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Development of the Multiple Intelligences Promotion Model for Thai Learners

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Abstract: Recently, Thailand's educational policy focused on developing learners' potential according to multiple intelligences. The research objectives were to develop the multiple intelligences (MI) promotion model and an MI screening test for Thai learners and propose policies to encourage MI so that learners can reach their full potential. The sequential mixed method was applied. First, the model and the MI screening test were developed. The participants were two groups of key informants, comprising 93 and 185 participants, respectively. The sample group consisted of 460 primary and secondary school students selected through multistage random sampling. The MI screening test consisted of characteristics of 45 behavioral observations. The result showed that the developing model was the "A2D model or AAD." This model consisted of three components: nine areas of intelligence, eight continuity mechanisms, and two success conditions. The MI screening result revealed that most learners had outstanding bodily–kinesthetic intelligence, accounting for 40.4%. The least prominent aspect was musical intelligence, representing 16.2%. The proposal policies comprised (a) The aspect of foundation for learning management with access to the A2D model, consisting of four sub-policy proposals, and (b) The aspect of encouraging learners to develop their full potential, consisting of six sub-policy proposals.

Keywords: *Learner, model, multiple intelligences, screening test, Thai education.*

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Introduction

Education management in the 21st century aims to develop Thai people to be highly skilled in learning. Learning management must be aware of the learners' different preferences, aptitudes, and intelligence to develop learners to their full potential. Learning is a sociological and psychological process once the learners understand their various intellectual balances. In 2015, the Thai Ministry of Education pursued a policy of "reducing study time, increasing learning time," in which multiple intelligences theory was a part of the learning theory. It was integrated into the Fundamental Education Core Curriculum of 2008. In the first phase, various activities were organized to develop learners' skills. These activities involved not only the development of the theory of multiple intelligences but also (a) the concept of sufficiency economy, which focuses on activities related to lifestyle, (b) mental intelligence in educational institutions using the wisdom path, which focuses primarily on a self-learning, (c) left and right hemisphere development, (d) the development of essential life skills in the 21st. Century, and (e) learning activities in clubs, such as mathematics, sports, music, and art, where learners can attend different clubs according to their interests, and service activities in which all learners must participate. Thus, learners take the initiative to manage their learning and appreciate their strengths. Additionally, Gardner (Gardner, 2011) suggested that each person has at least nine areas of intelligence, but they vary in different levels. Teachers must help learners connect intelligence with learning success and help them learn what they want to learn. In other words, Gardner argued that teachers must find ways to design instruction appropriate for learners and encourage learners to develop their weak intelligence by using strong intelligence to increase attitudes toward learning and learning achievement (Gardner & Hatch, 1989). Therefore, teachers could learn which type of intelligence a learner

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possessed by administering tests and designing classroom activities for multiple intelligences that were tailored to each learner's strengths (Meleen, 2019). The teacher's role is to help learners connect the material studied with components of multiple intelligences. After learners are exposed to memory strategies from all intelligence, they can select the strategies that work best for them and use them independently during their learning periods (Armstrong, 2000). In addition, Mbuva (2003) proposed a new way of teaching and learning MI in the classroom. Teachers should consider pedagogy, curriculum design and development, teaching and learning strategies, lesson plans that promote school-based learning, adequate evaluation and evaluation strategies, and the holistic approach to education. Students should also be able to apply their learning in the classroom to improve their overall intelligence and learning (Yavich & Rotnitsky, 2020). Özdemir et al. (2006) suggested that multiple intelligences can help teachers figure out how to structure teaching and learning experiences for students.

