The Development of a Literacy Curriculum Using Activity-Based Learning, Digital Curriculum and Spatial Identity to Enhance Literacy Skills of Elementary Students

Sira Somnam[1,*], Kittipong Wongtip[2] & Saroj Buaphanngam[3]

[1]Faculty of Education, Chiang Mai University, Chiang Mai, Thailand

[2]Faculty of Humanities and Social Sciences, Chiang Mai Rajabhat University, Chiang Mai, Thailand

[3]Faculty of Humanities, Chiang Mai University, Chiang Mai, Thailand

*Correspondence: Faculty of Education, Chiang Mai University, Chiang Mai, Thailand. Tel: 66-089-758-5753. E-mail: sira.s@cmu.ac.th

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Abstract

This study uses a research and development model (R&D) that aims to develop a literacy curriculum using activity-based learning, digital curriculum and spatial identity to enhance literacy skills of elementary students under the office of education, Chiang Mai municipality. The target groups include 235 elementary students, 12 elementary teachers and 34 Thai language teaching pre-service teachers. Data were collected in the academic year 2022-2023. The main tools used include a literacy curriculum, a literacy skills assessment test for participating students, a competency assessment form for designing learning activities of Thai language teaching pre-service teachers, a teaching management competency assessment form for teachers. For the data analysis, mean values, standard deviation, and T-test dependent are used. The research findings reveal that: Firstly, the literacy curriculum is composed of the following elements: 1) principles, 2) objectives, 3) activity organization in five stages including (1) the text comprehension stage, (2) vocabulary expansion stage, (3) profound sentence comprehension stage, (4) specialized reading proficiency stage, and (5) effective written communication stage, and 4) measurement and evaluation. Secondly, the outcomes of the use of the innovative literacy curriculum show that (1) the students exhibited significantly higher literacy skills after than before studying at a statistical significance level of 0.05, (2) the Thai language teaching pre-service teachers demonstrated a high level of competency for designing learning activities, and (3) the teachers showed a high level of learning management competency.

Keywords: literacy curriculum, activity-based learning, digital literacy, spatial identity, elementary students

1. Introduction

Through the National Education Plan 2017-2036, Thailand (Office of the Education Council, Ministry of Education, 2017) has focused on developing students to have basic skills and characteristics of Thai citizens in line with the Equitable Education Fund Act (Equitable Education Fund (EEF), 2018). The objective is to give people the right to receive and have equal access to education. In addition, the country's education policy is reflected through the Education Innovation Area Act (Ministry of Education, 2019). The objective is to invent and develop educational innovations to reduce educational inequality. This goal can be achieved by promoting students' access to education through improved Thai language skills, particularly reading and writing fluency. These skills can be used as tools for communication and learning content, knowledge and skills in other subjects, but from Thailand's PISA exam results showed that average 2022 results were down compared to 2018 in mathematics, reading and science. In all three subjects, average performance was lower in 2022 than in any previous assessment. (OECD,2023).

Sornchai Mungthaisong et al. (2017) and Narawan Poolpipat et al. (2018) studied Thai language teaching arrangements in schools in the northern region of Thailand and found that the Thai language skills of northern students were below the criteria and needed to be developed and promoted. From the above research findings, it reflects that teachers need to design curriculum in the form of learning activities for Thai language communication

skills to solve students' literacy problems. Based on the researcher's experience in teaching and researching Thai language, it was found that teaching Thai language is not yet related to its application in daily life. It is teaching that emphasizes theory and analysis rather than practicing language skills. Teachers lack knowledge and understanding in organizing Thai language learning activities. Teachers organize Thai language learning that focuses on tasks rather than on outcomes, specifically literacy skills. Teachers lack the application of digital technology to create an atmosphere and enhance understanding in learning. This problem may result from teachers not analyzing and designing Thai language learning curricula that are consistent with the learning skills of today's students. Teachers therefore lack a direction for organizing Thai language learning that will help students read and write fluently. In addition, the Thai Language Division, Faculty of Education, Chiang Mai University, sent Thai language teacher interns to practice in the municipal school area, under the Office of Education Chiang Mai Municipality. Which also encountered problems in literacy learning management as mentioned above. Based on research and the researcher's teaching experience, the researcher believes that the activity-based learning approach (Bonwell and Eison,1991) should be used to design literacy skill learning activities, digital curriculum concepts (Oliva and Gordon, 2013) should be applied as techniques for creating and using digitally focused learning materials, and spatial identity concepts (Richard Jenkins,2000) should be incorporated as content to connect with daily life and build pride in students' own identities. The researcher is therefore interested in developing literacy curriculum using activity-based learning, digital curriculum, and spatial identity to enhance the literacy skills of students under the Office of Education Chiang Mai Municipality. This curriculum will help solve problems and promote literacy skills of students, thereby helping to create quality youth who will become strong citizens of the country in the future.

