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# Development of Muay Thai Learning Management Model in the 21st Century to Promote Creative Learning

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## Abstract

This research and development aimed to (1) study on factors promoting physical activity through Muay Thai in educational institutions for health and well-being promotion, (2) investigation into the components of Muay Thai learning management in the 21st century for equitable education, (3) development of a 21st-century Muay Thai learning management model to promote creative learning, and (4) evaluation of the 21st-century Muay Thai learning management model for promoting creative learning. The study involved 1,458 participants across four groups: 1,400 key informants (randomly sampled) knowledgeable in Muay Thai or martial arts, 16 experts (purposive sampling) in these fields, 12 evaluators (purposive sampling) assessing model accuracy and appropriateness, and 30 evaluators (purposive sampling) assessing model feasibility and benefits. Data were collected via questionnaires, interviews, and evaluation forms. Qualitative data underwent content analysis, while quantitative data were analyzed for means and standard deviations. The findings will be presented descriptively. The results indicate that 1) The study on factors promoting physical activity through Muay Thai in educational institutions for health and well-being promotion revealed three key factors: Muay Thai within educational institutions, Muay Thai's contribution to health promotion, and Muay Thai's contribution to well-being. 2) The investigation into the components of Muay Thai learning management in the 21st century for equitable education identified nine components, collectively represented by the acronym "ITPC-EIPCE." 3) The development of a 21st-century Muay Thai learning management model to promote creative learning resulted in the model named "MUAY-CREATIVE." This developed model achieved an accuracy evaluation at a "Highest" level and an appropriateness evaluation at a "High" level. 4) The evaluation of the 21st-century Muay Thai learning management model for promoting creative learning indicated that the model demonstrated feasibility at a "High" level and beneficial outcome at a "Highest" level.

**Keywords:** Learning Management, Muay Thai, 21st Century, Creative Learning

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## 1. Introduction

Twenty-first-century learning management must contend with multifaceted global transformations spanning technology, innovation, lifestyles, society, and the economy, all of which inevitably influence the direction of educational system

development. The concept of "new future skills" therefore emphasizes cultivating students' creative thinking, life skills, vocational skills, and information, media, and technology literacy, alongside fostering adaptive learning to keep pace with the modern world. Muay Thai, as a national cultural art form of Thailand, possesses inherent physical, mental, and social value; when integrated with appropriate learning management, it can become a crucial tool for holistic student development. Educators must hold four core beliefs regarding their students: 1) students are valuable and deserve recognition; 2) students learn effectively through diverse processes; 3) students are capable of achieving learning success; and 4) students possess the potential for self-development towards success (Wongyai & Patphol, 2020). Twenty-first-century learning management primarily focuses on equipping students with essential skills for living and working in a rapidly changing world, particularly promoting creativity and the application of digital technology. These are central to shifting from traditional knowledge-transfer paradigms, where instructors disseminate information, to active, learner-centered approaches where students actively construct their own knowledge. Digital technology plays a pivotal role as a powerful tool in this process, enabling instructors to design diverse learning activities using various platforms and applications. This stimulates students' critical thinking, problem-solving abilities, and innovative thought, exemplified by using multimedia creation software, gamification, cloud collaboration, or virtual classrooms. Such approaches not only enhance engagement and challenge in learning but also provide opportunities for students to experiment, express themselves, and fully develop their creative potential within the digital landscape.

Muay Thai stands as a distinctive national sport and cultural art form, embodying the unique identity of Thai people in self-defense. Originating from the lifestyles and ancestral wisdom of Thai forebears, its combat techniques have gained global recognition. This profound societal wisdom, guided by established norms, fosters interconnectedness among Thais, cultivating a sense of brotherhood, family, and community living harmoniously with nature. This has evolved into customs, traditions, and creative rituals that shape the mind, including the ceremonies of accepting students, "Krob Kru" (teacher blessing), and "Wai Kru" (paying respect to teachers). These practices instill virtues such as trust, compassion, mutual respect, interdependence, and the four sublime states of mind (loving-kindness, compassion, sympathetic joy, and equanimity), leading to positive relationships. Historically, Thai men consistently trained in Muay Thai alongside weaponry. Over time, it evolved into a highest unique martial art, characterized by elegant yet powerful and fierce movements. It serves as a means of self-defense, physical conditioning, survival from danger, and national protection during wartime. Furthermore, it functions as a physical activity suitable for all ages and genders, and a viable profession. Beyond self-defense, Muay Thai holds immense significance across various dimensions, encompassing individual, community, societal, national, and international levels. Its historical ties and role in strengthening national security are clearly reflected. Therefore, Muay Thai is an invaluable cultural heritage that promotes personal well-being, strengthens social cohesion, preserves national identity, and garners international acclaim—all of which holistically contribute to national stability. (Office of the National Culture Commission, 1997; Saengchai, 2009; Bureau of Culture, Sports and Tourism, 2012; Kongkaew, 2022)

