Action, PeerT = Peer Transparency, IS_E = Efficacy for Instructional Strategies, SE_E = Efficacy for Student Engagement, CM = Efficacy for Classroom Management, Digit = Digital Adaptation

TABLE 8

Tested Paths for the Study's Model

Path			Coefficient [2]	S.E.	C.R.	*p*-value
InsT_P	→	Efficacy	0.321	0.164	1.647	0.100
InsT_A	→	Efficacy	0.462	0.260	2.656	0.008**
PeerT	→	Efficacy	0.209	0.056	2.211	0.027*
Efficacy	→	Digit	0.794	0.441	2.740	0.006**
InsT_P	→	Digit	-0.290	0.430	-0.864	0.387
InsT_A	→	Digit	0.119	0.685	0.397	0.691
Peer_T	→	Digit	0.042	0.146	0.257	0.797
Model fit indices: CFI = 0.913, IFI = 0.916, RMR = 0.041, RMSEA = 0.078						

*p<.05, **p<.01

InsT_P = Instructional Transparency in Planning, Ins_A = Instructional Transparency in Planning, PeerT = Peer Efficacy, Efficacy = Teacher Self-Efficacy, S.E. = Standard Error, C.R. = Critical Ratio

In contrast, though positive, the path from InsT_P to Efficacy is not statistically significant (coefficient = 0.321, $p = 0.100$), indicating that planning transparency may not be as impactful. Additionally, the influence of Peer Transparency (PeerT) on efficacy is statistically significant (coefficient = 0.209, $p = 0.027$). However, it has a smaller effect size

[2] Coefficient refers to standardized regression weights.

than InsT_A, indicating a modest but noteworthy effect of peer interactions on teacher efficacy.

The relationship between teacher self-efficacy and digital adaptation (Digit) shows the strongest direct influence among all the paths tested (coefficient = 0.794, p = 0.006), underscoring self-efficacy as a critical driver for successful digital adaptation. Other paths, such as those from InsT_P, InsT_A, and PeerT directly to Digit, reveal varying degrees of influence, with none being statistically significant. This lack of significance, particularly the negative coefficient for InsT_P to Digit (coefficient = -0.290, p = 0.387), suggests that even if teachers are aware of their changing roles and possess transparency, without the support of factors like teacher efficacy, they may not see positive effects in adapting to the digital age.

The analysis reveals a more detailed dynamic between teacher transparency, self-efficacy, and digital adaptation. It indicates that while aspects of transparency influence teacher self-efficacy, the direct effects of transparency on digital adaptation are less significant. This implies that enhancing digital adaptation might be more effectively achieved by boosting teacher self-efficacy. Teacher self-efficacy is crucial as it reflects teachers' confidence in integrating digital tools effectively. This confidence is significantly enhanced by transparent practices, such as sharing digital teaching methods and collaborative planning. Therefore, efforts to improve digital adaptation should focus on fostering supportive peer interactions and promoting active transparency in instructional practices.

5. DISCUSSION

This study explored the relationship between teacher transparency, teacher self-efficacy, and digital adaptation. Teacher transparency was used as an attribute to quantitatively measure shifts in teacher identity. For the first research question, theoretical model 2 best explained the data, which demonstrates that teacher transparency influences teacher self-efficacy in relation to digital adaptation. This finding supports the argument of Pennington and Richards (2016) that an individual's mental frameworks for monitoring and assessing personal performance are created by self-image and identity, which are shaped by their values and beliefs about appropriate conduct, aligning their identity with what they perceive as 'good' or 'proper.' As new roles associated with a changed identity emerge, the evaluation of a teacher's capabilities also evolves. Thus, this model clearly illustrates how shifts in identity and the development of teacher self-efficacy impact digital adaptation. This understanding highlights the importance of changes in teacher identity and the belief in one's ability to take on new roles for effective adaptation to altered circumstances.

