

## Multiple intelligence-based differential learning on critical thinking skills of higher education students



Alhamuddin Alhamuddin<sup>1</sup>, Dinar Nur Inten<sup>1</sup>, Dewi Mulyani<sup>1</sup>, Asep Dadan Suganda<sup>2</sup>, Juhji Juhji<sup>2</sup>, Veena Prachagool<sup>3</sup>, Prasart Nuangchalerm<sup>3,\*</sup>

<sup>1</sup>Faculty of Islamic Education, Universitas Islam Bandung, Bandung, Indonesia

<sup>2</sup>Fakultas Tarbiyah dan Keguruan, Universitas Islam Negeri Sultan Maulana Hasanuddin Banten, Serang, Indonesia

<sup>3</sup>Faculty of Education, Mahasarakham University, Kham Riang, Thailand

### ARTICLE INFO

#### Article history:

Received 7 March 2023

Received in revised form

10 July 2023

Accepted 11 July 2023

#### Keywords:

Multiple intelligences

Differential learning

Critical thinking skills

University students

Pedagogical strategies

### ABSTRACT

This research aims to scrutinize the impact of multiple intelligences-based differential learning on the enhancement of critical thinking skills among university students. A cohort of sixty-six teacher students actively participated in this empirical investigation. Critical thinking proficiency was meticulously assessed employing a battery of tests and a comprehensive questionnaire. The findings of this study unequivocally demonstrate that multiple intelligences-based differential learning exerts a discernible influence on the development of critical thinking abilities among university students. Intriguingly, the study found no significant difference in critical thinking performance among the various types of intelligence. Additionally, this research posits that differential learning grounded in multiple intelligences represents a viable alternative pedagogical approach that should be earnestly embraced by educators when devising and implementing instructional strategies and methodologies. Such an approach, the study contends, holds the potential to augment students' cognitive capacities in a manner that aligns with the exigencies of 21st-century education.

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### 1. Introduction

Learning in the twenty-first century is intended to prepare future generations to accept improvements in information and communication technologies in social life as well as the consequences of societal growth. The impact of global changes on the world of information and communication technology creates lots of new challenges and complex issues, necessitating the acquisition of a diverse set of life skills in order to deal with them and flourish in a world of rapid change. In line with that, the nation needs educated citizens with the ability to think critically about complex and controversial issues (Greene and Yu, 2016; Kim et al., 2019).

Therefore, the skill of developing a creative solution to a complex issue is undeniably important (Meyer and Norman, 2020). The educational policy

highlights the six vital skills that students need to acquire and that need to be taught by educators in schools. These skills are (1) creativity and innovation; (2) communication and collaboration; (3) research and information fluency; (4) critical thinking, problem-solving, and decision-making; (5) digital citizenship; (6) concepts and technology operations (Trilling and Fadel, 2009). These skills become demands and guidelines that need to be mastered by students from an early age. Thus, learning in higher education must be able to accommodate these skills to deliver competitive graduates (Nuangchalerm, 2017).

Critical thinking has become one of many important skills required in the 21st-century; thus, it is important for students to acquire the skill (Lin et al., 2017). Most parents, policymakers, and educators agreed to share the same goal of teaching that students need to learn how to think critically about the challenges of the transformational age (Greene and Yu, 2016). Yet, the reality is neither easy nor encouraging. Students' ability to think critically was relatively low compared to other countries, whereas the skill of critical thinking is becoming a 21st-century demand (Syahrial et al., 2019; Kwangmuang et al., 2021). The capabilities of the twenty-first century are aimed at raising the quality

\* Corresponding Author.

Email Address: [prasart.n@msu.ac.th](mailto:prasart.n@msu.ac.th) (P. Nuangchalerm)

<https://doi.org/10.21833/ijaas.2023.08.015>

Corresponding author's ORCID profile:

<https://orcid.org/0000-0002-5361-0377>

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and competitiveness of human resources. One of the assets that students must have in order to face science and technological growth is the ability to think. It's because one's ability to think critically and solve difficulties in life determines one's success. Furthermore, students are expected to be able to address high-level problems, so the capacity to think critically is also a means of achieving educational goals (Pradubthong et al., 2019; Wisetsat and Nuangchalerm, 2019; Prachagool and Nuangchalerm, 2021). Meanwhile, according to Ku et al. (2014), the ability to think critically is vital to improving and, as a result, it has become the emphasis of learning in some circumstances. For the improvement of thinking power, the development of other abilities, and as a model for student achievement, teaching students to think critically and solve issues efficiently is important.