Many researchers have found that multiple intelligences can help teachers and learners successfully program in their classes. However, the theory stresses that there is no particular set of teaching and learning for all learners. The dominant intelligence strongly influences successful measurement in the educational system. Students can apply in-class learning based on their dominant intelligence and learning style with dominance intelligence that enhance the student's learning process (Yavich & Rotnitsky, 2020). Dechagupt (2007) developed a learning experience model to develop multiple intelligences in elementary students. It focuses on providing opportunities for learners to practice self-learning activities in five steps, from living self-learning to learning with others through small group activities, analyzing learning activities, summarizing and building knowledge by themselves, and applying what they learn in meaningful applications. Moreover, multiple intelligences are expressed among learners according to their cultural background and social and cultural environment that combine in real life and daily action (Wilson, 2018). Additionally, to successfully educate all learners, the teacher must be aware of individual learning styles and multiple intelligence profiles that vary in strength. Many researchers stress learners and empower them to recognize their intelligence (Armstrong, 2000; Özdemir et al., 2006; Yavich & Rotnitsky, 2020). There is a need to consider designing teaching and learning processes to improve learning performance within the learner's appropriate capacity. Much of the research has focused on enhancing learner capacity using the theory of multiple intelligences. However, some studies create a model to enhance the learning style of all learners. For this reason, the researchers believe that the multiple intelligences model for Thai learners should be further developed to meet the current situation in Thai education. Because of this, researchers were interested in exploring the model of promoting multiple intelligences to develop the potential of learners adapted to Thailand.

Aims to Study

1. To develop multiple intelligence promotion models for Thai learners
2. To develop multiple intelligence screening tests for Thai learners
3. To propose policies for promoting multiple intelligences to develop the learners to their full potential

Scope of Research

This research only covered educational institutions at the basic education level under the Office of the Basic Education Commission (OBEC). The study period was six months, from January to July 2021. The theory used in the research was the MI theory developed by Gardner (Gardner, 2011), which consists of 9 intelligence areas: (a) Linguistic intelligence, (b) Logical and mathematical intelligence, (c) Spatial intelligence, (d) Bodily-kinesthetic intelligence, (e) Musical intelligence, (f) Interpersonal intelligence, (g) Intrapersonal intelligence (h) Naturalistic Intelligence, and (9) Existential intelligence.

Conceptual Framework for Research

Approaches to developing multiple intelligences to unleash the potential of learners were developed through a learning management process that responds to 9 areas of intelligence through learning processes inside and outside the classroom. It was applied with Biggs' 3-P model of the learning process (Biggs, 1989) with a learning model on the website that encourages learners to learn cooperatively, or a model to implement ICT in the classroom and a learning management model that promotes learners' multiple intellectual potentials. This model integrates indoor and outdoor activities according to teachers' learning processes and teaching strategies consistent with the dimensions of all nine multiple intelligences. The mechanism that drives the system is a consultation to increase teachers' effectiveness in designing teaching strategies and learning activities. This mechanism includes building collaboration at the executive, teacher, and community levels, as shown in the research framework in Figure 1.