2. Research Objective

1. Develop a literacy curriculum using activity-based learning, digital curriculum and spatial identity to enhance literacy skills of students under the Office of Education, Chiang Mai municipality.

2. Study the outcomes of the use of the literacy curriculum by means of

2.1 Studying the students' literacy skills after implementing the curriculum.

2.2 Studying the competency of Thai language teaching pre-service teachers in designing learning activities after participating in the curriculum development.

2.3 Studying the learning management competency of teachers after implementing the literacy curriculum.

2. Literature Review

In this research, the researcher studied relevant theoretical concepts to establish a research framework according to the main objective of the research, which is to develop a literacy curriculum. This curriculum will emphasize reading and writing learning activities that integrate digital activities and learning materials with local identity content. The theoretical concepts studied and applied as the research framework include Curriculum Development (Tyler, 1975), Literacy Skills (Bureau of Academic Affairs and Educational Standards, 2008), Activity-Based Learning (Bonwell and Eison, 1991), Digital Curriculum (Oliva and Gordon, 2013), and Spatial Identity (Richard Jenkins, 2000).

2.1 Curriculum Development

This research uses Tyler's curriculum development concepts. Tyler's model emphasizes four essential components for effective curriculum development: defining objectives, selecting learning experiences, organizing learning experiences, and evaluating the curriculum and its outcomes (Tyler, 1975). Tyler and team have studied and developed curriculum planning processes, providing guidance and technical assistance, encouraging the actual participation of teachers in program development, and addressing problems of evaluation and assessment (Tyler, 1986; Tyler, 1987). This research therefore adopts Tyler's curriculum development concept as the process for designing and developing a literacy curriculum, encompassing the curriculum principles, learning activities, learning activity management, and learning measurement and evaluation.

2.2 Literacy Skills

The demand for a high level of reading literacy in the current globalized world is constantly growing as people have to work with text information in new and more complicated ways (Stranovska, Gadusova, & Ficzere, 2019). Promoting early literacy activities can be done in many ways, such as to leave off the ends of sentences in predictable stories and let the child finish them, work with the child on the prerequisites to reading and book-related conventions and behaviors (Koenig & Holbrook, 2000). Rahman, Sopandi, Widya and Yugafiati (2019) have studied

and found that the mastery of literacy proficiency of each individual varies. Therefore, literacy is seen as an instrument that can be used to obtain and communicate information. While Abidin (2017) studied and found that the literacy learning model has proven to significantly contribute to the improvement of students' writing skills. The improvements observed across all participating schools suggest that this model effectively supports students across different ability levels.

2.3 Activity-Based Learning

Activity theory offers a framework for analyzing learning processes and outcomes. This framework acknowledges the complex interactions between learners, their context, and the supporting community (Jonassen, 2002). The situative perspective on learning in activity is facing new challenges and possibilities that require continuous development of the theoretical and methodological repertoire of the researchers (Greeno & Engeström, 2006). Activity-based Learning is the technique of learning utilizing performing tasks or activities that stimulates students to participate in their learning experience through practical activities such as independent investigation and problem-solving (Santhi & Malathi, 2024). In Activity-based learning, teachers develop learner self-regulation and self-facilitation by stating expectations that promote learner responsibility while integrating instructional strategies to foster activity-based learning through a new paradigm of thinking based on awareness, evaluation and implementation (Pang, 2010). Al Shloul, Mazhar, Iqbal, Yaseen Ghadi, Malik, and Hamam (2024) have researched and found that activity-based learning proves to be a student-centered approach that enhances learning outcomes by fostering active participation and practical engagement. Harfield, Davies, Hede, Panko and Kenley (2007) have researched and found that the link between the activities-based teaching and student learning was evident in a marked improvement in grades in relation to those from the previous class.

2.4 Digital Curriculum

Digital curriculum resources provide a range of possibilities for organizing content and engaging learners in new and innovative ways. They also present new challenges to teachers. Many of the presentations and discussions at the conference focused on digital curriculum designs for students (Remillard, 2016). Teachers' expectations of where authority for teaching and learning in the classroom would reside presented them with a mix of challenges, anticipated, and unanticipated. They expected at first that the digital curriculum would "teach" the students, and discovered soon after implementation began that this was not the case (Puttick, Drayton & Karp, 2015). Choppin and Borys (2017) specify that there are four perspectives on digital curriculum, including: 1) designer perspective; 2) policy perspective; 3) private sector perspective (e.g., publishers and philanthropists); and 4) user (teachers and schools) perspective. Al-Awidi and Aldhafeeri (2017) have researched and found that teachers are moderately ready for implementation of the digital curriculum in both components of readiness (technical and pedagogical). Teachers identified some factors that hinder their readiness. These factors are related to time constraints, knowledge and skills, infrastructure, and technical support.