Muay Thai contributes significantly to the holistic development of individuals, encompassing physical, emotional, social, mental, and intellectual dimensions, fostering well-rounded individuals capable of thriving happily within society. Consequently, all Thais should engage in Muay Thai for physical conditioning and to deepen their understanding of its principles, encouraging regular practice for both fitness and competition. The proliferation of Muay Thai clubs and organizations globally underscores its role in cultural exchange, enabling foreigners to appreciate Thai traditions and embrace Muay Thai as a universal art form. As a cornerstone of Thai identity and culture, Muay Thai is integral to national stability (Sangsawang, 1989). Preserving and perpetuating Muay Thai, with its inherent Thai characteristics, promotes this martial art as a vital part of Thai culture, serving as an educational medium for developing complete individuals physically, mentally, socially, and intellectually, while instilling a profound sense of Thai identity. However, current preservation efforts for Krabi Krabong, another traditional Thai martial art, often confine it to cultural heritage within physical education, thereby failing to connect past cultural values with contemporary life. This can lead to perceptions of Muay Thai as outdated and irrelevant to modern society, hindering its practical application. While Muay Thai clearly offers educational value for life quality and fosters national pride among Thais and foreigners alike (Kongkaew, 2022), contemporary Muay Thai learning management often lacks modernity, creative approaches, and alignment with 21st-century learner contexts. The extensive and diverse Muay Thai content in the 2001 Basic Education Curriculum often overwhelms instructors, preventing effective content selection. Furthermore, many teachers lack specialized, accurate Muay Thai knowledge and student-centric pedagogical approaches, impacting learning quality and student engagement. These content-related issues, coupled with teachers' insufficient expertise and concerns regarding child boxing, hinder the appropriate selection of essential learning content.

These challenges underscore an urgent need to develop a Muay Thai learning management model that caters to modern learners by integrating creative learning approaches with the cultivation of a Growth Mindset in both instructors and students. This model must also promote equity and participation, aligning with the concept that fostering a Growth Mindset through creative learning requires instructors to hold four correct beliefs about their students: (1) every student is valuable and deserves recognition, (2) all students can learn through diverse processes, (3) every student can achieve learning success, and (4) all students possess the potential for self-development towards success (Wongyai & Patphol, 2020). Furthermore, creative learning aimed at developing a Growth Mindset must focus on cultivating 21st-century life skills, as subject matter knowledge alone is insufficient for navigating the modern world. Currently, learning content should primarily stem from students' independent inquiry, with teachers serving as guides and designing activities that enable self-assessment of learning progress. For Muay Thai learning management in the 21st century, diverse approaches are crucial to meet individual learner needs and interests, aligning with natural developmental stages. Educational institutions must therefore provide conducive environments and

equipment to facilitate students' exploration of desired knowledge, while instructors are responsible for stimulating and promoting rational discovery and encouraging accountability for decisions. This aligns with Chiang Mai University's mission to provide advanced academic and professional education, aiming to produce graduates who can rationally comprehend societal changes (Panich, 2012). Creative Learning Management is an educational paradigm focused on designing activities and environments that foster holistic student development, particularly the cultivation of a Growth Mindset—the belief that intelligence and abilities can be developed through effort and learning from mistakes. Creative learning encourages students to embrace challenges, view obstacles as learning opportunities, and welcome constructive criticism for self-improvement, rather than adhering to existing abilities or avoiding failure. Consequently, instructors play a pivotal role in creating a safe atmosphere that supports experimentation, inquiry, and reflection, thereby fostering a sustainable Growth Mindset.

In summary, the development of a 21st-century Muay Thai learning management model to promote creative learning represents a crucial strategy aligned with the dynamic shifts in the current global landscape. Its primary objective is to address the demands of an innovation- and technology-driven society, thereby elevating Muay Thai beyond mere martial art to a powerful instrument for the sustainable development of Thailand's human capital. This learning model is meticulously designed to equip learners not only with in-depth knowledge of Muay Thai principles and techniques but also with the essential skills required for life and career in the 21st century. These include critical thinking, problem-solving, collaboration, and adaptability—skills vital for navigating the challenges and complexities of a rapidly evolving world. Furthermore, this approach to learning instills virtuous attitudes such as discipline, perseverance, respect, and pride in oneself and cultural heritage, forming the bedrock for holistic human resource development. Beyond the direct benefits to learners, the presentation and dissemination of Muay Thai through this creative learning model effectively promotes Thailand's Soft Power, showcasing its cultural values, wisdom, and unique Thai identity with grace on an international stage. This can inspire and gain acceptance worldwide, ultimately fostering a shared sense of pride among Thais and strengthening the nation's cultural resilience for generations to come.

## 2. Methodology

### 2.1. Research Design

This research employs a Research and Development (R&D) methodology, a comprehensive approach for creating and testing educational innovations. The researcher systematically collected data using diverse research instruments, including questionnaires for quantitative data collection, in-depth interviews to gain detailed insights into stakeholder contexts and perspectives, and focus group discussions to facilitate idea exchange and brainstorming for comprehensive development. Furthermore, the study involved assessing the validity and appropriateness of the developed learning model to ensure its quality and practical applicability within the context of Muay Thai learning management. Finally, the research encompassed an evaluation of the feasibility and utility of the model, confirming its value and potential for broad application. All collected data will undergo descriptive analysis to present the study's findings clearly and systematically.