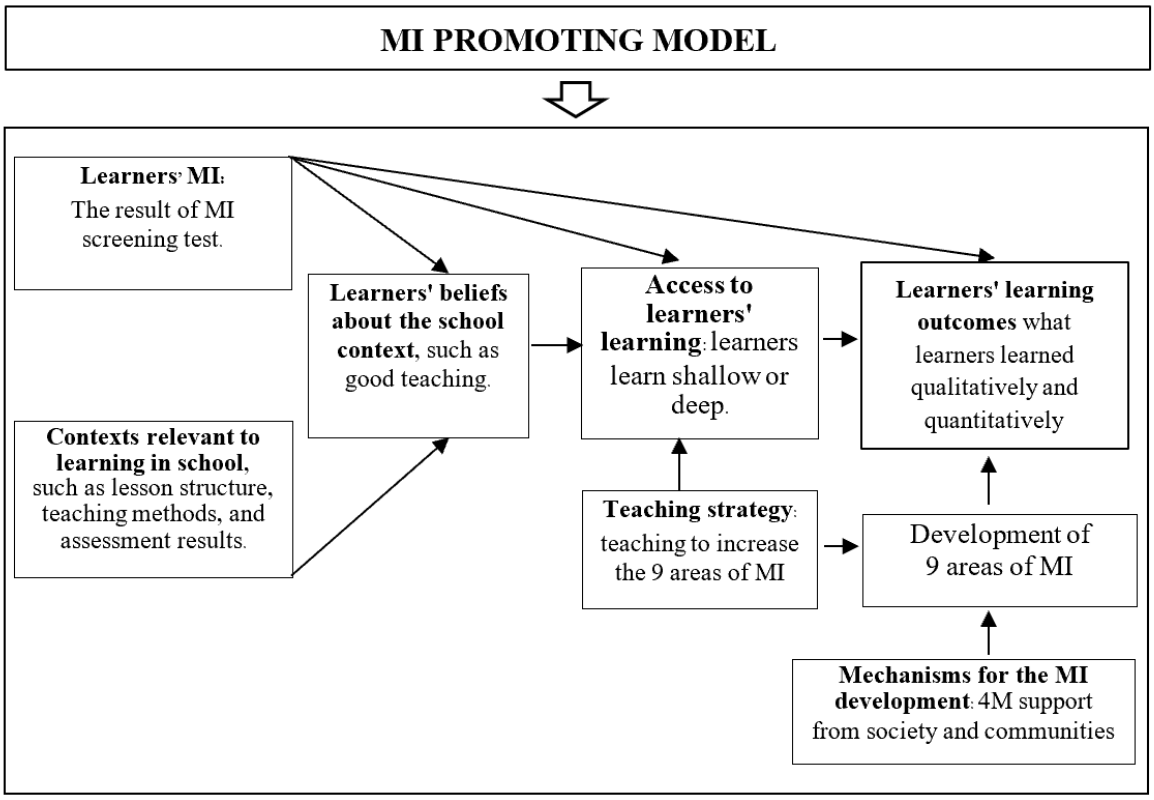

Figure 1. Conceptual Framework for Research

Methodology

This research used the sequential mixed method, consisting of 2 research phases: The first phase was a qualitative study followed by a quantitative study to synthesize the MIS test and the MI model to investigate the MI of primary and secondary school students. The second phase was a qualitative study to develop the MI model and formulate policy proposals to promote MI to develop the potential of learners in Thailand.

The first phase comprises two stages: (a) the MIS test and model were synthesized by document review, (b) the exploration of MI of primary and secondary school students. The population was elementary and secondary students, teachers, and parents in five regions: Northern, Eastern, Western, Central, and Southern Thailand. Multistage random sampling was used to select the sample group. First, a simple random technique was used to select six regional provinces. In the next stage, the same technique was used to select one school from each province and 20 students from each school, including their teachers and parents. However, two schools and 40 students with their teachers and parents were randomly selected in Bangkok. The total number of primary and secondary students samples was 640, and the researchers could access 460 sample data (71.88%).

The second stage comprised two stages and two groups; key informants cooperated in each stage: (a) those involved in educational management operations; that worked in educational institutions in the academic year 2020 to participate in focus group meetings to provide information, critique, and improve (draft 1) MI promotion model and policy proposals. The eligibility criteria consisted of one qualified expert in education and psychology, 21 school administrators, 22 teachers, 20 parents, and 29 primary and secondary school students, totaling 93 people. In addition, (b) those involved in implementing education management at the policy and practice levels were to attend the meeting to criticize and improve (Draft 2) the MI promotion model and policy proposals. Three education experts, 108 teachers and educational personnel from the office of primary education, 28 people from the office of secondary education, 45 people from educational institutions, and one person from the office of education policy and planning in Bangkok participated, totaling 185 people. The researchers conducted the meeting at this stage and revised all drafts of the MI promotion model and policy proposals.

Research Instrument

The research instrument was the MIS test, compiled by reviewing documents and searching the relevant literature in national and international electronic databases for the last 15 years (published between 2007 and 2021). The three qualified experts examined the item-target congruence index of the MIS test; it ranged from 0.67 - 1.00. Then, the reliability of the MIS test was assessed by 100 primary and secondary school students who were not part of the sample group. The intraclass correlation coefficient was .998, which can be considered excellent (Portney & Watkins, as cited in

Koo & Li, 2016). In addition, when the classification power (discrimination) was tested using a t-test, it was found that the quality of the discrimination power was statistically significant at the p <.001 level, and a discrimination power between 0.20-0.50 was considered a good discrimination power. Therefore, it was used for further data collection.

