

Understanding the Dynamics of Materials Adaptation in An English-Chinese Bilingual Storytelling Curriculum for First Graders

Ran Wang

Maharakham University, Thailand
Email: 63010563019@msu.ac.th

Prasong Saihong

Maharakham University, Thailand
Coessponding email: prasong.sa@msu.ac.th

Kanyarat Sonsupap

Maharakham University, Thailand
Email: kanyarat.s@msu.ac.th

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Abstract

This cross-sectional study examined materials adaptation within an English-Chinese bilingual storytelling curriculum for first graders to identify the potential factors influencing adaptation choice. It delved into the relationship between curriculum objectives, perceptions of picture books, and the use of tense and narrative. A survey (N=352) gathered demographic data of English teachers from China, and the data was analyzed using Partial Least Square (PLS) structural equation modeling. Findings illuminate how teachers' perception of picture books fully mediate the interplay between bilingual storytelling curriculum objectives and teachers' narrative in a picture book adaptation. Analyzing the results by narrative theory, it found that the essence of storytelling and narrative is making meanings; stories play a leading role in the curriculum for first graders to develop their bilingual narrative through sharing, reading, and telling stories. Consequently, teachers' understanding of picture books' possibilities as teaching materials, benefits for fostering students' bilingual development, and perception of the intertextuality of illustration and words can significantly facilitate teachers' narrative in a picture book adaptation. This study contributes by elucidating the mediating role of picture books, emphasizing the importance of linking curriculum objectives with teaching materials adaptation in practice. Furthermore, longitudinal research is to overcome the limitations of this cross-sectional correlation analysis.

Keywords: Materials adaptation; bilingual storytelling curriculum; first graders

Introduction

Story resources inherent in different cultures and languages pump into teaching materials for a bilingual curriculum. A bilingual storytelling curriculum accentuates storytelling as an

approach to facilitate students' language development, for example, through teachers' perception of stories, demonstration of plots and characters, and students' creation of stories. Rich story sources provide a support toolkit to explore collaborative storytelling activities for students of all ages (Carr, 2013). Studies have shown that storytelling, an ancient tradition to impart values and cultures, has been widely utilized to enhance students' language, cognition, and emotion and as part of a curriculum for teaching youth within an education environment (Iroh, 2022; Vinnikova, 2022; Connaughton et al., 2019; Hendrickson, 1992). For instance, researchers have discussed the validity of storytelling in teaching language to young learners (Piórkowska and Malenko, 2017), examined the dissemination and components of story-based teaching materials (Ondeng et al., 2022), and developed narrative text-based materials in a curriculum to stimulate students' interest, motivation, and vitalize teachers' teaching (Ningsih, 2022). However, as a double-edged sword, the richness of story resources challenges teachers' ability to choose and adapt teaching materials.

Materials adaptation comes from the process of modifying, simplifying, adding, deleting, and re-ordering teaching and learning materials to meet the learning context, curriculum objectives, learning goals, and learners' needs (Masuhara, 2022; Bosompem, 2014; Vonica & Isyam, 2013; McDonough et al., 2013). Adapting teaching materials is inevitable and is regarded as one essential technique and strategy of teaching (Hanifa & Yusra, 2023; Li & Li, 2021; Rizaldy, 2018). To some extent, it happens unconsciously and in different stages, from teaching preparation, during teaching, and after teaching. McGrath (2002) emphasized teachers' fundamental role as "mediators" between materials and learners, while Rizaldy (2018) summarized the obstacles teachers encountered, such as lack of expert experience, knowledge, and instruction on making materials adaptation and over-reliance on textbooks.

Under this circumstance, researchers explored the process of materials adaptation, including teachers' understanding, evaluation, and design of the teaching materials (Hanifa & Yusra, 2023; Carabantes & Paran, 2022; Choppin, 2011). For instance, Hanifa and Yusra (2023) researched how materials adaptation proceeds and found that teachers' feeling-sharing with the materials is significant in facilitating their understanding of the difficulty level of materials. Li and Li (2021) discovered that teachers' familiarity with the materials can ensure the best materials for learners and help them achieve learning goals, curriculum objectives, and needs. Masuhara (2022) highlighted the importance of assuming learner limitations while adapting materials. Students' needs are prioritized, from commercial coursebook adaptations catering to regional needs to teachers' behavior of adapting materials as a part of teaching strategies (Carabantes & Paran, 2022).

Despite much focused research on the materials adaptation process, the answer to this issue in bilingual education and storytelling curriculum remains weakly established. Therefore, investigating the following questions in a bilingual storytelling curriculum context is critical:

1. How do teachers acquire familiarity with the storytelling materials?
2. What's the relationship between curriculum objectives, perception of picture books, and narratives in materials adaptation for the bilingual storytelling curriculum?

The novelty of our study is (1) to explore the factors that facilitate teachers' familiarity with teaching materials and (2) to examine the relationship between teachers' perception of materials, narratives in adaptation, and curriculum objectives.