2.5 Spatial Identity

Spatial identity is based on the concept of place. According to Speller, Lyons and Twigger-Ross (2002), place is an integral part of identity and plays an important role in maintaining and/or enhancing the principles of distinctiveness and continuity, place is also an important link to identity as it organizes past experiences of individuals over time and their subjective interpretations. Similarly, Choudhary Bikramaditya Kumar (2014) stated that spatial identity is unique, characterized by development, growth, creativity, and reflection of ideology. At present, spatial identities have been created and reformed to be more consistent with the world in the era of globalization. Furthermore, Kadir, Aris and Ginting (2022) state that spatial identity as a whole is the result of people-place interaction constructed by the physical and psychological elements that embody a space. Collectively, spatial identity looks at how significant the space means to an individual or groups by having them experience the space in situ. In addition, Cheshmehzangi (2014) said that spatial syntagma offers significant value to the development of spatial and environment-behavior research studies in the context of human geography, planning, and social environment. Meanwhile, Sira Somnam (2020) applied the concept of spatial identity in organizing learning activities for research, which has created a textbook to enhance reading and writing skills in Thai that emphasizes spatial identity for ethnic groups students. The textbook includes vocabulary and stories from their local identity, which allows them to practice good Thai communication skills and creates pride in one's own identity. From the documents and related research mentioned above, the researcher has incorporated local identity content from Chiang Mai province, Thailand, as the content in designing reading and writing learning activities. This approach aims to instill pride in students about their local identity while simultaneously improving their Thai language reading and writing skills.

3. Method

3.1 Research Design

This study used a research and development (R&D) methodology. The population includes 1) Elementary students in grades 1-6 under Chiang Mai Municipality School 2) Thai language teachers in the elementary level under the Chiang Mai Municipal School. 3) Thai language teaching pre-service teachers, faculty of education Chiang Mai University. Sample group includes 1) 235 elementary students in grades 1-6, under Chiang Mai Municipality School 2) 12 Thai language teachers in the elementary level under the Chiang Mai Municipal School, classified as elementary school teachers 1-6, 2 people per grade level 3) 34 Thai language teaching pre-service teachers, faculty of education Chiang Mai University**.** For selecting the sample group, the researcher gave teachers of each school freedom to apply to participate in activities and to select the grade level of students who should be included in the development program, 1 grade level per school, and Thai language teaching pre-service teachers also applied to participate in activities. Research variables include: 1) the independent variable is the literacy curriculum 2) the dependent variable is the student's literacy skills, competency in designing learning activities of Thai language teaching pre-service teachers, and teaching management competency of teachers. Research tools include: 1) A questionnaire and interview questions on essential needs and guidelines for developing a literacy curriculum for Thai language teaching pre-service teachers, teachers, and educational supervisors 2) A literacy curriculum 3) A literacy skills assessment test for elementary students 4) A competency assessment form for designing learning activities of Thai language teaching pre-service teachers 5) A teaching management competency assessment form for teachers**.** This research collected data from July 2022-December 2023. The methods are classified according to the research and development (R&D) methodology as follows.

3.2 Step 1 Research (R1): Needs Analysis

The first stage of research is to survey the needs and guidelines for developing a literacy curriculum for Thai language teaching pre-service teachers, teachers, and educational supervisors. Research tools include: a questionnaire and interview questions on essential needs and guidelines for developing a literacy curriculum for Thai language teaching pre-service teachers, teachers, and educational supervisors. For the data analysis, mean values, standard deviation, and content analysis are used.

3.3 Step 2 Development (D1): Curriculum Design

The second stage of research is curriculum design based on the findings from the first step. In this stage, researchers, Thai language teaching pre-service teachers, and regular teachers jointly designed the curriculum and learning activities. Then, Thai language teaching pre-service teachers took the curriculum and tested it in 6 schools that had a similar context to the research target schools, 1 grade level per in 1 school, with different grade levels. Then it was revised and developed into a complete curriculum. Research tools included a curriculum quality assessment form. For the data analysis, mean values, and standard deviation are used.

3.4 Step 3 Research (R2): Curriculum Implementation

The third step of research is the implementation of the curriculum. This step started from training on using the curriculum for regular teachers. The regular teachers adjusted the content and methods to be in line with the student context. Teachers then used the curriculum to organize learning with students. Research tools included a literacy skills assessment test for elementary students, a competency assessment form for designing learning activities of Thai language teaching pre-service teachers, and a teaching competency assessment form for teachers. For the data analysis, mean values, standard deviation, and T-test dependent are used.