Data Collection

This research was certified for human research ethics by Srinakharinwirot under certificate number SWUEC/E - 529/2563 for ethics of research involving human subjects. To collect all data, the research team coordinated data collection with network researchers in the target areas, such as supervisors, school administrators, and teachers.

Data Analysis

In the first phase, the researchers analyzed MI literature and applied a qualitative study in analytic induction to define the MI promotion model and the MIS test. Then, the validity was checked MI promotion model by focus group technique with 5 group participants, namely experts in education and psychology, school administrators, teachers, parents, and primary and secondary school students. Moreover, the validity of the MIS test was then assessed to check content validity by an expert in psychology, measurement, and education. The reliability was checked in the consistency of the measurement by the intraclass correlation coefficient. The research team summarized the experts' criticisms and improved the MI promotion model in the second phase. The policy proposals were presented to support Thai learner education with the MI promotion model. The quantitative data of the MIS test were analyzed by narrative statistics such as percentage, mean and standard deviation, mean comparison analysis with t-test, and principal component analysis (PCA) using the R program.

Results

The result of this research revealed that (a) multiple intelligence promotion models preparing for Thai learners were A2D or AAD, (b) multiple intelligence screening tests for Thai learners consisting of 45 behaviors observed, *(*c) policies for promoting multiple intelligences to develop the learners to their full potential comprised four sub-policies, all details as following.

The model for developing and promoting multiple intelligences for the development of learners' potential was A^2D or A square D or AAD format that had a structure consisting of three components, with nine areas of intelligence, eight continuity driving mechanisms, and two success conditions as follows:

Component 1 Area, represented by the letter "A_1" means the area of intelligence referred to as the brain capacity of the learners that affects thinking, decision-making, problem-solving, learning, and life of learners. It was classified into nine areas, where each learner would have all nine areas of intelligence but with different levels in each area, as follows.

1) *Linguistic intelligence* is a person who can learn a language quickly and can master the language.

2) *Logical-mathematical intelligence* is a person with the ability to use numbers, set up problems, solve problems or make hypotheses, and test hypotheses with causal thinking.

3) *Spatial intelligence* is a person's ability to see three-dimensional images and directions, be sensitive to surrounding things, identify characteristics, and connect the relationships between those things.

4) *Bodily-kinesthetic intelligence* is a person who moves the body fluently, can efficiently utilize body movement and has a harmonized mind and body.

5) *Musical intelligence* is a person who is sensitive to perceiving and responding to the melody of sound and can use and create the core of music, which is low pitch, high pitch, rhythm, and speed of sound.

6) *Interpersonal intelligence* is a person who has human relations, sensitivity in observing facial expressions and the gestures of others, and understanding emotions, feelings, thoughts, and intentions.

7) *Intrapersonal intelligence* is a person who can see oneself, know oneself, understand one's thoughts, emotions, and needs, and can control behavior

8) *Naturalistic intelligence* is a person who understands nature and the changes in nature and knowledge of plants and animals.

9) *Existential intelligence* understands the truth of the world and life, human existence, and the human value to the world and universe.

Component 2 Activity or "Learning activity", represented by the letter "A2" means the practice of learners inside and outside the classroom that was designed to correspond to what learners had preferences and aptitude for and promoted

the development of intelligence in all nine areas of learners. There were four activities which were (a) general learning activities, (b) creative games learning activities, (c) scientific process learning activities, and (d) role-play learning activities.

Component 3 Digital Platform, represented by the letter "D" means digital platform or application or computer program that enhances, promotes, and supports learning to develop intelligence in all nine areas of intelligence.

The eight mechanisms that continuously drove the development of students' multiple intelligences were: (a) the relationship between the learners and the teachers or parents, (b) the cultural environment, (c) the learning pyramid, (d) the active learning of learners, (e) motivation for creative learning, (f) organizing small group learning activities, (g) using technology media, and (h) assessment of learners' learning.