### 2.2. Research Area, Population and Sample

The research was conducted at Chiang Mai University and 12 educational institutions across Thailand. These institutions are located in the provinces of Chiang Mai, Chiang Rai, Lamphun, Lamphun, Phayao, Phitsanulok, Phetchabun, Uttaradit, Nakhon Ratchasima, Chaiyaphum, Sisaket, Bangkok, and Pathum Thani.

The study's population comprised four distinct groups: 1) Key informants knowledgeable in Muay Thai or martial arts, drawn from 20 educational institutions across Thailand that offer instruction in these disciplines; 2) Experts providing critical information on Muay Thai or martial arts, defined as instructors with over five years of high-level teaching experience in these fields; 3) Evaluators assessing the accuracy and appropriateness of the learning management model, who were qualified specialists or academics in Muay Thai; and 4) Evaluators assessing the feasibility and benefits of the learning management model, consisting of administrators from institutions that provide Muay Thai or martial arts instruction.

The research sample comprised a total of 1,458 participants, categorized as follows:

1. One Thousand four hundred key informants with knowledge of Muay Thai or martial arts, selected via simple random sampling.
2. Sixteen experts in Muay Thai or martial arts, each possessing over five years of teaching experience, selected through purposive sampling.
3. Twelve evaluators assessing the accuracy and appropriateness of the learning management model, selected by purposive sampling.
4. Thirty evaluators assessing the feasibility and benefits of the learning management model, also selected by purposive sampling.

### 2.3. The Tools Used in the Study Include

1. Questionnaire on factors promoting physical activity through Muay Thai in educational institutions for health and well-being promotion.
2. Interview form on the components of 21st-century Muay Thai learning management for equitable education.
3. Evaluation form for the accuracy and appropriateness of the 21st-century Muay Thai learning management model to promote creative learning.
4. Focus group discussion record form.

5. Evaluation form for the feasibility and benefits of the 21st-century Muay Thai learning management model to promote creative learning.

#### 2.4. Data Collection

**Documentary Study:** This involved collecting data from various documents, books, and journals, encompassing relevant theories, concepts, and research. The gathered information was then utilized to analyze study issues and establish foundational data to guide the research design.

**Key Data Collection:** The researcher collected crucial research data through questionnaires and in-depth interviews, representing a qualitative data collection approach. Questionnaires were developed to gather initial information, followed by in-depth interviews with key informants in Muay Thai. This qualitative data was then used to design the 21st-century Muay Thai learning management model to promote creative learning. The instruments used included: 1) a questionnaire on factors promoting physical activity through Muay Thai in educational institutions for health and well-being promotion, and 2) an interview guide on the components of 21st-century Muay Thai learning management for equitable education.

**Design and Development:** This phase involved both quantitative and qualitative data collection. It commenced with designing the 21st-century Muay Thai learning management model to promote creative learning. Subsequently, experts evaluated the accuracy and appropriateness of this developed model. A focus group discussion was also conducted with experts to further refine and perfect the 21st-century Muay Thai learning management model for promoting creative learning. The instruments employed were: 1) an evaluation form for the accuracy and appropriateness of the 21st-century Muay Thai learning management model for promoting creative learning, and 2) a focus group discussion record form.

**Learning Management Model Evaluation:** This involved quantitative data collection by evaluating the feasibility and beneficial outcomes of the 21st-century Muay Thai learning management model for promoting creative learning by qualified experts. The instrument used was an evaluation form for the feasibility and beneficial outcomes of the 21st-century Muay Thai learning management model for promoting creative learning.

#### 2.5. Data Analysis

**Qualitative Data Analysis:** In this research, a qualitative data analysis approach employing an interpretive methodology was utilized to achieve the study's objectives. The researchers comprehensively synthesized data from diverse sources, including open-ended questionnaires, in-depth interviews that provided detailed contextual and experiential insights from participants, and focus group discussions that reflected diverse perspectives and social interactions. The aim of this synthesis was to summarize key themes emerging from the extensive dataset and, crucially, to analyze the relationships between these data points. This analysis sought to identify underlying patterns, trends, or hidden meanings, ultimately leading to a profound and comprehensive understanding of the phenomenon under investigation.

**Quantitative Data Analysis:** In this research, quantitative data analysis plays a crucial role in summarizing and interpreting the findings. The researchers systematically analyzed data collected from assessment forms, utilizing appropriate statistical software to ensure accuracy and reliability in calculations. The analytical method employed was descriptive statistics, which focuses on characterizing the dataset. The results of the analysis will be presented in terms of mean, indicating the central tendency of the data, and standard deviation, signifying the data's dispersion around the mean. This approach aims to provide readers with a clear and systematic overview of the data.

### 3. Results

This research involved the classification of collected data and the presentation of findings in accordance with the established objectives. The research outcomes can be summarized as follows:

The study on factors promoting physical activity through Muay Thai in educational institutions for health and well-being promotion found that the factors promoting physical activity through Muay Thai in educational institutions for health and well-being promotion comprise three key elements:

1. Factors promoting Muay Thai physical activity within educational institutions, which include: individual aspects, environmental aspects, equipment, management, budget, activity format, and location.
2. Factors promoting Muay Thai physical activity in educational institutions for health promotion, which consist of: predisposing factors, enabling factors, reinforcing factors, and challenges.
3. Factors promoting Muay Thai physical activity in educational institutions for well-being, which encompass: health aspects, community and place aspects, financial aspects, social aspects, and learning, career, and work aspects.