3.5 Step 4 Development (D2): Evaluating and Improving the Curriculum

The final step of research was to inquire about the satisfaction of students, teachers, and Thai language teaching pre-service teachers, and to conduct discussions to reflect on the results of using the curriculum. Research tools included a questionnaire on satisfaction in participating in activities and group discussion questions. For the data analysis, mean values, standard deviation, and content analysis are used.

3.6 Ethical Consideration

This research was conducted in accordance with ethical principles for human research. It began with inviting participants by allowing Thai language teachers from each school to apply voluntarily and select one grade level of students per school for development, 1 grade level per school. All participants and their parents were informed about the research process and provided written consent to participate in this study. Emphasis was placed on practical learning activities rather than academic ones. There was no forcing or causing frustration in participating in the

activity. In addition, the researcher explained and asked permission from students and regular teachers to record pictures of participating in activities and asked for permission to use the images for public relations and educational purposes only.

4. Results

4.1 Results of the Needs and Guidelines for Developing a Literacy Curriculum of Thai Language Teaching Pre-Service Teachers, Teachers, and Educational Supervisor: Research (R1)

Table 1. Needs of Thai Language Teaching Pre-Service Teachers, Teachers, and Educational Supervisor for Developing a Literacy Curriculum

	Items	$\bar{X}$	S.D	Degree
1	The importance of learning about literacy skills	4.60	0.42	highest
2	Teaching curriculum	4.68	0.34	highest
3	Teaching and learning activities	4.63	0.41	high
4	Media and learning resources	4.47	0.34	high
5	Student promotion	4.84	0.37	highest
6	Measurement and evaluation	4.92	0.19	highest
Total		**4.69**	**0.35**	**highest**

The analysis revealed that Thai language pre-service teachers, in-service teachers, and educational supervisors reported very high overall needs, with a mean of 4.69 and a standard deviation of 0.35. Classified into each aspect, it was found that measurement and evaluation, student promotion, and teaching curriculum had the highest level of essential needs with means of 4.92, 4.84, and 4.68, respectively

4.2 Interview Data for Curriculum Development Guidelines

Thai language teaching pre-service teachers, teachers, and educational supervisors want the development of the literacy curriculum to be promoted in the following areas: 1) Characteristics of the literacy curriculum according to the context of the students 2) Learning activities in the literacy curriculum are interesting and focused on practice measure and evaluate according to purpose 3) Media and learning resources for the literacy curriculum are diverse, modern, and relevant to real life. Focus on learning resources in the community 4) Characteristics of students following the curriculum are able to read and write, enthusiastic, courageous in thinking and expressing themselves through communication in Thai. 5) Teacher characteristics according to the literacy curriculum must be a person who can search for new techniques for teaching reading and writing. Design and organize learning that is consistent with the context of learners in the digital age. 6) Activities to measure and evaluate the literacy curriculum must be an authentic assessment. Emphasis on practice in communicating in Thai language.

4.3 Results of the Literacy Curriculum Design: Development (D1)

This research produced a prototype curriculum to promote reading and writing skills, totaling 6 courses, classified into grades 1-6, 1 course per grade level. The overall quality of the curriculum was at a high level, with an average value of 4.45, standard deviation 0.52. The content of the curriculum is classified into 1 learning unit per grade level. It consists of 5 learning plans, 2 hours each, for a total of 10 hours, through the 5-step "Literacy curriculum through Chiang Mai story" model. The curriculum model consists of 1) Curriculum principles: literacy curriculum to enhance skills of students, using activity-based learning, a digital curriculum and spatial identity 2) Curriculum objectives: 1. promote literacy skills for students under Chiang Mai municipal school. 2. study guidelines for designing and developing a curriculum to promote literacy skills focusing on spatial Identity content combined with digital technology. 3) Learning management process: 1. Text comprehension stage 2. Vocabulary expansion stage 3. Profound sentence comprehension stage 4. Specialized reading proficiency stage 5. Effective written communication stage

Learning units and learning plan schedules consists of: 1) Elementary 1: Let's travel to Chiang Mai includes: 1. Around Chiang Mai City 2. Pay homage to the Buddha pagoda 3. Visit a traditional market in Chiang Mai 4. Visit the Chiang Mai City Gate 5. Visit the Chiang Mai Zoo 2) Elementary 2: Clothing and accessories includes: 1. Names of clothing around us 2. Help me find clothes 3. Hurry and get dressed 4. Family stories 5. Dress up for school 3)