The focus on the development of critical thinking skills can be seen from the core aspects of these skills, which include interpretation, analysis, evaluation, explanation, conclusion, and self-regulation (Facione, 2015). The appropriate learning technique is required for developing critical and practical thinking skills (Tari and Rosana, 2019). To address the numerous skills and success gaps that modern society expects, a new approach to education is required, focusing on the fundamental skill sets known as the 4Cs: Creativity, communication, collaboration, and critical thinking. To overcome life's challenges, learning systems must be built in such a way that students can think critically, creatively, and collaboratively (Supena et al., 2021).

Several studies have found that integrating multiple talents improves learning outcomes. In a well-designed learning environment filled with many forms of project-based activities, the skills of remembering, understanding, applying, analyzing, evaluating, and producing can all be used at the same time. To improve the learning process, students must be challenged with the task of "learning to learn," in which they actively and cooperatively explore, develop, analyze, and solve problems related to the obstacles they experienced. This approach is projected to become a strategy for students to acquire critical and creative thinking abilities, as well as collaborative skills, which are essential in everyday life (Shih, 2018).

Not only for students, the 21st-century also requires the workforce to have critical thinking skills, communication skills, leadership skills, collaboration skills, adaptability, productivity, accountability, innovation, global citizenship skills, entrepreneurial skills, and spirit, as well as the ability to access, analyze, and synthesize information. Thus, the world of education should consider critical thinking skills and collaboration skills as learning content and mandatory tasks for educators to develop these skills for students, especially in the learning process. In addition to the appropriate learning approach for students, 21st-century learning should also pay attention to the

fundamental learning principles of the 21st-century, namely, that (1) instruction should be student-centered; (2) education should be collaborative; (3) learning should have context; and (4) schools should be integrated with society (Dishon and Gilead, 2021; Prachagool and Nuangchalerm, 2021).

Students become the center of learning and the subject of learning based on these concepts. As a result, learning is viewed through the lens of what is best for students, and learning must be student-centered. The uniqueness of students with various potentials, interests, abilities, and learning styles is a major problem in 21<sup>st</sup>-century learning. In today's world, where the digital era has pervaded all aspects of people's lives and a pandemic that has yet to end has hit, the life sector must utilize all of its intelligence to survive and continue to live.

Similarly, instructors in the education industry must be digitally literate and capable of combining diverse learning subjects and materials with various interactive, inventive, and fascinating media that may be used in blended learning while also improving all elements of students' intellect. According to the findings, in order to develop students' intelligence in blended learning, educators must not only develop digital applications for them but also prepare various innovative content and interactive digital activities, as well as facilitate and accommodate students' different learning styles through differentiated instruction (Agbi and Sengsri, 2020).

Differentiated instruction is better applied in learning as early as possible to make sure all aspects of students' development are promoted properly and become a strong foundation and basis for pursuing life and higher education. Agustín et al. (2021) suggested in their research that to be able to stimulate the students' multiple intelligences, the educator should provide various learning activities that accommodate students' interests and talents. Thus, students can solve various simple problems in their lives. In addition, the results showed that 33.84% of the students being studied are inclined toward linguistic intelligence, while 24.5% of the students are inclined toward interpersonal intelligence. Knowing the students' intelligence, educators are expected to design and deliver learning materials and approaches that are adapted to the students' intelligence.