The investigation into the components of Muay Thai learning management in the 21st century for equitable education found that the Muay Thai learning management components for equitable education in the 21st century consist of nine elements, collectively abbreviated as "ITPC-EIPCE." These components are: 1) Inspiring Educators, 2) Tailored Assessment, 3) Pedagogy Dynamic, 4) Cultural Diversity, 5) Empowered Learners, 6) Innovative Technologies, 7) Practical Life Skills, 8) Comprehensive Resources, and 9) Engaging Activities. Further details for each component are provided below.

1. Inspiring educators are fundamental to developing Muay Thai learning for equitable education. Teachers must serve as both academic leaders and sources of inspiration, possessing a deep understanding of their learners and the ability to adapt instruction to accommodate diverse skill levels, backgrounds, and life contexts. Experienced and well-trained instructors can effectively convey both the competitive and cultural dimensions of Muay Thai. Effective teaching should incorporate a variety of techniques, including demonstrations, practical exercises, technology integration, and creative activities, to stimulate interest

and genuinely involve all student groups, including those with physical limitations or limited educational opportunities. Ultimately, educators who can foster motivation and design inclusive learning experiences will enable Muay Thai to become an accessible learning tool for everyone.

2. Tailored Assessment plays a crucial role in developing Muay Thai to promote equitable education. This approach emphasizes flexible evaluation that considers individual differences in physical attributes, foundational skills, and learning contexts. Employing diverse assessment methods adaptable to learners' potential, such as individualized assessments or developmental evaluations by specific aspects, helps mitigate comparison biases. This, in turn, ensures that Muay Thai learning is genuinely inclusive, fair, and accessible to everyone.

3. Dynamic Pedagogy is central to developing Muay Thai learning to promote educational equity. This approach emphasizes adapting teaching methods to suit each learner at different times, rather than adhering to rigid, traditional formats. Utilizing proactive learning management techniques, participatory teaching, and experiential learning helps to foster motivation, reduce skill disparities, and provide opportunities for everyone to engage in comprehensive and meaningful learning.

4. Cultural diversity plays a crucial role in developing Muay Thai to promote equitable education. By acknowledging and respecting cultural variety, Muay Thai can transcend its traditional Thai context, offering equal access and learning opportunities to students from diverse nationalities and cultural backgrounds. Designing learning processes that consider this diversity—for instance, by using multiple languages, adapting content to local contexts, and encouraging cross-cultural exchange among learners—will foster an environment of mutual understanding and collaborative learning. Consequently, Muay Thai can genuinely become a space for developing skills, respect, and coexistence within a multicultural society.

5. Empowered Learners focuses on enabling Muay Thai students to confidently define their own learning paths, which is central to advancing equitable education in Muay Thai. Twenty-first-century learners are diverse in terms of skills, physical backgrounds, gender, age, and learning goals. Therefore, learning design must consider individual contexts while promoting a sense of value and the right for everyone to grow in their own way. Creating an environment that allows learners to choose practice methods based on their motivations—such as training for health, competition, or a professional career—and utilizing diverse techniques like demonstrations, digital media, and hands-on practice will enhance learning effectiveness. Additionally, it is crucial to reduce disparities in resources, including training facilities, equipment, and technology, to ensure equitable access to learning for all in every aspect of life.

6. Innovative technologies serve as a crucial mechanism for advancing Muay Thai to promote equitable education. By integrating technology and innovation, all learners, regardless of limitations in location, time, or resources, gain equal access to learning. Examples include the use of personal training applications, posture analysis programs, or virtual reality (VR) simulations of real-life scenarios. These technologies enhance the diversity of learning modalities, alleviate restrictions for learners unable to access physical training facilities, and provide opportunities for higher learner engagement in ways suited to their individual contexts. This truly fosters high-quality, inclusive, and equitable learning opportunities in the 21st century.

7. Practical Life Skills extends beyond mere physical training, emphasizing the development of transferable life skills applicable to daily living. These include emotional management, collaboration, and goal setting, which collectively bridge social gaps and equip learners to navigate life's challenges. Effective learning design for these skills necessitates systematic instruction and diverse techniques, such as demonstrations, hands-on practice, and the strategic use of technology like video tutorials or practice applications. Furthermore, tailoring learning to individual capabilities and implementing continuous assessment are crucial for fostering comprehensive physical and cultural understanding, ultimately preparing learners to function effectively in both their personal lives and professional spheres.

8. Comprehensive Resources play a pivotal role by providing diverse and accessible learning materials, including instructional documents, demonstration videos, and digital media. This ensures that learners from all backgrounds can access information and practice skills beyond the traditional classroom setting. The availability of comprehensive resources covering both theoretical and practical aspects, such as the history, rules, and various techniques, significantly enhances physical and mental skills, as well as health performance. Integrating technology is crucial for improving learning efficiency, and curricula must be thoughtfully designed to suit all learner groups, thereby fostering equitable learning opportunities.

9. Engaging Activities is crucial for fostering equitable learning and expression among all students. Strategies like group practice, competitive scenarios, or applying skills in real-world contexts can significantly enhance participation. This participatory learning approach comprehensively develops both physical and social skills. By tailoring activities to suit learners of all levels, the aim is to mitigate learning disparities and promote equitable development within the subject of Muay Thai. This can be summarized in the following Figure 1.