Elementary 3: Chiang Mai traditions includes: 1. Worship the city pillar 2. Loy Kratong Festival 3. Giving alms to monks at midnight 4. Northern New Year 5. Walking up the mountain on Buddha Day 4) Elementary 4: A variety of food in Chiang Mai includes: 1. Various northern foods 2. How to cook northern food 3. Traditional cooking methods of the northern people 4. Northern desserts 5. Sharing northern food recipes 5) Elementary 5: Different races, I'm your friend includes: 1. Ethnic stories 2. Understanding cultural differences 3. Drawing an ethnic mind map 4. Learning my native language 5. Wisdom creates happiness 6) Elementary 6: The Charm of Chiang Mai includes: 1. Looking at the careers of northern people 2. Let's play folk games 3. Let's listen to the stories of the northern people 4. Let's listen to the beliefs of the northern people 5. Coming taste northern herbs

4.4 Results of Literacy Curriculum Implementation: Research (R2)

4.4.1 Results of the Study of Students' Literacy Skills after Learning According to the Literacy Curriculum

Table 2. Literacy Skills of Students Before and After Learning (full score=115)

Grade level	Before learning		After learning		t-value	p-value
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
Grade 1	48.35	9.40	92.02	8.81	36.01*	0.00
Grade 2	39.83	22.51	63.25	30.13	7.89*	0.00
Grade 3	63.48	21.58	77.00	20.26	12.55*	0.00
Grade 4	64.19	21.51	84.52	18.70	7.62*	0.00
Grade 5	52.85	22.75	84.78	24.69	8.94*	0.00
Grade 6	55.48	6.98	93.80	8.20	30.20*	0.00

Note.* $p<0.05$

From the table, it is found that after learning in elementary school students have higher skills in reading and writing Thai than before participating in the program at a statistical significance of 0.05 at every level. Classified by area, it was found that Grade 1, Grade 6, and Grade 5 had the highest literacy skills after learning, with t values of 36.01, 30.20, and 8.94, respectively.

4.3.2 Results of Learning Activity Design Competencies of Thai Language Teaching Pre-Service Teachers after Participating in Curriculum Development

Table 3. Competencies in Designing Learning Activities of Thai Language Teaching Pre-Service Teachers

	Items	$\bar{X}$	S.D	Degree
1	Curriculum analysis competency	4.65	0.65	highest
2	Learning unit design competency	4.65	0.65	highest
3	Competency in designing learning management plans	4.24	0.48	high
4	Competency in designing learning activities	4.47	0.58	high
5	Learning media design competency	4.20	0.44	high
6	Competency in designing measurement and evaluation of learning outcomes	4.20	0.42	high
	Total	**4.40**	0.42	high

From the table, it was found that the overall competency in designing learning activities was at a high level, with a mean of 4.40 and a standard deviation of 0.54. Classified into each aspect, it was found that curriculum analysis competency and learning unit design competency have the same highest level of performance followed by competency in designing learning activities. with means of 4.65, 4.65, and 4.47, respectively.

4.3.3 Results of Teachers' Learning Management Competencies

Table 4. Teachers' Learning Management Competencies

	Items	$\bar{X}$	S.D	Degree
1	Preparation for learning management	4.44	0.65	high
2	Application of the learning management plan	3.61	0.77	high
3	Learning management	4.39	0.73	high
4	Transferring knowledge content	4.42	0.60	high
5	Techniques for promoting reading and writing skills	3.83	0.51	high
6	Using media and applications for learning management	3.72	0.78	high
7	Literacy encouragement for students	4.11	0.57	high
8	Providing literacy feedback for learners	3.97	0.65	high
9	Classroom management	4.06	0.71	high
10	Creating a learning environment	4.25	0.73	high
	Total	**4.08**	**0.67**	**high**

From the table, it was found that teachers' learning management competencies were overall at a high level with mean of 4.08 and a standard deviation of 0.67. Classified into each aspect, it was found that competency in preparation for learning management, transferring knowledge content and learning management have the highest level of performance with means of 4.44, 4.42, and 4.39, respectively.