Students, as the nation's next generation, should be equipped with the ability to think critically, the ability to analyze and solve various problems that exist in society, and the ability to provide definite solutions for the progress and prosperity of the nation. Thus, the teaching given to students at the higher education level should be able to continue the learning that has been started early on, namely learning by looking at students' different intelligences and providing them with the necessary attitudes, knowledge, and skills. Individual differences and the development of students' problem-solving skills should become a learning alternative so that students can practice providing

acceptable and rational solutions, learn independently, and be creative, responsible, and highly high-initiative students (Aadzaar and Widjanti, 2019).

## 2. Methodology

The participants of this study were 66 teacher candidates who enrolled in a university course in teacher education. They are volunteering to take part in the study and responding to its implementation. The study employed a test of critical thinking skills and a student response questionnaire. This instrument has been validated by three experts in the field of education. Then they provided comments for revising items and their appropriateness. The validation sheet contains components for assessment of the content, format, use of sentences, and conformity with learning indicators. The validation results showed a value of 4 with very valid criteria to be used. The reliability value was 0.848, and it was ready for data collection.

To examine the students' critical thinking skills, the multiple choice test, which was accompanied by reasons to fill it in, was given prior to and after learning using the packages developed. This form of assessment was not just right or wrong as a form of interpretive activities that students have done in learning. The student's critical thinking skills test consists of 12 items covering critical thinking indicators (Ennis, 2011), with 3 questions of basic clarification indicator, 2 questions of decision indicator, 2 questions of inference indicator, 3 questions of advanced clarification indicator, and 2 questions of supposition and integration indicator.

The students' questionnaire was given at the end of the learning process to find out the students' responses to the learning. The components of the assessment of student responses include aspects of learning renewability, interest, motivation, convenience, and expectancy in classroom learning. The criterion for the percentage of student responses used a Likert scale. The rubric score used is from 1 to 4, with scores of 1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree.

The research data were analyzed descriptively and quantitatively. After obtaining the pretest and posttest scores on the student's critical thinking skill test, a different test was carried out by a paired t-test statistical analysis with the criteria if the value was  $\text{sig.} > \alpha$  ( $=0.05$ ): There is no difference in test results before and study ( $H_0$ ) and if the value is  $\text{sig.} < \alpha$  ( $=0.05$ ): There are differences in test results before and after participating in learning ( $H_1$ ). Furthermore, the increase in students' critical thinking skills was calculated using the N-gain formula. The results of the normalized gain calculation were interpreted according to the following criteria: 1) Low criteria if the score  $\text{Ng} < 0.3$ ; 2) Medium criteria if  $0.3 \geq \text{Ng} < 0.7$ ; 3) High criteria if  $0.7 \geq \text{Ng} \leq 1.0$ . The students' responses data were analyzed using a qualitative description. Student's responses data were used to answer research

questions about students' responses to learning activities and questions about students' critical thinking skills. The interpretation of the student response criteria is as follows: 1) The fewer criteria if the score is  $\leq 25$ ; 2) Medium criteria if  $25 > P \leq 50$ ; 3) Good criteria if the score is  $50 > P \leq 75$ ; 4) The very good criteria if  $75 > P \leq 100$ .

## 3. Result and discussion

It can be concluded that the most effective strategies for developing multiple intelligences are contextual strategies that require students to be active and generate some products. The results showed that after students have learning activities about the various methods that can accommodate various students' intelligences, it is possible to draw the conclusion that contextual strategies are the best strategies for developing multiple intelligences. In addition, in order for the teacher to accomplish the learning objectives that have been outlined, they will need to use a range of different teaching strategies. This is due to the fact that the same technique or method may be used to enhance different aspects of the student's intelligence. The paired sample t-test is utilized for the purpose of determining whether or not there is a significant difference in the means of two samples obtained from the same subject or from distinct subjects sharing comparable characteristics (Table 1).

**Table 1:** Comparing score between before and after learning

Test	N	Mean	SD	SE
Pretest	66	56.19	15.81	1.95
Posttest	66	84.55	6.12	0.75

Based on the data shown in Table 1, the typical level of critical thinking ability prior to receiving differentiated instruction is 56.19. Compared to that, the capacity to think critically after receiving differential education resulted in an average score of 84.55. This indicates that utilizing excellent differential training might lead to improvements in one's ability to think critically. A preliminary exam was given to the students in this investigation in order to evaluate and identify the various forms of intelligence that were present among them.