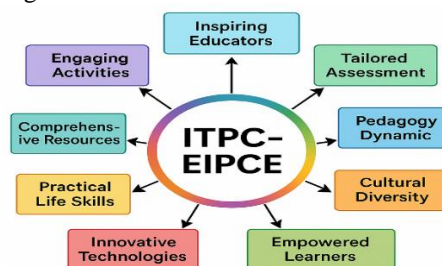


Figure 1. Components of 21st-Century Muay Thai Learning Management for Equitable Education

The development of a 21st-century Muay Thai learning management model to promote creative learning found that the developed 21st-century Muay Thai learning management model designed to promote creative learning is named "MUAY-CREATIVE." Its details are as follows:

1. Movement Factors: Effective implementation of Movement Factors can be achieved through learning management planning that emphasizes Active Learning and integrates Muay Thai postures with physical fitness activities. This approach aims to develop both gross and fine motor skills, with activities adapted to each learner's age and potential. It should also incorporate knowledge of physiology and health. Utilizing Body Mapping techniques will efficiently connect Muay Thai movements with the learner's body structure. Furthermore, individual movement development should be regularly assessed, and a dynamic learning environment fostered through the use of diverse spaces, such as fields or outdoor classrooms, to encourage participation. Crucially, movement activities should be linked to psychosocial goals, leading to holistic physical and mental development.

2. Understanding of Wellbeing: To foster a genuine understanding of holistic well-being (referred to as "U"), the learning management process must effectively integrate physical, mental, and social dimensions. Muay Thai serves as a foundational activity to encourage students' self-reflection and the integration of essential life skills, such as emotional regulation and self-management. Effective instructional design necessitates collaboration with health specialists and the utilization of standardized tools for assessing student well-being both pre- and post-activity. Furthermore, it is crucial to innovate activities that promote happiness and a diverse understanding of well-being within cultural contexts. This includes integrating Muay Thai with music, organizing nutritional workshops, and employing relevant learning media to ultimately develop sustainable school-level well-being programs.

3. Access & Agency: Fostering Access & Agency is central to equitable learning management, necessitating the design of inclusive lessons that accommodate all student groups without discrimination and adapt activities for learners with special needs. Developing diverse learning channels, both online and offline, by leveraging technology and providing comprehensive resources, is crucial for reducing educational disparities. Simultaneously, promoting students' ability to choose learning methods aligned with their aptitudes and be assessed based on their individual potential empowers their role and ownership of their learning. Furthermore, co-developing curricula with families and communities and establishing support mechanisms for disadvantaged individuals will lead to a diverse and sustainable learning ecosystem for all students.

4. Youth-Community Linkage: The Youth-Community Linkage approach, a guideline for learning management aimed at connecting youth with their communities, can be implemented through diverse activities that emphasize integrating local knowledge and wisdom into formal education. Inviting local sages or community experts, such as Muay Thai instructors, to serve as guest lecturers, coupled with organizing off-campus learning activities at authentic local venues like boxing camps or cultural centers, will enhance students' direct experiences. Furthermore, promoting student-led community service projects, encouraging the production of documentaries about local culture, and establishing platforms for knowledge exchange between youth and community professionals or experienced individuals will foster positive relationships and raise awareness of the value of their local cultural heritage. This approach also facilitates collaboration with community organizations, contributing to the overall strength and sustainability of society.

5. Cultural Pedagogy: It is an educational process deeply integrating cultural dimensions into teaching and learning. This approach designs lessons to connect with the roots and identity of Muay Thai in each region, promoting the use of local dialects and incorporating local performing arts into the classroom. It emphasizes fostering direct experiences through activities aligned with significant cultural days, such as Muay Thai Wai Kru Day, involving students in valuable rituals like Wai Kru ceremonies, and encouraging the expression of identity through traditional attire. Furthermore, this pedagogical framework aims to instill ethical values by analyzing historical narratives of past Muay Thai masters, providing opportunities for learners to create art, organize community exhibitions, and broaden their perspectives through comparative studies with other ASEAN martial arts. This comprehensive approach cultivates a holistic and contemporary understanding of cultural heritage.

6. Resilience Learning Design: Resilience Learning Design is an educational management process aimed at developing learners' ability to adapt and recover from adversity. Its core principle involves designing flexible learning plans, such as blended learning that can be adjusted according to circumstances, and integrating Social and Emotional Learning (SEL) concepts. The learning process emphasizes developing systemic problem-solving skills, learning from mistakes, and fostering a positive attitude through challenging activities and simulations that allow learners to practice decision-making under constraints. Furthermore, it prioritizes diverse assessment methods, including self-reflection and group discussions, alongside establishing a holistic student support system where mentors provide guidance and encouragement to sustainably promote adaptive skills and mental well-being.