The two success conditions were (a) Collaboration, represented by the letter "C1", means the cooperation of agencies involved in the management of education for learners in the digital era, including cooperation of agencies at national, local, community, and household levels; and (b) Connection, represented by the letter "C2", means linkages from national to local policy agencies, operational level until the learners, detail as shown in Figure 2.

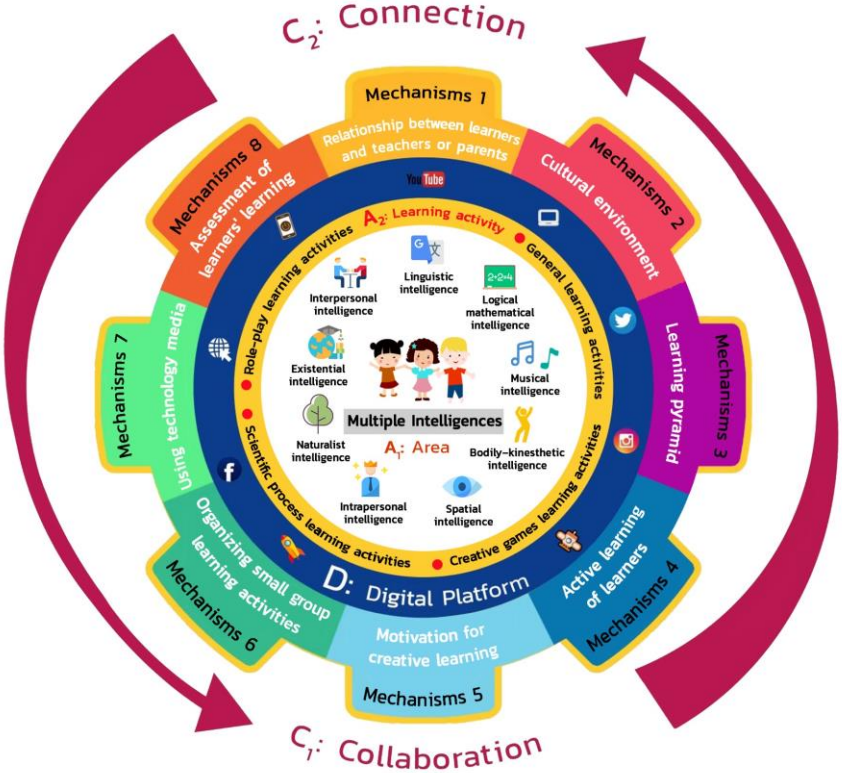

Figure 2. A²D Model

Multiple Intelligences Screening Test (MIS Test) for multiple intelligences of primary and secondary school students was a behavioral observation form with 45 behaviors observed in each aspect of the intelligence quotient with the same number of 5 behaviors. When analyzing the components, it was found that there are two components. Component 1 has 43 questions, describes the variance at 45.3%, and has a standard deviation of 3.3. Component 2 increased the ability to explain the variance by 5%. However, considering the model and the scree plot, it showed that the MIS Test should have had only one component. Hence, 45 behaviors were maintained to have the same number in all nine aspects. The analysis results are shown in Table 1 and Figure 3.

Table 1. The Results of the Analysis of the Main Components of the Multiple Intelligence Screening Model

	Test 2 (45 Behaviors)	
	Component 1	**Component 2**
Standard Deviation	3.00	1.20
Proportion of Variance	.40	.10