Literature review

Bilingual education and language development

Bilingual education dates back to the times of Greek and Roman, and it is a well-organized and planned program using two or more languages to teach subject matter rather than just the languages (Cummins & Hornberger, 2008; Cummins, 2009). However, with the popularity of bilingual education, the terms extend to any educational program involving two languages in teaching and learning (Chen, 2017). Since the mid-1960s, researchers have examined the complexity and effectiveness of bilingual education programs from the perspectives of economy, society, politics, and globalization (Nurutdinova & Bolotnikov, 2018; Lewis, 1980) and at different levels from early to higher education (Ozfidan, 2017; Yana et al., 2021). For example, Lewis (1980) analyzed the social and linguistic environment of communities where bilingual programs are set and discussed the attitudes toward languages, the needs policies of languages, and bilingual programs.

Furthermore, researchers found that different kinds of bilingual curricula serve various purposes for people of minorities and majorities (Baker, 2006; Diane, 2012; Chen et al., 2020). For example, Chen et al. (2020) found that for students who get access to bilingual education from elementary to middle school, the objective was to make balanced bilinguals understand school courses and engage in academic activities in two languages. Diane (2012) examined four strong forms of bilingual education—additive bi, multilingualism, and additive bi, multiliteracy, in which a minimum of 50% of the subject was instructed in a second, foreign, heritage, or indigenous language, and they summarized that their aims were further developing the first language, academic achievement, and intercultural understanding respectively.

With the increasing development of bilingual curricula, researchers have investigated the merits of bilingual education from cognition, neurolinguistic, socio-cultural, creativity, language, and academic perspectives (Parra et al., 2021; Jawad, 2021; Farhan, 2019; Lavigne et al., 2022; Arnaiz-Castro, 2022; Antonchuk, 2018; Moreno, 2019; Ozfidan, 2017; Li, 2022). For instance, Chen (2017) evaluated early immersion, two-way language education, and maintenance education and found that all types can positively enhance language and academic skills on a rolling basis without any negative impacts. Other research found that bilingual two-way immersion programs may improve reading skills in minority and majority-language elementary school children (Marian, 2013).

The relationship between bilingual education and language development has long been explored, and many researchers validated the positive effect of bilingual education on facilitating learners' language development (Lavigne et al., 2022; Arnaiz-Castro, 2022; Antonchuk, 2018; Moreno, 2019; Ozfidan, 2017; Jawad, 2021). For example, Jawad (2021) compared the contradictory views on the relationship between mother and second languages for bilinguals and explained that the cognitive merits of bilinguals have much more than monolinguals (Van Dijk, 2019). Furthermore, Jawad summarized that bilinguals' ability to use the second language and the culture will achieve creative capabilities when they constantly try to use both languages.

Additionally, researchers found that bilingualism can improve learners' phonological awareness, expressive vocabulary, comprehension, executive function, and multilinguistic awareness, which support honoring students' language and culture as worthy of instruction (Lavigne et al., 2022). Antonchuk (2018) emphasized that providing a child with a solid bilingual education based on the bilingualism between two languages can result in the subsequent opportunity for easier acquisition of other languages.

Therefore, bilingual education can build a bridge between two languages and develop students' confidence and fluency in using written and oral second language for academic achievement and daily communication (Ozfidan, 2017).

Picture books and narratives

Using picture books in a storytelling curriculum has been widely acknowledged as a valuable tool to improve students' core competencies in English and other language foundations (Wardini et al., 2021; Xu, 2021; Chou, 2013; Lado, 2012). For example, Wardini et al. (2021) highlighted that teachers facilitate language teaching and learning by utilizing the words, illustrations, and design of picture books, which cover linguistic, story, and picture values (Hsiu-Chih, 2008).

Regarding the linguistic value of picture books, researchers emphasized using vocabulary, picture words, and short sentences to help children understand new and challenging vocabulary (Ab Rahman & Chiu, 2022; Guillén, 2019). Meanwhile, the interaction of pictures and words can work together to improve students' visual and verbal reading skills (Birketveit, 2015). Ouvrard (2022) found that authentic illustrations of picture books as teaching materials can mobilize teaching objects and learning purposes, awaken teachers' enthusiasm for lesson plans, and increase students' engagement in learning.

Compared with textbooks, many primary teachers are not confident choosing picture books and children's literature as teaching materials (Dolan, 2016). It shows a lack of materials adaptation strategies. Therefore, Mede and Yalçın (2019) investigated the adaptation strategy, highlighting the close relationship between students, tasks, context, time, and beliefs. However, Pratiwi (2020) still identified that teachers usually adopted limited techniques to cope with materials adaptation while lacking the implementation of extension, subtraction, and re-ordering. In this sense, taking advantage of picture books (Dolan, 2016) in illustrations and texts is challenging for teachers to utilize as teaching materials for students fully.

Researchers recognized the significant role of picture books in language education and materials development (Wolanin, 2021), analyzed the multimodal dynamics of picture books, and emphasized the importance of teaching visual literacy to children (Forsyth, 2023). As a multimodal narrative, illustration and texts are mutually influenced. Therefore, teachers must understand the relationship between pictures and text in picture books.

Narrative theory and bilingual storytelling curriculum

The narrative theory of Walter Fisher has been widely used in fields of social construction, behavioral interpretation, children's literature, and pedagogy (McTighe & McTighe, 2018; Miller, 2020; Brown, 2022; Cadden, 2022). For example, Cadden (2022) found that since the 1980s, narrative theory has become the lens through which researchers view the narrative structure and representation of children's literature, such as the relationship between the author's voice and the narrator in stories. Stories employ narrative ways to make meaning, view human experiences, realize communication, and construct reality and identity (Davidson, 2023; Suparto, Lao, & Salim, 2023). Narrative inherently means meaning-making across genres and contexts (Davidson, 2023; Summers, 2022), and Summers (2022) has emphasized using narrative at both micro and macro levels.