For research question 2, only the paths from Instructional Transparency in Action to

teacher self-efficacy, from Peer Transparency to teacher self-efficacy, and from teacher self-efficacy to digital adaptation were significantly validated. The result confirms the beneficial role of transparency in response to environmental changes, as highlighted in prior research on the effects of teacher transparency (Anderson et al., 2013; Aranyi et al., 2022; Howard, Winkelmes, & Shegog, 2020; Liu, 2022; Means & Neisler, 2021; Winkelmes et al., 2016). The findings suggest that as teachers adopt more transparent instructional practices in adapting to the digital era, their self-efficacy is positively influenced, leading to a more effective integration of digital tools. Both teacher transparency and teacher self-efficacy positively impact teachers' adaptation to the digital age. This underscores the ongoing, dynamic—rather than stable—nature of teacher identity, which continuously evolves, encompassing both personal and contextual elements (Beijaard, Meijer, & Verloop, 2004). By validating the positive impact of teacher transparency on adapting to the digital era, the study affirms the significance of a teacher identity that aligns with changing educational environments.

In addition, the path analysis of the final model reveals that teacher transparency does not directly influence digital adaptation positively; instead, it must operate through teacher self-efficacy. This result, along with the findings of other studies, showed that English teachers have relatively lower average scores in teacher transparency and self-efficacy compared to teachers of other subjects, which provides essential implications for adapting English teachers to the changing educational environment.

The path analysis results reveal that teacher transparency influences digital adaptation through teacher self-efficacy, which suggests that teachers' perception of their competence is vital in identity adaptation and performance suited to the digital age. Since teacher self-efficacy, like teacher identity, concerns perceived rather than actual ability (Bandura, 1997), teachers need to believe in their effectiveness to fulfill roles shaped by a changed identity, thus facilitating beneficial teaching behaviors. Therefore, the relatively lower teacher transparency and teacher self-efficacy among English teachers indicate that they are particularly vulnerable to changes in the digital era, necessitating further attention and preparation for these challenges.

There are distinct aspects of a second language teacher's identity that differentiate them from teachers of other subjects. One aspect involves teachers' contradictory identities, as Varghese et al. (2005) identified. While navigating similar tensions between personal and professional identities, second language teachers often have an additional layer of identity related to their status as either native or non-native speakers of English (Parks, 2017; Pennington & Richards, 2016). This dual identity as both a teacher and a learner of the target language places them under pressure to stay ahead of their students. Furthermore, inputs from non-native teachers are perceived to impact English development negatively, reinforcing the 'native-speaker myth' (Tomlinson & Masuhara, 2017). This myth affects

English teachers' identity and self-efficacy, including those in Korea. Similarly, Hiver (2013) found that a lack of language self-efficacy was nearly synonymous with a lack of teaching self-efficacy for Korean English teachers. These findings imply that negative evaluations of English proficiency may be a significant reason why Korean English teachers' self-efficacy and transparency are lower compared to the teachers of other subjects.

The influence of Peer Transparency on teacher self-efficacy turns out to be significant. This result supports März and Kelchtermans's (2020) argument that peer culture supports adapting to a new and challenging teaching environment and that teachers can significantly benefit from knowledge exchange with their more experienced colleagues. Uitto, Kaunisto, Kelchtermans, and Estola (2016) also mention that teachers' self-understanding develops and is reconstructed through peer interaction. He further explains that transparency in peer mentoring and peer culture is essential for successful teacher mentoring. Research on Japanese English teachers (Thompson & Dooley, 2019) also argues that social feedback from colleagues is a crucial source of teacher efficacy and suggests that similar teacher cultures in Korea could also benefit from the development of collective efficacy. The results mentioned above and suggestions propose a potential solution for improving the relatively low self-efficacy of Korean English teachers.

6. CONCLUSIONS AND IMPLICATIONS

The study conducted SEM with multiple proposed models to analyze the relationships among teacher transparency, teacher self-efficacy, and digital adaptation. This study employs transparency as a measurable attribute of teacher identity shift. The results suggest that it is not merely the teacher's self-perceived efficacy that dictates their transparency. However, rather, teacher identity, evolving in response to situational demands, brings about a shift in the perception of competencies required, in this case, teacher transparency. This change, in turn, influences teacher self-efficacy. This model illustrates that teacher self-efficacy is impacted by the required roles, as defined by teacher transparency, which is contingent upon the shifting identity of teachers. Additionally, the results suggest that teacher transparency with students and peers directly influences teacher self-efficacy but does not directly lead to digital adaptation without the mediating effect of increased self-efficacy, highlighting the importance of teacher self-efficacy in digital adaptation.