According to the findings of the preliminary exam, 30.76 percent of students possessed interpersonal intelligence, 26.12 percent possessed linguistic intelligence, 18.46 percent possessed musical intelligence, and the remaining students possessed intrapersonal, kinesthetic, naturalistic, or spatial intelligence. The teacher implemented a strategy known as differential instruction in order to accommodate the wide variety of intelligences that were possessed by each student. With this strategy, the teacher aligned the instructions with the requirements of the students in order to maximize each student's potential and the student's overall learning achievement. A contextual method was utilized, which is a type of learning technique that requires students to be involved in the learning

process and gives them the ability to develop their own learning products. Then, in order to meet the learning goals that had been specified, teachers produced learning plans by selecting many learning techniques. This was done since it is possible for one way to be used to improve some of the students' existing intelligence. Students are able to better understand how the information they are learning applies to real-world situations when teaching and learning methodologies are contextualized (Johar et al., 2018). Learning always aims to be related to the context of situations and requirements in addition to the application of theory, and this is something that it strives to do constantly. The implementation of this method is an example of teaching in a manner that is congruent with the context of the students as

well as the context of the other educational components. Students put what they've learned into practice, and this helps teachers build their experience, reasoning, and analytical skills. Learning is not just about remembering, but also about stimulating critical and creative thinking abilities, thus learning that is analytical and engaging can help higher-order thinking skills. This is because learning is not just about remembering. The capacity to think critically is a skill that may be developed by making it a habit to think critically about everything in life, no matter how basic or intricate. A person's capacity for critical thinking may be defined as their ability to do tasks such as interpretation, analysis, assessment, inference, and explanation in accordance with theory and experience (Table 2).

**Table 2:** ANOVA test for comparing intelligences

	Sum of squares	df	Mean square	F	Sig.
Between groups	168.97	5	33.79	.894	.491
Within groups	2267.39	60	37.79		
Total	2436.36	65			

Based on Table 2, it can be seen that the sig. value is greater than 0.05, so it can be concluded that  $H_0$  is rejected, which means that in general there is no difference in critical thinking skills between types of intelligence in the posttest data. Through a differential instruction approach, each teacher can provide learning services that suit the needs of students. It is structured based on student differences, which include learning readiness, interests, and learning profiles designed by differentiating content, process, and product. This is because not all children can benefit equally from the instructional treatment they receive. Knowing what makes this differential instruction effective is important since it can inform the design of adaptive instruction and support (Juhji and Nuangchalerm, 2020; Schlatter et al., 2020). So, teachers can come up with learning strategies based on the students of services that can meet the needs of different students. There are no more students whose completeness and learning success are hampered by mistakes in generalizing their potential and learning tendencies. They have the tendency to stand out in one or several intelligence potentials that are different from one another. Every student is a unique individual with a million potentials. They come with different characteristics, different features and experiences, and different cultural backgrounds (Gage and Smith, 2016). Teachers, as key players in the learning process, must be able to embrace these differences in characteristics and develop each student's potential. Thus, students can receive learning stimuli that are in accordance with their uniqueness. The teacher must find the appropriate way of learning; all students learn according to their interests and talents through differentiated instruction (Erdem and Keklik, 2020). The comparison among components of intelligence is explored and reported in Table 3. Based on the observations made at the beginning of the study, it can be seen that students had a tendency toward

interpersonal intelligence. Interpersonal intelligence is closely related to the students' socialization skills needed to live in society. Interpersonal intelligence is a person's ability to relate to or interact with the people around them to feel emotionally and understand the moods, intentions, and wills of others. The strategies needed to develop students' interpersonal intelligence are learning strategies that are meaningful, fun, and easy for parents to use at home (Agustin et al., 2021). So, the methods that can be used to improve and hone students' interpersonal intelligence can take the form of simulation methods, project methods, role-playing methods, and holistic integrative methods. This can be seen in the students' willingness to get along, communicate, cooperate, understand others, and patiently follow the rules that are applied together.