The use of narrative is the focus of a bilingual storytelling curriculum, utilizing stories as a source of materials and adopting telling stories as the pedagogical approach (Miller, 2020) to

share knowledge and experiences—storytelling functions as the curriculum objectives, teaching approach, and learning outcomes.

Furthermore, researchers examined the guidance of narrative theory in planning lessons, choosing stories, and adapting materials for bilinguals who need to improve English reading and bilingual narrative skills (Gudmundsdottir, 2013; Chavez, 2022; Vaish & Vaish, 2020; Bonifacci et al., 2018; Farida, Supardi, & Muchtar, 2023). For example, Chavez (2022) found that utilizing stories from bilingual parents in the English curriculum can facilitate the development of collaborative teaching materials, teaching activities, and strategies. Gudmundsdottir (2013) likened teaching to interpreting stories, in which narratives serve as the explanation device.

Laurie and Pesco (2023) assessed narratives by integrating curricular goals into the assessment process to estimate bilingual children's language abilities. Researchers have examined the factors influencing narratives from the micro- and macro-structural levels—vocabulary, phonological awareness, morphological and syntactic comprehension, phonological memory, letter knowledge, grammar, and story sequence and structure (Bonifacci et al., 2018; Lucero, 2018). Kupersmitt et al. (2014) analyzed four types of causal relations in the coherence and cohesion of bilingual narratives: psychological, motivational, physical, and inter-clausal connectivity, and proposed the significant role of pictures in improving oral narratives. Additionally, Vaish and Vaish (2020) examined lexical density and episodic structure indicators for bilingual children to enhance their reading and storytelling abilities in diversified texts.

Therefore, researchers began to explore the interplay between stories (storytelling) and children's narrative abilities by focusing on bilinguals or comparing monolinguals and bilinguals (MacLeod & Pesco, 2023; Fiestas & Peña, 2018; Lucero, 2018; Young, 2015). For example, Lucero (2018) found that English-Spanish bilingual children can significantly improve vocabulary in both languages while developing overall story structure at different levels. However, MacLeod and Pesco (2023) found a macrostructural narrative growth among emerging bilingual children in telling the central plot, characters, and outcomes of stories in French. Fiestas and Peña (2018) also proved the transfer of macrostructural narrative for bilinguals, regardless of the mediated learning experience and languages (Otwinowska et al., 2018). Young (2015) suggested that the bilingual and monolingual children performed similarly on the unique narratives but performed significantly differently on the narrative retells.

Researchers found that bilingual children follow a specific sequence to achieve language competency—narrative organization, vocabulary, and morphology (Westby, 2022; Paradis, 2016). Narrative tasks usually require receptive (comprehensive) and expressive (production) language skills to make students recognize, understand, and tell the story characters, plots, ideas, and themes.

From the teaching perspective, teachers can maximize the use of picture books and storytelling to foster students' comprehension in reading by focusing on grammar and language complexity (Melchor, 2015; Fojkar et al., 2013). Accordingly, we hypothesize:

- Hypothesis 1 (H1). Curriculum objectives can positively influence teachers' perceptions of picture books while adapting the material in a bilingual storytelling curriculum.
- Hypothesis 2 (H2). Teachers' perception of picture books can positively influence their use of narrative in adapting picture books for a bilingual storytelling curriculum.
- Hypothesis 3 (H3). Teachers' perception of picture books mediates between curriculum objectives and narrative in materials adaptation.
- Hypothesis 4 (H4). Teachers' perception of picture books positively influences tense use in materials adaptation.

Drawing on the literature review, Figure 1 shows the relationship between the constructs and four hypotheses.

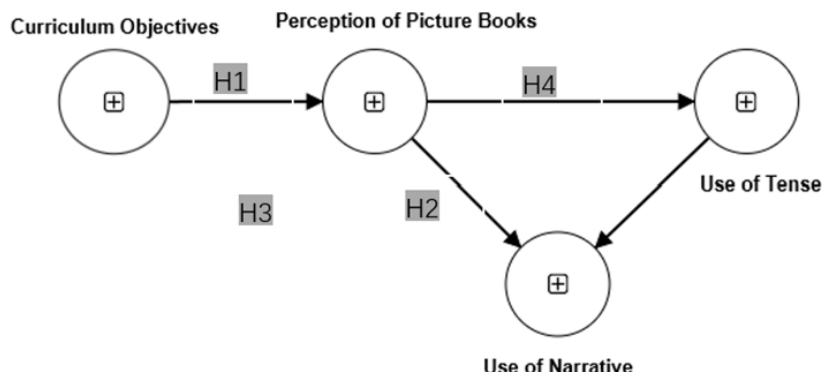


Figure 1. Conceptual model

Note.

H1= Curriculum Objectives->Perception of Picture Books

H2= Perception of Picture Books->Use of Narrative

H3= Curriculum Objectives->Perception of Picture Books->Use of Narrative

H4=Perception of Picture Books -> Use of Tense

Research method

This study investigated the proposed hypotheses using a survey in the context of China. It aims to examine how the curriculum objectives influence the teaching materials and approaches. A PLS-SEM was adopted to analyze the data collected from a survey by unveiling the dynamics of these constructs.