The study results have implications for English teachers' adaptation to digital environments. It shows that they must possess strong self-efficacy to thrive in the new digital era and effectively fulfill their roles. Due to Korean English teachers' unique challenges as non-native speakers, a targeted program to enhance their self-efficacy is necessary. The program should focus on developing a positive teacher culture, collective teacher culture

mainly, as the result shows that Peer transparency enhances teacher efficacy. The targeted program will help Korean English teachers increase their confidence and effectiveness and ensure that the transition into increasingly digital-centric teaching methods is successful. Implementing interventions will significantly improve English teachers' self-efficacy and engagement with their students, ultimately enhancing educational outcomes.

Future research could increase the number of measurement items related to digital adaptation to represent English teachers' experiences better and improve the model fit. Additionally, including a more extensive and diverse sample of teachers from various educational levels and geographic regions would strengthen the findings and make them more applicable.

Applicable levels: Secondary

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APPENDIX A

Descriptive Statistics for Teacher Transparency Survey

Items	*M*	*SD*
Instructional Transparency		
Transparency in planning		
I identify a specific learning goal for each assignment, task or activity	4.15	0.86
I provide an example of a high-scoring assignment before giving assignments.	4.07	0.93
I provide assessment criteria for the quality of students' work.	4.46	0.69
I provide my students with detailed feedback on how well they are doing.	4.16	0.82
Transparency in action		
I am comfortable discussing my instructional decisions with my students.	4.09	0.91
I provide clear instructions for each assignment.	4.59	0.56
I clearly explain to students how their work will be evaluated.	4.57	0.68
I am available to meet with my students to discuss any concerns or questions they may have.	4.62	0.54
Self Transparency		
I share the class materials that I found in addition to the standard course contents with my peers.	4.03	1.02
I provide my peers with useful information about their successes and failures.	3.24	1.19
I am open to criticism and ready to discuss my mistakes with my peers.	4.10	0.83
I share my goals and my strivings in the class with my peers.	3.74	0.93
Peer Transparency		
My peers share the class materials that they found in addition to the standard course contents.	3.85	1.03
My peers provide me with useful information about my successes and failures.	3.39	1.05
My peers are open to criticism and ready to discuss their mistakes.	3.70	0.95
My peers share their goals and strivings in the class.	3.73	0.97

APPENDIX B

Descriptive Statistics for Teacher Self-Efficacy Survey

Items	*M*	*SD*
Instructional Strategies		
1. I can provide students with an alternative explanation and example when they are confused.	4.47	0.62
2. I can use a variety of assessment strategies.	4.25	0.72
3. I can adjust teaching and learning strategies as needed.	4.34	0.71
4. I can accurately deliver content knowledge to students.	4.43	0.63
5. I can provide students with specific feedback about their learning.	4.25	0.71
6. I can solicit a variety of good questions throughout the lesson.	4.23	0.80
7. I can communicate to students the specific learning objectives and outcomes of the lesson	3.88	0.94
Student Engagement		
8. I can use teaching methods to motivate students with low interest in the subject I teach.	3.78	0.98

9.	I can maintain high levels of student engagement in learning tasks.	3.75	0.91
10.	I can get students to believe they can do well in the subject I teach.	4.08	0.83
11.	I can use teaching methods to motivate students with low interest in the subject I teach	4.20	0.76
12.	I can motivate students to perform to their fullest potential.	4.06	0.79
13.	I can clarify student misunderstandings or difficulties in learning.	4.29	0.67
14.	I can provide a positive influence on students' academic development.	4.26	0.68
Classroom management			
15.	I can maintain a positive classroom climate of courtesy and respect.	4.30	0.74
16.	I can maintain an environment in which students work cooperatively.	4.16	0.78
17.	I can manage student discipline and control disruptive behavior.	4.29	0.69
18.	I can establish a classroom management system with each group of students.	4.02	0.88
19.	I can effectively use allocated time for various activities and manage routines and procedures.	4.02	0.86

APPENDIX C

Descriptive Statistics for Digital Adaptation Items

	Items	*M*	*SD*
1.	I was able to transition to non-face-to-face classes during the pandemic with no difference in student engagement or participation compared to in-person classes	3.45	1.129
2.	I can embrace the impact of cutting-edge technology on education with a positive attitude and adaptability.	3.95	0.842