4.4 Results of evaluating and improving the curriculum: Development (D2)

4.4.1 Results of students' satisfaction towards participation in the curriculum

Table 5. Students' Satisfaction Towards Participation in the Curriculum

	Items	$\bar{X}$	S.D	Degree
1	The teacher teaches easily, fun and not boring	4.75	0.44	highest
2	Teachers provide opportunities and encourage reading and writing according to learning activities	4.77	0.42	highest
3	Learning activities are diverse and interesting	4.78	0.41	highest
4	Learning activities help practice reading and writing skills	4.78	0.43	highest
5	Learning activities help build pride in local Lanna identity	4.78	0.41	highest
6	Interesting learning media helps you understand the content well	4.77	0.42	highest
7	Learning media helps practice reading and writing skills well	4.77	0.43	highest
8	There is an opportunity to evaluate one's own and friends' work	4.17	0.38	high
9	Scoring is given according to criteria it's not too difficult or easy	4.19	0.39	high
10	I read and write better and am happy to learn in this class	4.78	0.42	highest
	Total	**4.65**	**0.41**	highest

From the table, it was found that students' satisfaction towards participation in the curriculum was overall at the highest level with mean of 4.65 and a standard deviation of 0.41. Classified into each aspect, it was found that learning activities are diverse and interesting, learning activities help practice reading and writing skills, learning activities help build pride in local Lanna identity have the highest level of performance all with an equal mean of 4.78.

4.4.2 Results of Thai Language Teaching Pre-Service Teachers' Satisfaction Towards Participation in the Curriculum

Table 6. Thai Language Teaching Pre-Service Teachers' Satisfaction Towards Participation in the Curriculum

	Items	$\bar{X}$	S.D	Degree
1	The concepts and origins of the curriculum can actually be used to design learning activities to promote students' literacy skills	4.62	0.70	highest
2	The course gives students the opportunity to analyze the context of students and target educational institutions	4.50	0.75	highest
3	Students reviewed principles for designing learning activities from course instructors	4.56	0.70	highest
4	Students practiced sub-skills in designing learning activities to promote reading and writing skills	4.21	0.69	high
5	Students have the opportunity to express their opinions and participate in designing learning activities to promote reading and writing skills of the target group of students	4.26	0.62	high
6	The process of designing learning activities helps enhance the competencies of teachers as activity designers	4.62	0.70	highest
7	The process of designing learning activities promotes the application of theoretical knowledge to practice in real situations	4.56	0.70	highest
8	Learning media creation activities help develop skills in designing and applying learning media that are consistent with real contexts and situations	4.50	0.79	highest
9	Designing measurement and evaluation activities helps promote measurement and evaluation skills according to actual conditions	4.06	0.42	high
10	Students are happy to design learning activities according to this curriculum	4.85	0.36	highest
	Total	**4.47**	**0.64**	**high**

From the table, it was found that Thai language teaching pre-service teachers' satisfaction towards participation in the curriculum were overall at a high level with mean of 4.47 and a standard deviation of 0.64. Classified into each aspect, it was found that, students are happy to design learning activities according to this curriculum, the concepts and origins of the curriculum can actually be used to design learning activities to promote students' literacy skills, the process of designing learning activities helps enhance the competencies of teachers as activity designers, have the highest level of performance with means of 4.85, 4.62, and 4.62, respectively.

4.4.3 Results of Teachers' Satisfaction Towards Participation in the Curriculum

Table 7. Teachers' Satisfaction Towards Participation in The Curriculum

	Items	$\bar{X}$	S.D	Degree
1	The concepts and origins of the curriculum can actually be used to design learning activities to promote students' literacy skills	4.67	0.49	highest
2	The curriculum provides opportunities for teachers to analyse the principles and processes of organizing learning according to the curriculum	4.50	0.80	highest
3	The curriculum provides teachers with guidelines for organizing learning to promote pride in Lanna identity and local wisdom	4.83	0.39	highest
4	The curriculum gives teachers the opportunity to adjust vocabulary and content that are consistent with the knowledge of the students	4.50	0.80	highest
5	The curriculum gives teachers the opportunity to design learning activities that are relevant to the learners' context	4.75	0.45	highest
6	The process of designing additional learning activities helps promote professional teacher competency	4.08	0.51	high

Table 7. Teachers' Satisfaction Towards Participation in The Curriculum (continued)

	Items	$\overline{X}$	S.D	Degree
7	The curriculum is easy to apply in the context of real situations	3.92	0.67	high
8	Using learning media according to the curriculum helps develop skills in analyzing and applying learning media that is consistent with the learners' context	4.00	0.60	high
9	Organizing learning activities helps promote measurement and evaluation skills according to actual conditions	3.08	0.67	high
10	Teachers are confident and happy to organize learning activities according to this curriculum	4.83	0.60	highest
	Total	**4.42**	**0.60**	**high**

From the table, it was found that teachers' satisfaction towards participation in the curriculum were overall at a high level with mean of 4.42 and a standard deviation of 0.60. Classified into each aspect, it was found that competency in the curriculum provides teachers with guidelines for organizing learning to promote pride in Lanna identity and local wisdom, teachers are confident and happy to organize learning activities according to this curriculum, the curriculum gives teachers the opportunity to design learning activities that are relevant to the learners' context have the highest level of performance with means of 4.83, 4.83, and 4.75, respectively.