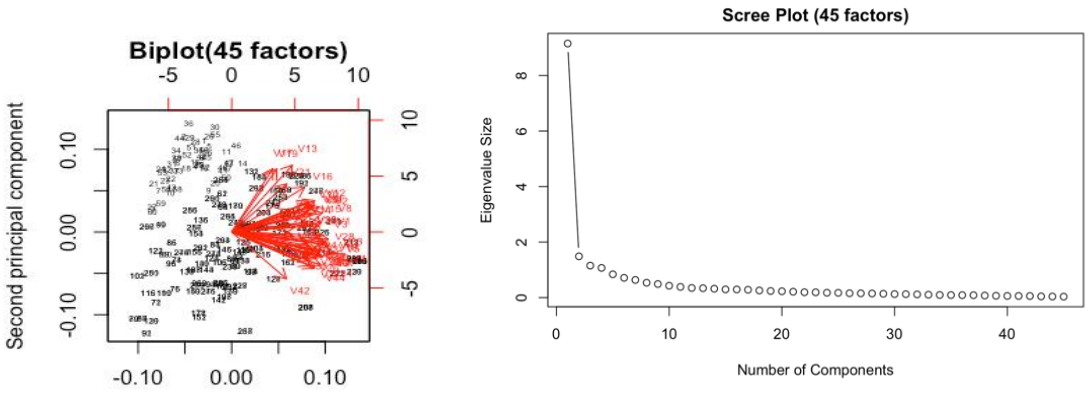

Figure 3. The Results of the Model Analysis and Scree Plots of the 2nd Edition of the Multiple Intelligences Screening Test

In addition, the screening results for 460 students revealed that the majority were primary school students, with 308 people standing for 66.9%. When classified by grade, it was found that most of them were in 5th grade at the primary level, with 110 people representing 23.9%. In the secondary level, most of them were in 9th grade, with 61 people representing 18.5%. Most students had outstanding physical and motor intelligence, accounting for 40.4%. The least prominent aspect was music, accounting for 16.2%, as detailed in Figure 4.

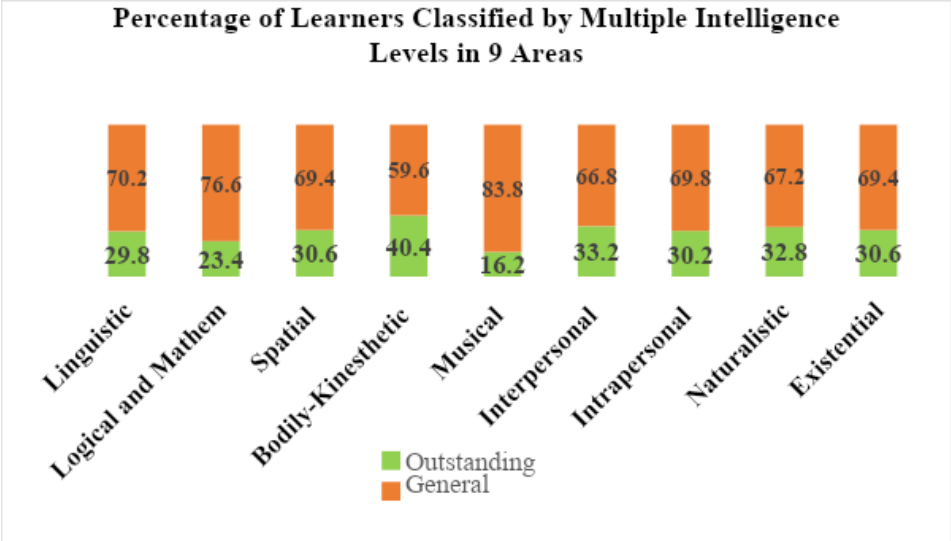

Figure 4. Percentage of Learners Classified by Multiple Intelligence Levels in Nine Areas

The policies proposed for developing and promoting MI for developing learners' potential had two aspects. The first policy, laying the foundation for the learning environment that approaches the A²D model, comprised four sub-policies: (a) developing school administrators to be leaders in digital transformation, (b) developing teachers' potential in digital learning management, (c) developing an educational environment to be suitable for active learning, and (d) promoting the role of community and private sectors in learner development. The secondary policy, encouraging learners to develop their full potential of MI, included six sub-policies: (a) using information from MI screening tests as a base for the development of individual learners, (b) integrating the A²D Model into the curriculum, (c) encouraging the teachers to design their teaching strategies that promote MI so that learners can access deep learning with quantity and quality, (d) promoting and developing teachers to be proficient in learning management that promotes learners' MI, (e) referral of learners throughout the period in the education system, and (f) allocation of resources by the school context to promote equitable learners' MI development.