7. Empowered Educators & Learners: To foster educational empowerment for both educators and learners, the teaching and learning process must shift the teacher's role from solely being a knowledge transmitter to becoming a facilitator, coach, and mentor. This transformation is achieved through continuous professional development, such as workshops and the creation of professional learning communities (PLCs). Concurrently, learners must be empowered with ownership of their learning. This involves providing opportunities for them to participate in planning, scheduling practice, recording and evaluating their own progress, choosing preferred learning styles, and demonstrating leadership through peer instruction or group activities. Furthermore, establishing collaborative networks among educational institutions and promoting volunteerism in knowledge transfer to communities are crucial mechanisms for expanding impact and creating a sustainable learning ecosystem.

8. AI, Technology & Adaptive Innovation: Integrating Artificial Intelligence (AI), technology, and innovation into Muay Thai learning management offers multifaceted opportunities to create modern, personalized learning experiences. This can involve utilizing AI-driven applications to analyze and assess the accuracy of Muay Thai movements, developing digital lessons like online videos or microlearning accessible via mobile devices, and applying Virtual Reality (VR) and Augmented Reality (AR) for simulated training and interactive learning materials. Furthermore, learning activities can be designed through gamification, using QR codes for access to supplementary resources, and developing Learning Management Systems (LMS) for digital manuals and lesson plans. Additionally, learners can be encouraged to create their own content via online platforms and link training activities with health applications to analyze and provide personalized skill development recommendations for optimal effectiveness.

9. Tailored Assessment: Tailored Assessment represents a personalized approach to learning evaluation, meticulously designed to align assessment tools and methods with each learner's unique abilities and needs. This process integrates various assessment criteria, notably rubrics that differentiate skill proficiency levels. It encompasses practical assessments, such as skill demonstrations, and knowledge evaluations through diverse activities, including question-answering or creative project development. The approach further promotes self and peer assessment alongside the cultivation of portfolios to continuously monitor progress. Importantly, it leverages technology, like online quizzes, and emphasizes providing positive feedforward to foster development, prioritizing this over sole reliance on scores. The core of this model is Dynamic Assessment, which offers a flexible and adaptable evaluation responsive to a learner's potential, ensuring that assessments genuinely reflect capabilities and fully promote learning potential.

10. Inclusiveness & Infrastructure: Developing inclusive and equitable Muay Thai learning necessitates robust infrastructure development that accommodates all learners. This involves adapting the physical environment for universal accessibility, such as installing ramps and promoting universal design principles. Additionally, a diverse range of learning materials, including audio, visual, and textual formats, should be provided to support learners with specific limitations and language barriers. For those in remote areas, online support and community-based training center networks are crucial. Furthermore, fostering parental involvement, coordinating scholarships and equipment for underprivileged students, and establishing a centralized infrastructure data system are vital mechanisms for reducing disparities and fostering sustainable Muay Thai education opportunities.

11. Value-Based Citizenship: Fostering citizenship enriched with cultural and ethical values can be effectively integrated through Muay Thai instruction, primarily by instilling desirable attributes in learners. This involves promoting discipline, respect for instructors, training partners, and community rules, alongside individual and collective responsibility. Muay Thai education can also link to civic duties and cultural preservation within communities, broadening learners' perspectives through critical thinking by comparing it with other martial arts cultures and understanding contemporary ethical issues like cultural diversity. Furthermore, activities such as competitions, media production, or open house events serve as crucial platforms to reflect and promote ethical values and pride in Thai identity, concurrently encouraging an open mind towards global cultures. These approaches collectively guide the sustainable development of learners into high-quality and virtuous citizens.

12. Engaging Activities & Economy: Muay Thai learning management can concretely integrate creative activities with the creative economy concept to holistically develop learners. This involves organizing diverse activities such as creating educational games and projects, promoting the performance of traditional Muay Thai techniques, and integrating Muay Thai with cultural tourism. Furthermore, learners should be encouraged to develop entrepreneurial skills through designing Muay Thai-related products or souvenir brands, establishing sales areas to generate income, and building youth networks to drive the local creative economy. Additionally, supporting learners in conducting small research projects to explore Muay Thai's potential within the community economy is a crucial approach that aligns with the national Soft Power policy, which aims to promote and export Thai culture for sustainable economic value. This can be summarized in the following Figure 2:

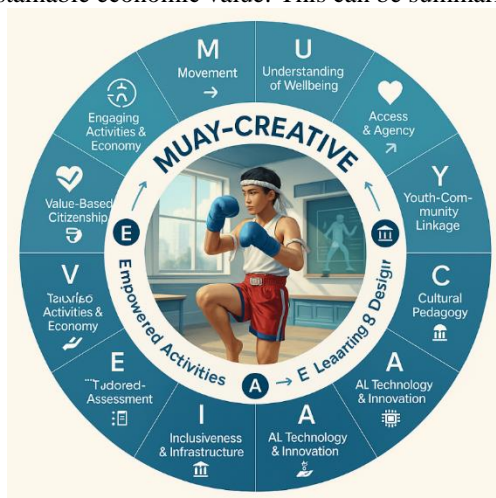


Figure 2. 21st-Century Muay Thai Learning Management Model for Promoting Creative Learning

The researcher subsequently evaluated the accuracy and appropriateness of the developed 21st-century Muay Thai learning management model designed to promote creative learning. The results are presented as follows:

**Table 1. Mean, Standard Deviation, and Interpretation of the Accuracy and Appropriateness Evaluations of the 21St-Century Muay Thai Learning Management Model for Promoting Creative Learning (n=12)**