Sample selection and data collection

The author surveyed to collect data from 352 English teachers from primary schools in China. These teachers come from nationwide. Each respondent was selected using purposive sampling. Participants reviewed a lesson plan with the specific curriculum objectives and teaching material adapted from an English picture book: Fish is Fish. In the end, they evaluated all the materials—the questionnaire measured curriculum objectives, perception of picture books, evaluation of narrative, and use of tense.

Table 1 shows the detailed information of the participants. All the participants are English teachers, with 31.5 % aged 22-30, 38.4% aged 31-40, 23% aged 41-50, and 7.1% aged over 50. 71.3% is female, while 28.7% is male.

Table 1. Participant demographics

Demographics	Category	Frequency	Percent
English Teachers	Female	251	71.3
	Male	101	28.7
Age	22-30 years old	111	31.5
	31-40 years old	135	38.4
	41-50 years old	81	23.0
	Over 50 years old	25	7.1

n=352

Figure 2 demonstrates the excerpt from the picture book *Fish is Fish*. Figure 2-a shows the original texts in English. It is a long conversation between the fish and the frog, with complex words and expressions. Figure 2-b is the adapted text in English, using simple sentence structure and past tense to present the illustration. Figure 2-b also shows the translated text in Chinese.

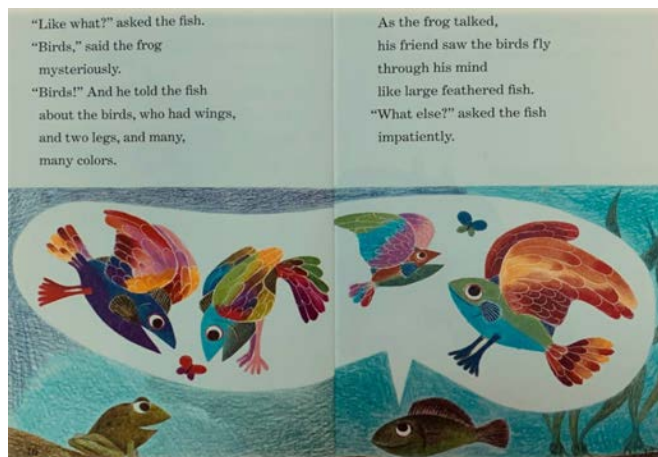


Figure 2-a. The original of *Fish is Fish*



Figure 2-b: the adapted of *Fish is Fish*

Figure 2a & 2b: Samples of *Fish is Fish* using in the bilingual storytelling curriculum

The survey structure

The survey instrument was initially in Chinese to minimize misunderstandings caused by differences in expression between languages. The original questionnaire consists of two sections with 48 items; section one is multiple choices for teachers' general attitudes toward the bilingual curriculum objectives, options, challenges, and adaptation of teaching materials, with eight items (Q3- Q6, Q8, Q10, Q13, and Q24); section two presents the specific curriculum materials, in terms of the parallel texts of the original and adapted, providing the corresponding pictures. It measures the evaluation of participants with a 6-Likert points scale, ranging from 1 (strongly disagree) to 6 (strongly agree). Questions are composed of 12 items. The author deployed the questionnaire to respondents via the Internet. In total, 352 responses were deemed usable for analysis. Obtained data were analyzed using SPSS and Smart PLS 4.0.

Table 2 shows all the items and scales representing the latent variables. The perceptions of picture books (PP) encompasses three indicators that are reflective of the construct, meaning that

the perception of picture books can cause the performance in the following aspects: knowing the benefits of picture books to facilitate bilingual development (PP1), knowing how to use picture books as the teaching materials in the bilingual curriculum (PP2), and understanding the relationship between texts and illustrations (PP3). Evaluation of curriculum objectives (EC) has two items, indicating (1) evaluating the English storytelling objective (EC1) and (2) evaluating the objective of reading English picture books (EC2). EC is measured as a formative construct, which shows that the two indicators can explain the evaluation.

The use of tense (UT) functions as a formative construct, indicating two aspects: (1) evaluating the use of past tense in a specific context and (2) evaluating the use of past continuous tense in a specific context. The use of narrative (UN) encompasses two indicators: (1) the consistency of narrative details and the learning objectives, and (2) the consistency of emotional expression and the learning objectives. In SPSS, the whole reliability of the scale is good, with $\alpha=0.862$.

Table 2. Items and scales for all latent variables.

Latent variable	Items	Scale	References
Perception of Picture Books	PP1(Q7)	Do you believe using picture books or storybooks as teaching resources is beneficial for developing students' bilingual abilities?	Miller, 2020; Ouvrard, 2022
	PP2(Q11)	How well do you understand picture books used for the bilingual curriculum?	
	PP3(Q12)	Regarding picture books, do you have a strong understanding of the narrative relationship between text and illustrations?	
Evaluation of Curriculum Objectives	EC1(Q18)	Based on the provided course information, is the curriculum objective of telling the English story reasonable?	Lavigne et al, 2022; Arnaiz-Castro, 2022
	EC2(Q21)	Based on the provided course information, is the curriculum objective of reading the English picture book reasonable?	
	EC_global(Q17)	Based on the provided course information, do these teaching and learning objectives suit first-grade students' characteristics?	
Use of Tense	UT1(Q29)	When adapting the text and describing the frog's experiences after leaving the pond, using the past tense (e.g., He saw cows; He saw birds) won't significantly affect their language acquisition.	MacLeod and Pesco, 2023; Bonifacci et al., 2018;
	UT2(Q30)	Using the past continuous tense when the frog describes its experiences (e.g., Birds were flying) won't significantly affect first-grade students' language acquisition.	
	UT_global(Q31)	Using two or more tenses in specific contexts will not significantly affect first-grade students' language acquisition in adapting the text.	
Use of Narrative	UN1(Q37)	The adapted text aligns better with the course's language goals and students' English proficiency level while focusing on the narrative details.	Wolanin, 2021; Forsyth, 2023