Discussion

This research showed that the model for developing and promoting multiple intelligences for developing learners' potential was the A2D or A-Square-D or AAD format, which had a structure consisting of three components, with nine areas of intelligence, eight continuity drive mechanisms, and two conditions for success. This MI promotion model differed from the ACACA model because the ACACA model referred to Thai culture (Dechagupt, 2007), while the A2D model used digital platforms as an essential tool to develop learners' MI and prepare them for life in a digital world. Digital education consists of a series of activities that require using multi-intelligence theory. Tools and technologies

have enabled easy and practical education without barriers to time and place (Mankad, 2015). In addition, the A2D model was consistent with the research of Elliott's model. It suggested that teachers' instructional strategies correspond to the nine dimensions of multiple intelligences (Elliot, 1991, as cited in Yaumi et al., 2018). An adaptation of Elliott's model was that mentoring improves teachers' effectiveness in designing instructional strategies and learning activities and creates unity at the executive, teacher, and community levels, as well as in Dix's (2007) study, which requires the ICT model for use in the classroom. In addition, the MI promotion model can focus on students practicing self-learning activities and being integrated into curriculum and learning management. In teaching and learning for students, it is necessary to focus on students' learning styles by organizing teaching and learning according to their different needs (Özdemir et al., 2006; Yavich & Rotnitsky, 2020).

The MIS test developed by this research analysis of the 2nd test was suitable for screening learners' multiple intelligences. The benefits of the screening test could be used to assess learners' development and encourage learners to develop normally (Gilliam et al., 2005). In addition, teachers could screen learners' MI and design their instructional activities to enhance individual learners' strengths (Meleen, 2019). According to the theory of MI (Gardner & Hatch, 1989), learners were differentiated in one aspect of intelligence. There should be supportive elements conducive to learning so learners can develop and continuously progress. When comparing each aspect of intelligence, it was found that most students had low linguistic and musical intelligence. The result was similar to the study by Hajhashemi et al. (2012) who indicated that the concept of a particular area of intelligence, that a person might be powerful in a particular area, such as musical intelligence, he or she most likely possesses a wide range of abilities, such as verbal, musical, and naturalistic intelligence (Cherry, 2022).

In addition, the research results provided suggestions for the policy and institutional levels to encourage learners to develop their full potential in real life. Teachers should design lessons appropriate for learners to strengthen them (Gardner & Hatch, 1989). Additionally, this policy is expected to enhance the learner's ability to provide appropriate curriculum and materials through classroom activities. The MI theory promoted the environment to support learner style through lesson plans. It was aligned with results from Murray and Moore (2012), who demonstrated that using classroom strategies allows teachers to support the classroom environment. It provided educational opportunities for individual learners.

Conclusion

This study aimed to develop Thai learners to their full potential. A 2-phase sequential mixed method was used. The MIS test and the MI model were developed in the first phase. The MIS test was an appropriate behavioral observation test that could classify behaviors reflecting nine areas of intelligence into five behaviors toward one aspect of intelligence. It had excellent reliability. The MI model was called A2D or AAD and had a structure of three components, eight driving mechanisms, and two success conditions. After screening the learners' MI, it showed that most of the learners had a unique point at Bodily-kinesthetic intelligence, which was 40.4%. The minority, on the other hand, had a musical intelligence score of 16.2%. In the second phase, two policy proposals for developing and promoting multiple intelligences to realize learners' potential were put forward, namely (a) the aspect of foundation for learning management with access to the A2D model, consisting of five sub-proposals and (b) the aspect of encouraging learners to develop their full potential, consisting of six sub-proposals. Implementing these measures will continuously develop Thai learners' potential and prepare them for the digital world.

Recommendations

The current study formulated the MTS test, which is the first step in providing a MI screening test for students in Thailand. It could help teachers to identify students' strengths and weaknesses. Most importantly, however, teachers used the test results as guidelines for designing their classroom activities to ensure that each student had the opportunity to experience direct interaction with each of the nine bits of intelligence. Future research could further explore implementing the A2D model in different school contexts, such as size, location, and use of digital facilities, in terms of student development MI.