Evaluation list	Appropriate			Accurate		
	M	SD	Level	M	SD	Level
1. Principles of Thai Indigenous Wisdom Curriculum	4.40	0.46	High	4.14	0.57	High
2. Objectives for Analytical Thinking Development	4.60	0.44	Highest	4.28	0.57	High
3. Integrated Wisdom Curriculum Content	4.48	0.44	High	4.18	0.60	High
4. Active Learning Activities	4.47	0.52	High	4.37	0.55	High
5. Curriculum Alignment Across All Educational Levels	4.45	0.51	High	4.22	0.55	High
6. Reflective Curriculum Evaluation	4.48	0.50	High	4.16	0.51	High
7. Learner Citizens Valued by Society	4.62	0.39	Highest	4.20	0.53	High
8. Professional Networks and Collaborations	4.72	0.40	Highest	4.21	0.56	High
9. Integration of Technology and Artificial Intelligence	4.42	0.54	High	4.25	0.56	High
Overview	4.51	0.46	Highest	4.22	0.55	High

Table 1 illustrates the evaluation results of the 21st-century Muay Thai learning management model designed to promote creative learning. The model was found to be highest appropriate (M=4.51, SD=0.46), particularly in terms of its networking aspects and learner focus. Furthermore, it demonstrated a high level of accuracy (M=4.22, SD=0.55). These findings collectively indicate that the 21st-century Muay Thai learning management model for promoting creative learning possesses a high quality in both its content and its reliable learning management approach.

The evaluation of the 21st-century Muay Thai learning management model for promoting creative learning found that the evaluation results of the Muay Thai learning management model in the 21st century for promoting creative learning, specifically concerning its feasibility and beneficial outcomes, are presented as follows:

**Table 2. Mean, Standard Deviation, and Interpretation of the Feasibility and Beneficial Outcomes of the 21St-Century Muay Thai Learning Management Model for Promoting Creative Learning (n= 30)**

Evaluation list	Feasible			Beneficial		
	M	SD	Level	M	SD	Level
1. Principles of Thai Indigenous Wisdom Curriculum	4.55	0.46	Highest	4.46	0.52	High
2. Objectives for Analytical Thinking Development	4.36	0.56	High	4.52	0.51	Highest
3. Integrated Wisdom Curriculum Content	4.24	0.54	High	4.35	0.52	High
4. Active Learning Activities	4.43	0.47	High	4.51	0.52	Highest
5. Curriculum Alignment Across All Educational Levels	4.42	0.51	High	4.43	0.52	High
6. Reflective Curriculum Evaluation	4.41	0.52	High	4.52	0.51	Highest
7. Learner Citizens Valued by Society	4.36	0.54	High	4.44	0.53	High
8. Professional Networks and Collaborations	4.37	0.53	High	4.53	0.49	Highest
9. Integration of Technology and Artificial Intelligence	4.69	0.40	Highest	4.28	0.54	High
Overview	4.43	0.50	High	4.44	0.51	High

Table 2 indicates that the developed Muay Thai learning management model for promoting creative learning in the 21st century was assessed as highest feasible (M=4.43, SD=0.50) and highest beneficial (M=4.44, SD=0.51). These high ratings, particularly concerning the model's content, learning activities, and objectives, reflect its qualitative acceptance.

#### 4. Discussion

The study on factors promoting physical activity through Muay Thai in educational institutions for health and well-being promotion found that factors promoting physical activity through Muay Thai in educational institutions for health and well-being promotion encompass three key dimensions: Muay Thai within educational institutions, Muay Thai's contribution to health promotion, and Muay Thai's contribution to well-being. This aligns with Kongkaew's (2019a) emphasis on these factors at the tertiary level. Secondly, factors influencing student health are categorized into four dimensions—predisposing, enabling, reinforcing, and problematic—which resonate with findings by Thongsuk, Kusonwong, & Malarat (2022) highlighting the roles of perceived benefits, barriers, personal skills, feelings, and socio-contextual influences on consistent Muay Thai exercise. Thirdly, factors impacting student well-being cover physical and mental health, community and environment, financial aspects, social dimensions, and learning, career, and work. These factors underscore that Muay Thai is not merely a physical activity but an integrated mechanism for enhancing students' quality of life across all dimensions, consistent with Thongtamlung, Polsiri, & Rattanasiri's (2018) discussion on the influence of social, family, economic, technological, and communication factors on local wisdom preservation. Furthermore, Lapratthanathong, Sookzai, Sangkhawadee, & Sawangmek (2022) indicated that successful physical activity management in higher education necessitates systematic consideration of academic year, attitudes, knowledge, relationships, and supportive networks to address 21st-century challenges. Additionally, Meksawan (2020) proposed a creative concept for establishing a Muay Thai Studies Institute as a hub for research, innovation development, and global promotion, integrating Muay Thai into formal education. This approach positions Muay Thai as a creative learning tool that addresses health, well-being, and sustainable development in an era of change. The entirety of this knowledge stems from a study that synthesizes data from diverse physical, behavioral, and social contexts, reflecting a dynamic and intricately connected "learning ecosystem." This, in turn, facilitates Muay Thai learning management as a form of creative learning that genuinely responds to the goals of 21st-century education.