- UN2(Q39) The adapted text better aligns with the course’s language goals and students’ English proficiency level while emphasizing emotional expression in the story. The adapted text better aligns with the course’s language goals and students’ English proficiency level while focusing on emotional expression in the story.
- UN_global(Q42) Please evaluate the adapted text overall. Do you believe it maintains the story’s completeness, coherence, and profound philosophical elements?

Note. In reliability statistics, Cronbach’s Alpha= 0.862, items are 12

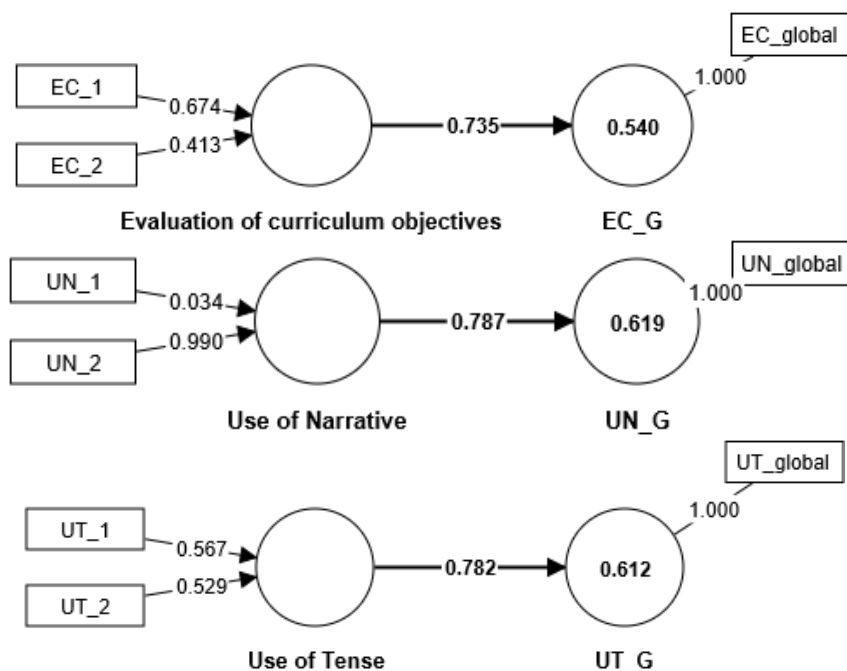


Figure 3. Formative construct reliability estimates of the redundancy analysis through PCA (principal composite analysis)

Additionally, EC_global, UT_global, and UN_global are tested for the total score of constructs EC, UT, and UN because they are designated as formative variables that need to do the redundancy analysis through the sum-up items (see Figure 3). Redundancy analysis tests whether the formative construct is highly correlated with the reflective measure of the same construct. (Chin, 1998) Convergent validity using redundancy analysis was 0.70, reaching the minimum (Frank Falk, 2017). Figure 2 shows the redundancy estimates are 0.735, 0.787, and 0.782, respectively, all above 0.70, which means that the formative constructs of EC, UN, and UT are equally reliable, corresponding to their reflective construct.

Descriptive statistics

Table 3 displays the distribution and correlations among the latent variables. The mean values of each indicator fall within the range of 4.06-4.64, suggesting a relatively balanced distribution, while the standard deviation of each indicator ranges from 1.104-1.259, indicating a

small dispersion in the sample data. According to Klein (1998), if the absolute value of skewness in sample data is below three and the absolute value of kurtosis is less than 10, the observed variables typically adhere to a normal distribution. In this study, the absolute values of skewness for all items are below 3, and the absolute values of kurtosis are well below 10, significantly deviating from the suggested reference values. Consequently, the shape of the large sample data can be considered to largely conform to a normal distribution, although normal distribution considerations are unnecessary when using Smart PLS.

Table 3. Descriptive Statistics of the Variables and Correlations Between the Variables.

Variables	Indicators	Range	M(SD)	Skewness (SE)	Kurtosis (SE)
Perception of Picture Books	PP1_Benefits of picture books for bilingual development	5	4.18(1.240)	-.632(.130)	.097 (.259)
	PP2_Using picture books as resources in a bilingual curriculum	5	4.06(1.259)	-.420(.130)	-.253 (.259)
	PP3_Understanding the relationship between texts and illustrations of picture books	5	4.30(1.173)	-.485(.130)	-.119(.259)
Evaluation of Curriculum Objectives	EC1_Telling stories in English using the specific language points	5	4.15(1.120)	-.492(.130)	.033 (.259)
	EC2_Reading the specific English picture books	5	4.43(1.206)	-.607(.130)	.004 (.259)
Use of Tense	UT1_Use of the past tense	5	4.45(1.139)	-.810(.130)	.914(.259)
	UT2_Use of the past continuous tense	5	4.58(1.104)	-.861 (.130)	1.059(.259)
Use of Narrative	UN1_Consistency of narrative details with learning objectives	5	4.64(1.161)	-.843(.130)	.471(.259)
	UN2_Consistency of emotional expression with learning objectives	5	4.59(1.105)	-.798(.130)	.741(.259)