The second highest intelligence possessed by students was linguistic intelligence; this can be seen from the results of the pretest, which showed that 25% of students were in this category. Linguistic intelligence is intelligence related to verbal or language. Linguistic intelligence is intelligence in managing words, or the ability to use words effectively both orally and in writing (Iyitoglu and Aydin, 2015). Moreover, singing is one of the methods that can improve students' verbal-linguistic intelligence. Meanwhile, the storytelling method with the technique of writing fantasy stories was proven to increase linguistic intelligence in the above-average category.

Therefore, the methods that can be used to develop and facilitate linguistic intelligence are lecture sessions, discussions, storytelling, and role-playing. To develop students' linguistic intelligence, educators can also choose various learning activities that lead to literacy activities, where literacy studies can be tailored to the interests of each student, for example, environmental literacy, health literacy, and emergent literacy (Aiman and Hasyda, 2020).

**Table 3:** Comparison between intelligences

Intelligence	Mean difference	SE	Sig.	95% confidence interval		
				Lower bound	Upper bound	
Interpersonal	Kinesthetic	-1.459	3.728	.999	-12.434	9.515
	Linguistic	-1.322	1.877	.981	-6.850	4.205
	Musical	-4.254	2.051	.315	-10.294	1.785
	Naturalistic	-.293	4.494	1.000	-13.523	12.937
	Spatial	-2.793	4.494	.989	-16.023	10.437
Kinesthetic	Interpersonal	1.459	3.728	.999	-9.515	12.434
	Linguistic	.137	3.849	1.000	-11.195	11.469
	Musical	-2.794	3.937	.980	-14.385	8.796
	Naturalistic	1.166	5.611	1.000	-15.353	17.686
	Spatial	-1.333	5.611	1.000	-17.853	15.186
Linguistic	Interpersonal	1.322	1.877	.981	-4.205	6.850
	kinesthetic	-.137	3.849	1.000	-11.469	11.195
	Musical	-2.932	2.264	.787	-9.599	3.735
	Naturalistic	1.029	4.595	1.000	-12.498	14.557
	Spatial	-1.470	4.595	1.000	-14.998	12.057
Musical	Interpersonal	4.254	2.051	.315	-1.785	10.294
	kinesthetic	2.794	3.937	.980	-8.796	14.385
	Linguistic	2.932	2.264	.787	-3.735	9.599
	Naturalistic	3.961	4.669	.957	-9.783	17.706
	Spatial	1.461	4.669	1.000	-12.283	15.2069
Naturalistic	Interpersonal	.293	4.494	1.000	-12.937	13.523
	kinesthetic	-1.166	5.611	1.000	-17.686	15.353
	Linguistic	-1.029	4.595	1.000	-14.557	12.498
	Musical	-3.961	4.669	.957	-17.706	9.783
	Spatial	-2.500	6.147	.998	-20.596	15.596
Spatial	Interpersonal	2.793	4.494	.989	-10.437	16.023
	kinesthetic	1.333	5.611	1.000	-15.186	17.853
	Linguistic	1.470	4.595	1.000	-12.057	14.998
	Musical	-1.461	4.669	1.000	-15.206	12.283
	Naturalistic	2.500	6.147	.998	-15.596	20.596

The third intelligence that students have in the subject of learning models for early childhood is musical intelligence. Musical intelligence is the ability to relate to rhythm, hum, and sounds. People who have musical intelligence are used to humming, singing, and playing musical instruments in their activities. Musical intelligence is related to the ability to catch sounds, distinguish, compose, and express oneself through sounds or rhythmic sounds.

This intelligence, which includes sensitivity to rhythm, melody, and sound color, can be used to develop students' musical intelligence, as the study proves that children look enthusiastic while teachers are actively involved in activities employing the singing method. Another method that can be used to develop this intelligence is the demonstration method, where students can demonstrate the material they have understood in the form of poetry or rhythmic rhymes. Thus, to facilitate and channel student intelligence through music, as mentioned above, teachers can also use a learning approach that combines motion with musical accompaniment in certain learning sessions. This is because the strains of music can comfort and calm students' hearts and psychological conditions so that they can give brilliant thoughts and ideas (Aguayo et al., 2021).