Limitations

This research period was only six months during the epidemic phase of COVID-19. Therefore, the study's results were mixed with the sample group of learners, as no distinction was made between primary and secondary levels. If the student level had been separated, obtaining more in-depth information specific to the learner level would have been possible.

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Authorship Contribution Statement

Chanpleng: Conceptualization, design, data analysis, interpretation, writing, editing/reviewing, supervision. Visuttranukul: Conceptualization, design, data analysis, interpretation, writing, editing/reviewing, supervision, Drafting manuscript. Khwanrat: Data collection, data analysis. Poopan: Reviewing, Data collection. Pattrawiwat: Reviewing, Data collection. Kijtorntham: Data collection, data analysis. Phonsuwan: Reviewing, Data collection.

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Appendix

The MIS Test consists of 9 areas of intelligence, five behaviors observed for each area, two scoring criteria, and two levels of interpretation.

Multiple Intelligences Screening Test			
Intelligence	**Learner's Behavior**	**Regular**	**Irregular**
1. Linguistic	1.1. Quickly learning		
	1.2. Likes to read letters from surrounding things		
	1.3. Talkative and knows when to talk		
	1.4. Knows how to use language and tone to convince listeners		
	1.5. Likes activities that uses speaking skills		
2. Logical and Mathematical	2.1. Thinking of paying, changing money fluently		
	2.2. Good at Math and likes to calculate		
	2.3. Have an incrementally systematic analysis method		
	2.4. Likes to solve complex problems and guess the answer		
	2.5. Think rationally		
3. Spatial	3.1. Proficient in mapping and direction		
	3.2. Good at categorizing and organizing		
	3.3. Good eyes, good eyesight, and quickly specify the details of what can be seen		
	3.4. Likes to draw, paint, design posters, organize exhibitions		
	3.5. Likes puzzles, play photo hunt game, and arrange things to fit in the space		
4. Bodily-Kinesthetic	4.1. Learns the hand-on tasks well		
	4.2. Uses different parts of the body to perform activities well		
	4.3. Likes to show gestures along with speaking, and show gestures to convey meaning		
	4.4. Moves body fluently, and have good balance		
	4.5. Likes physical activities such as acting, performance, and dancing		
5. Musical	5.1. Can hear music, catch the rhythm and melody well		
	5.2. Good at creating or imitating music		
	5.3. Likes to play music as a hobby, and love to collect music stories		
	5.4. Likes musical instruments, and learn to play them quickly		
	5.5. Likes to modify lyrics, compose songs to memorize the lesson		
6. Interpersonal	6.1. Well mind reading		
	6.2. Access to the likes, thoughts, and motivations of others well		
	6.3. Sensitive to the perception of the surrounding people, and capture the feelings of others		
	6.4. Sociable, and interact with others well		
	6.5. Like group work		
7. Intrapersonal	7.1. Know and understand oneself, and can tell the pros and cons		
	7.2. Can express thoughts and feelings		
	7.3. Self-reliance and self-responsibility		
	7.4. Like to write their own diary		
	7.5. Like to play adventure games or role playing with various types of characters		
8. Naturalistic	8.1. Knowledge of plants and animals, observant, remembers and classifies plants and animals around them.		
	8.2. Sensitive to environmental changes		
	8.3. Like to be surrounded by nature, and be in nature		
	8.4. Understand and be interested in natural phenomena		
	8.5. Be a nature conservationist, and like school and community cleaning activities		
9. Existential	9.1. Like to meditate		
	9.2. Believe in spirit		
	9.3. Be interested in and follow religious doctrines		
	9.4. Like to question the value of human beings towards the world		
	9.5. Love, and have mercy on human and animals		

Scoring Criteria

- Regular practice has 2 points
- Irregular practice has 1 point

Interpretation in each area

- A score of 1-8 means that the learner has general intelligence just like the public.
- A score of 9-10 means that the learner has a superior intelligence than the general population.