5. Discussion

5.1 Results of the Development of Literacy Curriculum

The researcher developed the curriculum according to the research and development process with using Tyler's curriculum development concepts (Tyler, 1975). Therefore, the quality of the curriculum is at a high level. Based on Tyler's curriculum development process, the researcher has designed a curriculum according to the following steps. The first step is to study the needs and requirements for developing curriculum by asking and interviewing students, teachers, and study supervisors. This is in line with what Kulisara Vijitchayavanich (2022) stated, that the basic information studied will be used as important information in curriculum development. The second step is designing the curriculum and the quality of the curriculum is assessed by experts. This is in line with Sittiphon Aj-in (2021) who said, that after drafting the curriculum, the curriculum must be evaluated before the curriculum is put into trial. The third step is teachers' use of curriculum innovation. There are researchers, experts, and educational supervisors joining in to supervise and give suggestions, as Kulisara Vijitchayavanich (2022) said, implementing the curriculum is putting the curriculum into practice to develop learners to have characteristics according to the curriculum objectives. Step 4 is improving the quality of the curriculum. The researcher asked students and teachers about the satisfaction of participating in activities and organized group discussion activities for evaluation and reflection for improving the curriculum. This is consistent with Wareerat Kaewurai (2021) who said, that curriculum evaluation is an examination of the results of using the curriculum. This will help to gain information on whether the curriculum can bring about changes in student behaviour according to the curriculum goals or how the curriculum should be revised. In this step, in the part of organizing a reflection discussion. The researcher has presented an online exhibition. Virtual exhibition format (Metaverse) to present media and learning activities according to the curriculum of regular teachers from 11 municipal schools. Such activities create a network of academic cooperation. As well as obtaining guidelines for planning to expand academic cooperation in learning management to promote reading and writing skills together further.

5.2 Results of Using Innovative Literacy Curriculum

The results of students' reading and writing skills revealed that after learning according to the literacy curriculum, students have higher reading and writing skills than before learning at a statistical significance of .05, which is a result of the learning management process according to five stages of curriculum, including the text comprehension stage, vocabulary expansion stage, profound sentence comprehension stage, specialized reading proficiency stage, and effective written communication stage. This is a teaching process that has been systematically designed by using the concept of activity-based learning, digital-based learning, and the concept of spatial identity to design learning activities that focus on having students participate in learning activities and provide opportunities for students to practice and learn on their own. According to research results, on using activity-based learning, as shown by Al Shloul, Mazhar, Iqbal, Yaseen Ghadi, Malik, and Hamam (2024) found that activity-based learning proves to be a

student-centered approach that enhances learning outcomes by fostering active participation and practical engagement. In addition, the literacy curriculum also emphasizes learning media created from various digital platforms according to the concept of digital curriculum learning management, such as online Thai language games. Reading and writing applications which stimulates learning as Remillard (2016) said, digital curriculum resources provide a range of possibilities for organizing content and engaging learners in new and innovative ways as for the reading script used in organizing learning. The researcher has applied the concept of spatial identity to design the curriculum, corresponds to Choudhary Bikramaditya Kumar (2014) stated, that spatial identity is unique, full of creativity and reflection of ideology at present, spatial identities have been created and reformed to be more consistent with the world in the era of globalization, through the design of learning units "Chiang Mai Stories" for students in grades 1-6 include: Come visit Chiang Mai, Northern clothing, Chiang Mai traditions, Various northern foods, various ethnicities and the way of life of Lanna people, respectively. This learning unit uses the spatial identity of Chiang Mai province and the Lanna ethnic group as content in learning activities. This makes it easier for students to understand and develop pride in their own local identity through communication, reading and writing Thai.

The learning activity design competency of Thai language teaching pre-service teachers after participating in curriculum development is at a high level. Especially the competency in designing learning units, at the highest level, this may be because the researcher uses Tyler's curriculum development concepts (Tyler, 1975), allowed the students to analyze the curriculum. Then they had students design learning units and learning plans accordingly. The researcher provided suggestions at every step. Therefore, the learning unit design competency is at the highest level.

Teachers' learning management competency after using the literacy curriculum is at a high level, especially in preparing for learning management. Transferring knowledge content as well as preparing learning management plans and creating a learning environment in reading and writing for students. This is because the researcher uses Tyler's curriculum development concepts (Tyler, 1975), which gives teachers the opportunity to participate in the design and application of the curriculum according to the context of the learners.