Measurement model

To assess the reliability and validity of our measurement instruments. We conducted internal consistency reliability analyses in Smart PLS 4.0. Table 4 shows the results, indicating high internal consistency for all constructs: perception of picture books ($\alpha=0.865$), evaluation of curriculum objectives (estimate=0.735), use of tense (estimate=0.782), and use of narrative (estimate=0.787). Table 3 also shows the convergent validity of reflective and formative constructs (PP is reflective; EC, UT, and UN are informative). The outer loadings of perception of picture books are 0.897 (PP1), 0.881 (PP2), and 0.884 (PP3). The outer weights of evaluation of curriculum objectives are 0.493 (EC1) and 0.598 (EC2); the outer weights of use of tense are 0.432 (UT1), 0.659 (UT2); the outer weights of use of narrative are 0.548 (UN1), 0.699 (UN2). Generally, the outer weights of formative construct are not as high as the reflective one. Thus, all the values of convergent validity are acceptable, suggesting that the indicators within each construct reliably measure the underlying constructs.

Table 4 shows the internal consistency reliability by considering AVE and Estimate. The AVE for each construct is higher than the correlations between that construct and other constructs, indicating good discriminant validity. For a reflective construct, AVE refers to the Average variance extracted; its accepted value is above 0.5 (AVE \geq 0.5). The AVE value of PP is 0.788, which shows an acceptance. The estimated value of the redundancy analysis is considered for

formative constructs (EC, UT, and UN). As demonstrated in Figure 2 and Table 4, the EC, UT, and UN estimates are all above 0.70, indicating validity.

Table 4 also demonstrates indicators' outer loadings (or weights) to measure the convergent validity. For reflective constructs, outer loadings are above 0.70, indicating a convergent validity, while for formative constructs, outer weights are considered without a specific standard value, but the higher, the better. The higher the weight, the stronger the indicator's relevance for forming the formative construct (Hwang et al., 2022). Usually, outer weights are lower than out loadings.

Table 4. Internal consistency reliability, convergent validity, discriminant validity, weights' statistics

Construct	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	(AVE) *	Estimate*
PP	0.865	0.865	0.918	0.788	
EC	-	-	-	-	0.735
UT	-	-	-	-	0.782
UN	-	-	-	-	0.787
Formative Constructs	Indicators	Outer weights	Reflective Constructs	Indicators	Outer loadings
Evaluation of curriculum	EC1	0.493	Perception of Picture Books	PP1	0.897
	EC2	0.598		PP2	0.881
Use of Tense	UT1	0.432		PP3	0.884
	UT2	0.659			
Use of Narrative	UN1	0.548			
	UN2	0.699			
Discriminant Validity-cross loadings					
Indicators	Evaluation of Curriculum Objectives	Use of Narrative	Use of Tense	Perception of Picture Books	
PP1	0.346	0.461	0.897	0.387	
PP2	0.379	0.466	0.881	0.376	
PP3	0.364	0.48	0.884	0.346	
EC1	0.897	0.309	0.367	0.186	
EC2	0.931	0.271	0.381	0.139	
UT1	0.166	0.281	0.391	0.871	
UT2	0.166	0.281	0.391	0.871	
UN1	0.206	0.741	0.397	0.258	
UN2	0.289	0.85	0.445	0.311	
Correlations Between the Variables					
Variables	EC	UN	PP	UT	
EC	-	0.315	0.409	0.174	
UN	0.315	-	0.529	0.359	
PP	0.409	0.529	-	0.417	
UT	0.174	0.359	0.417	-	

Note. AVE= Average variance extracted; AVE \geq 0.5. Estimates= value of the redundancy analysis. Redundancy analysis tests whether the formative construct is highly correlated with the reflective measure of the same construct. (Chin, 1998) Convergent validity using redundancy analysis was 0.70, reaching the minimum (Frank Falk, 2017). The higher the weight, the stronger the indicator's relevance for forming the formative construct (Hwang et al., 2022)

Structural model

We assessed the overall fit of the structural model using fit indices. The results in table 5 indicate a satisfactory fit to the data (with SRMR=0.042), confirming that the structural model adequately captures the underlying dynamics.

The structural model specifies path coefficients, representing the strength and direction of these relationships. The results of the path coefficients are presented in table 5. All the paths are statistically significant at the 95% confidence interval.

The author utilized bootstrapping analysis to examine the mediation effect of picture books between curriculum objectives and narrative in teaching materials, indicating a significantly full effect of curriculum objectives on narrative.