The investigation into the components of Muay Thai learning management in the 21st century for equitable education found that the nine components of Muay Thai learning management in the 21st century for equitable education are collectively referred to as "ITPC-EIPCE." This aligns with Kongkaew's (2019b) proposed learning management model for physical education at Chiang Mai University, which integrates five clear components (SIPCE) and a PACE process. Furthermore, it resonates with Khamsri, Chamroen, & Thongchai (2021), who highlight the crucial roles of curriculum, management, and community collaboration in developing the Muay Thai sports tourism industry. The framework is also supported by Seeratjarern & Chuaychu (2023), who emphasize that true national development hinges on equitable education and reduced disparity through the shared responsibility of all sectors, rather than solely relying on designated agencies.

The development of a 21st-century Muay Thai learning management model to promote creative learning found that the developed 21st-century Muay Thai learning management model for promoting creative learning, termed "MUAY-CREATIVE," demonstrated "Highest" accurate and "High" appropriate evaluation results. This aligns with Kongkaew (2021), who emphasized Muay Thai's role as a cultural heritage promoting health, potential, and national stability at individual, communal, and international levels. Furthermore, it supports Khamsri, Chamroen, & Thongchai's (2021) assertion that Muay Thai learning management should encompass systematic planning, organizing, directing, and controlling. The MUAY-CREATIVE model also resonates with Wongyai & Patphol's (2020) approach of structuring learning to suit learners' nature, social, cultural, and technological contexts through a flexible creative learning framework. This framework promotes imagination, higher-order thinking, expert collaboration, and technology integration for novel idea development. Concurrently, it aligns with Meksawan (2020), who advocates for establishing a "Muay Thai Studies Institute" as a specialized entity to promote, conserve, develop knowledge, innovate, and advance Muay Thai as a global sport. By integrating theoretical and practical concepts, the "MUAY-CREATIVE" model not only addresses creative learning but also serves as a crucial tool to foster collaboration among education, community, and government policies, positioning Muay Thai as a driving force for sustainable development across cultural, health, educational, and economic dimensions.

The evaluation of the 21st-century Muay Thai learning management model for promoting creative learning found that the developed 21st-century Muay Thai learning management model for promoting creative learning was found to be highest feasible and exceptionally beneficial. This aligns with Sakulrattanakulchai (2017), who proposed that active learning management should be designed to suit diverse learners by integrating teaching methods that encourage genuine exchange, learning, and participation, while also reducing rigid evaluation frameworks to foster complete freedom of expression and creative learning. Further support comes from Yomdit & Kraisornrat (2018), who found that Muay Thai, as a sports tourism product, can be developed through various curricula such as health, career, self-defense, sport, security, show, and ancient Muay Thai, reflecting its flexibility and connection to the creative economy. This is also consistent with Nimprang, Watcharintrungkoon, & Boonkanan's (2019) assessment of Muay Thai activity management in basic education institutions, which highlighted five essential components for quality management: planning, implementation, monitoring, development, and reflection with improvement.

#### 5. Conclusion

The 21st-century Muay Thai learning management model for promoting creative learning not only addresses the demands of a rapidly evolving world but also elevates Muay Thai as a sustainable tool for developing Thailand's human capital. This

model equips learners with the necessary knowledge, skills, and attitudes to thrive in a dynamic global landscape. Furthermore, it serves to promote Thailand's Soft Power and instills pride in a cultural heritage that can be gracefully disseminated on an international scale.

## 6. Recommendations

### 6.1. Recommendations for Research Utilization

The following recommendations can be considered for research utilization:

1. Develop, apply, and promote the comprehensive adoption of the MUAY-CREATIVE model, encompassing all 12 components, within schools, universities, and learning centers to foster creative learning.
2. Design diverse Muay Thai curricula for equitable education, creating varied programs that provide access for all learner groups through physical, digital, and social learning resources.
3. Establish collaborative networks across various sectors, integrating efforts between educational institutions, Muay Thai camps, communities, and other relevant organizations to develop Muay Thai's value at an international level.
4. Leverage technology to drive learning by developing online platforms and applications for practicing, reviewing, and creating Muay Thai content. This should emphasize the use of AI, AR/VR, and adaptive learning systems.
5. Implement flexible and comprehensive evaluation methods that reflect learners' knowledge, skills, attitudes, and socio-cultural outcomes, contextualized to their specific learning environment.

### 6.2. Recommendations for Future Research

Recommendations for future research can be as follows:

1. To investigate the real-world impact of the MUAY-CREATIVE model, evaluating its post-implementation effects in schools or universities, with a focus on behavioral outcomes, attitudes, health, and civic attributes.
2. To conduct comparative research, utilizing experimental or quasi-experimental designs, between groups employing and not employing the model, in order to measure significant differences in achievement, participation, and skills.
3. To extend the research into policy and system studies, examining the establishment of Muay Thai institutes, the standardization of subject curricula, or provincial/regional networks to drive systemic implementation.
4. To conduct in-depth studies on specific target groups, such as underprivileged students, ethnic minorities, and individuals with disabilities, to develop Muay Thai as a tool for promoting sustainable equality.
5. To develop specialized assessment tools, including creative skill assessment forms, civic attribute evaluation tools, and online assessment systems adaptable to the unique contexts of learners.

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