6. Conclusions

In conclusion, the literacy curriculum is composed of principles, objectives, activity organization in five stages including the text comprehension stage, vocabulary expansion stage, profound sentence comprehension stage, specialized reading proficiency stage, and effective written communication stage, and measurement and evaluation, totaling 6 courses, classified into grades 1-6, 1 course per grade level. The overall quality of the curriculum was at a high level, with an average value of 4.45 and standard deviation 0.52. Applying the concepts of activity-based learning, digital curriculum, and spatial identity in designing the literacy curriculum can promote competencies in designing learning activities for Thai language teaching pre-service teachers and promote learning management competency of regular teachers. The important thing is to help solve problems, and promote and develop literacy skills for elementary school students to improve their reading and writing fluency. This will help learners have good language skills. They are able to use the Thai language as a tool for communication and living happily in society.

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Appendix A

Curriculum Model to promote literacy skills

This research produced a prototype curriculum to promote reading and writing skills, totaling 6 courses, classified into grades 1-6, with 1 course per grade level, through the 5-step "Literacy curriculum through Chiang Mai story" model, as shown in the curriculum model figure follows:

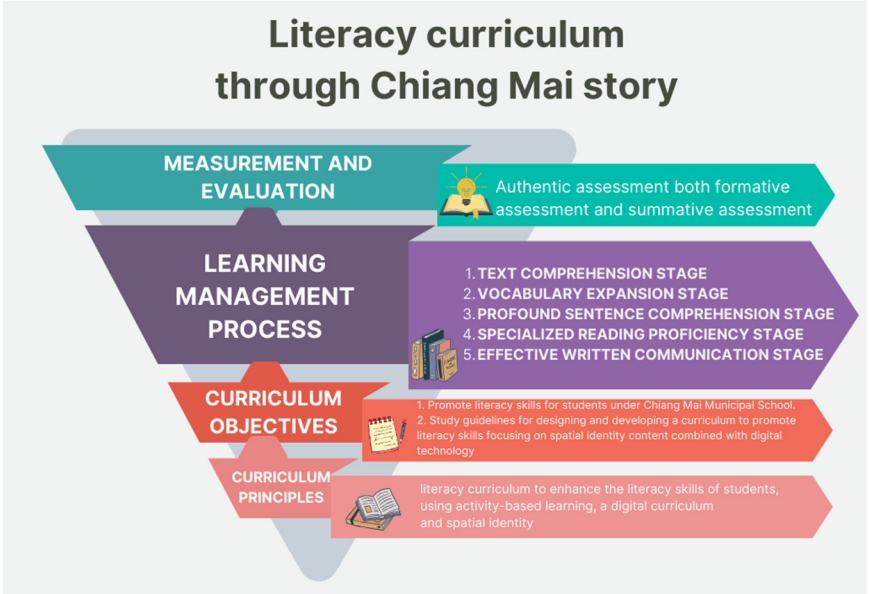

Figure 1. Curriculum Model to Promote Literacy Skills

Appendix B

Learning units and learning plans schedule of curriculum model

Table B: Learning Units and Learning Plans Schedule

Grade Level	Learning Unit	Learning Activity Plan
Elementary 1	Let's travel to Chiang Mai	1. Around Chiang Mai City
		2. Pay homage to the Buddha pagoda
		3. Visit a traditional market in Chiang Mai
		4. Visit the Chiang Mai City Gate
		5. Visit the Chiang Mai Zoo
Elementary 2	Clothing and accessories	1. Names of clothing around us
		2. Help me find clothes
		3. Hurry and get dressed
		4. Family stories
		5. Dress up for school
Elementary 3	Chiang Mai traditions	1. Worship the city pillar
		2. Loy Kratong Festival
		3. Giving alms to monks at midnight
		4. Northern New Year
		5. Walking up the mountain on Buddha Day
Elementary 4	A variety of food in Chiang Mai	1. Various northern foods in Chiang Mai
		2. How to cook northern food
		3. Traditional cooking methods of the northern people
		4. Northern desserts
		5. Sharing northern food recipes
Elementary 5	Different races, I'm your friend	1. Ethnic stories
		I'm your friend
		2. Understanding cultural differences
		3. Drawing an ethnic mind map
		4. Learning my native language
		5. Wisdom creates happiness
Elementary 6	The Charm of Chiang Mai	1. Looking at the careers of northern people
		2. Let's play folk games
		3. Let's listen to the stories of the northern people
		4. Let's listen to the beliefs of the northern people
		5. Coming taste northern herbs

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Authors contributions

Asst. Prof. Dr. Sira Somnam is the head of the research project. All authors were responsible for study design and data collection. Asst. Prof. Dr. Sira Somnam drafted the manuscript, and all authors revised and approved the final manuscript.

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