Table 5. Structural model estimates and model fit statistics

Path relationship	Path coefficient estimate	Standard deviation (STDEV)	T statistics	VIF	2.5%	97.5 %	p-value
Curriculum Objectives -> Perception of Picture Books	0.409	0.046	8.984	1	0.32	0.498	0.000
Curriculum Objectives -> Use of Narrative	0.216	0.033	6.522	-	0.154	0.284	0.000
Curriculum Objectives -> Use of Tense	0.171	0.031	5.461	-	0.113	0.235	0.000
Perception of Picture Books -> Use of Narrative	0.529	0.043	12.162	1.21	0.439	0.611	0.000
Perception of Picture Books -> Use of Tense	0.417	0.053	7.806	1	0.308	0.517	0.000
Use of Tense -> Use of Narrative	0.168	0.057	2.958	1.21	0.057	0.278	0.003
Model Fits Statistics	Saturated model	Estimated model					
SRMR	0.036	0.042					
NFI	0.918	0.914					

Note. The variance inflation factor (VIF) tests for collinearity. VIF<3, indicating ideally, SRMR=the standardized root mean square residual, SRMR <0.080 represents a goodness of model fit. NFI=the normed fit index, NFI>0.80 means the model fits the empirical data. (Latan et al, 2019)

Figure 4 illustrates the empirically validated inner mode, showing that the obtained data supported H1, H2, H3, and H4. Curriculum Objectives can influence the perception of picture books in a correlation of 0.409, and the perception of picture books can influence the use of narrative in a correlation of 0.459; however, curriculum objectives cannot directly influence the use of narrative without the mediating role of perception of picture books. Curriculum objectives can also impact the use of tense through the perception of picture books.

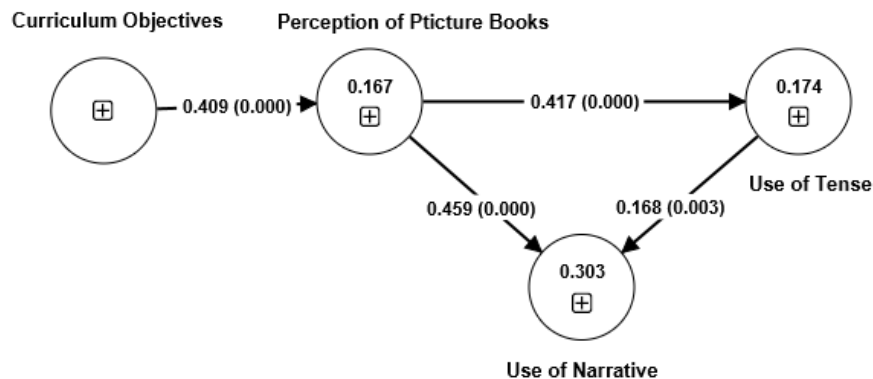


Figure 4. The inner model with path coefficients and p-values

Table 6 shows the effect sizes of constructs, indicating a medium effect size. The effect sizes suggest to what extent the correlations can be applied in reality. f^2 value between the perception of picture books and curriculum objectives is 0.201 ($0.201 > 0.15 > 0.35$), representing a medium-size effect; f^2 value between the perception of picture books and use of narrative is 0.249 ($0.249 > 0.15 > 0.35$), representing a medium-size effect; the size effect between the perception of picture books and use of tense is also a medium-size effect (with f^2 value=0.21). But, the effect size between the use of tense and the use of narrative is small (with f^2 value=0.033). Generally, the results show a medium-sized effect of the research.

Table 6. f^2 Effect sizes

Constructs	f^2 Effect sizes		
	Perception of Picture Books	Use of Narrative	Use of Tense
Curriculum Objectives	0.201		
Perception of Picture Books		0.249	0.21
Use of Tense		0.033	

Note. f^2 qualifies effects in terms of their contributions to the R^2 . f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes.

Figure 5 displays the overall model, including the inner and outer models. This overall model shows the potential constructs influencing teachers’ choices of words and expressions in adapting materials for a bilingual storytelling curriculum. The construct of curriculum objectives involves students’ ability to read English picture books and tell stories in English, which influences how teachers perceive picture books from the aspects of their benefits, intertextuality, and possibility as resources. Teachers’ perceptions of picture books can influence their narrative in the adapted materials, considering how to align the textual expression of emotion with the curriculum’s learning objectives and how to correspond the narrative details to the curriculum objectives. Overall, perceptions of picture books mediate between curriculum objectives and the use of narrative.

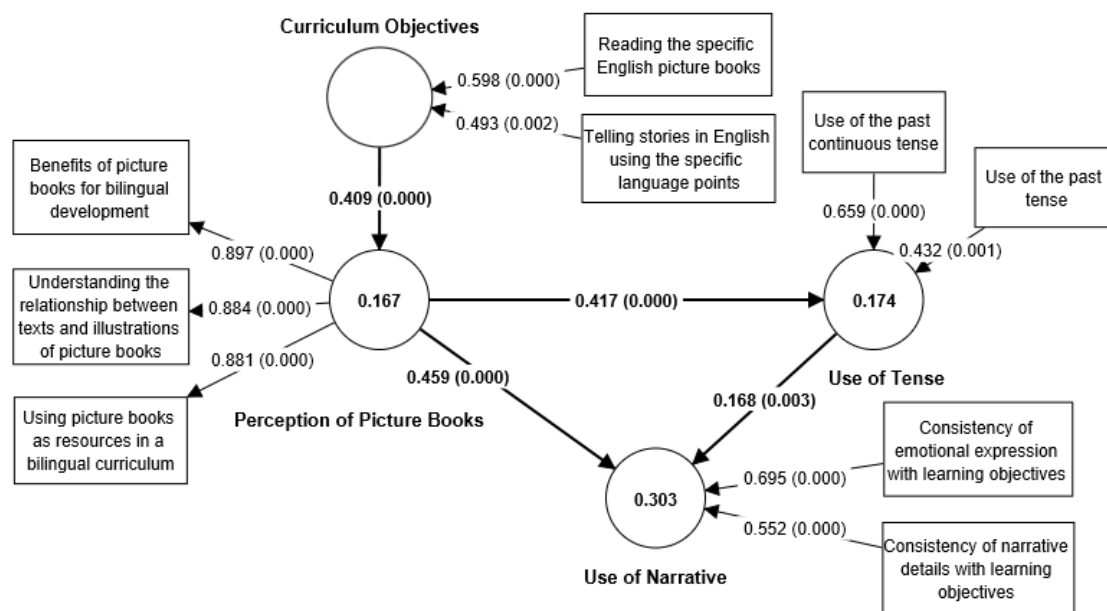


Figure 5. Overall model (outer model and inner model)

Results and discussion

This research investigated the dynamics of materials adaptation for a bilingual storytelling curriculum by exploring the relationship between curriculum objectives, teachers' perception of picture books, and the use of narrative and tense in the adapted versions. Furthermore, it examined the mediating role of teachers' perception of picture books.

Specifically, curriculum objectives can positively and significantly influence teachers' perception of picture books; furthermore, teachers' perception of picture books can play a positive and significant role in helping teachers choose specific narratives in a picture book adaptation. Additionally, one of the results found that teachers' perception of picture books can fully mediate between curriculum objectives and the use of narrative in materials adaptation. Morgado (2019) emphasized the mediation of picture books in helping children aged 5-12 understand social complexity and meaningful intercultural action via carefully selecting the multimodality and topic. Riquelme and Munita (2018) discussed the adult readers' role as mediators of emotional narrative in reading picture books, which is a tool to cultivate children's social and emotional development. The finding occurs in a bilingual curriculum where stories are the teaching materials and storytelling is the teaching approach. Macgilchrist (2018) suggested a highlight of focusing on the content and information loaded in the teaching and learning materials to how to mediate them. Therefore, with the mediation of picture books, specific curriculum objectives can guide teachers in adapting teaching materials for young learners.

This result emphasizes the interrelationship between curriculum objectives and teaching materials via the mediation of picture books. To some extent, teachers' attitudes and understanding of picture books can facilitate the consistency of curriculum objectives and materials. Different from passive reliance on textbooks, teachers tend to actively participate in adapting picture books for young learners instead of being confined to traditional textbooks.

Picture books inherently provide rich and diversified resources from illustration to text, which is increasingly becoming the arena for language teaching. The artistry and flexibility in

visual and textual expressions of picture books present freedom and chances for teachers to add their understanding and values to the materials. Sovič and Hus (2016) emphasized the importance of illustration as a medium to develop children's cognition and found that correcting the illustration is necessary for children's needs. Therefore, focusing on the inter pictoriality and intertextuality of pictures and texts creates more possibilities for imagination and creativity in adapting materials (Cabo et al., 2017).

The narrative theory can guide teachers to follow students' acquisition sequence from macrostructure to microstructure (Bonifacci et al., 2018). The result shows that in materials adaptation for first graders, teachers re-write the stories to align the emotional and detailed narrative with the learning objectives of the bilingual curriculum by using the past tense and past continuous tense.

Teachers' perception of picture books can positively and significantly influence their use of narrative in adapting materials. The more teachers realize the benefits of picture books for developing first graders' bilingual skills, the better they know how to utilize the words, sentence structures, and grammar used in the adapted versions to maintain the storyline, plot, characters, and themes.

Our study explored the potential influencing factors for teachers to make appropriate narrative texts based on picture books for first graders, illuminating the importance of perception of and interaction with picture books for teachers. Furthermore, it highlights the significance of narrative in setting curriculum objectives, achieving teaching objectives, and imparting linguistic and emotional knowledge to students through sharing stories and reading picture books.

Limitations and future research

This study has some limitations. For example, our research is based on a bilingual curriculum in English and Chinese, which includes adapting materials from Chinese into English and vice versa. However, as a cross-sectional study, the survey only reflected teachers' understanding and performance exposure to the specific curriculum guidelines and the picture books (*fish is fish*). Therefore, it should be cautious to generalize our findings to other languages and contexts. Future research in this field could adopt a longitudinal study and further observe how teachers interact with picture books in multiple languages and how this interaction facilitates their perception and sharing with young learners.

In summary, this study underscores the crucial role of picture books in adapting teaching materials and highlights its mediating role in integrating curriculum objectives in macro-scope and narrative expression in micro-scope. As a deeper understanding and application of narrative theory in bilingual contexts, it is evident that there is much more to elucidate the interplay between picture book perception and narrative expression from both teachers' and students' perspectives in bilingual education.

Conclusion

In conclusion, this study delved into the relationship between curriculum objectives and teachers' narrative in materials adaptation and the mediating role of picture books in adapting materials for an English Chinese bilingual storytelling curriculum. Using PLS-SEM analysis, we found that curriculum objectives can fully impact teachers' narrative expression in materials adaptation by mediating their perceptions of picture books. It is worth noting that the mediation of picture books plays a significant role in connecting objectives and outcomes. Without a complete

understanding of picture books, curriculum objectives are just a heap of words in the air; however, perceiving picture books makes these words down to earth.

Declaration of conflicting interest

The authors in this paper acknowledge that there is no conflict of interest.

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