In the fourth category, intrapersonal intelligence is the ability to understand oneself, be responsible for what one does, and use information independently to solve problems. This intelligence is in the form of the self-ability to think reflectively, which refers to self-awareness about feelings and processes own thoughts. Among the methods that can be used to help students with intrapersonal intelligence understand learning material and engage in learning are role-playing, assignment methods, and project methods. Students understand

the reasons for experiencing certain feelings, but children also have more control over their feelings and do not channel them too much. In addition, students who have a tendency for intrapersonal intelligence can be given learning activities in the form of problem-solving, since these activities can help students sharpen their intelligence. A learning process emphasizing students' independence in solving problems can sharpen students' intrapersonal intelligence in finding problems in general, finding facts, clarifying problems, expressing opinions, finding solutions, and implementing them (Rery and Anwar, 2021).

The fifth intelligence possessed by students in this study is kinesthetic intelligence. Kinesthetic intelligence is intelligence related to the ability to use the body skillfully to express ideas or thoughts and manipulate objects, which includes coordination, balance, endurance, strength, flexibility, and speed in physical skills. Kinesthetic is the ability to use the whole body to express ideas and feelings well in handling or creating something. So, in order to make students attend lectures comfortably and happily and produce good results, several methods that can be used include Playing methods, including various physical games or traditional games, demonstration methods, simulation methods, and song movements. As in the subject of learning models for students, apart from being asked to write a paper with digital concepts, students are also asked to be able to simulate a learning model in the language of the paper and to provide various media tools and use them in learning. Therefore, lecture activities are not just asking students to think critically on a conceptual basis but also leading students to be able to apply the concepts they understand in learning practice.

In the sixth category, naturalistic intelligence is intelligence related to individual concern for nature and the surrounding environment. Naturalistic intelligence is the ability to recognize the environment and treat it proportionally. The methods that can be used to accommodate naturalistic intelligence are varied according to the material and the expected achievements of students. For example, in the subject of early childhood learning models, students can be assigned to create a science learning activity for children using the experimental method. Spatial intelligence is a person's ability to understand more deeply the relationship between objects and space. This intelligence is commonly referred to as a person's ability to perceive colors, lines, and shapes. This is based on the fact that in choosing the right action to take, thinking skills are needed, including one's skills and competencies to understand the relationship between symptoms, and assess, and consider a problem-solving approach so that they are able to take efficient solutions. Methods that can be used to bridge the intelligence of students who have this intelligence include the demonstration method in drawing activities for an early childhood class design that uses the central learning model. Other methods are simulation, the experimental method, and the assignment method.

The study shows that the series of activities during lectures, using a differentiated instruction approach and involving various learning methods in every lecture activity, could accommodate all the intelligence possessed by students and improve their critical thinking skills. In addition, lectures with a differentiated instruction approach enabled students to generate learning products either in the form of learning media, video tutorials, or early childhood learning methods for online and face-to-face learning, which are very useful in the education world. [Alsubaie \(2020\)](#) looked into the effectiveness of differentiated training based on multiple intelligences. Middle school students in Saudi Arabia demonstrated metacognitive reading comprehension in Arabic. Two-way ANOVA analysis and the t-test were used to analyze the data from the pre and post-test. ANOVA and t-test results demonstrated the effectiveness of various intelligence-based tailored trainings on metacognitive reading comprehension.

The implementation of learning through the application of differentiated instruction that is friendly to children's potential, demands, and talents can make learning activities a vehicle for developing cultural education, encouraging students to be ready to face modern, progressive globalization and support equality, and the vision of education in the new era. This potential-friendly education is the seed of hope that becomes the ultimate support for the nation's problems. In addition, the main thing is that differentiated instruction also supports the noble vision of the character education movement, which aims to make students not only knowledgeable but also have good morals and character ([Zawacki-Richter et al., 2019](#)). The 21st-century is the era of

student-centered learning. This principle is inherent in every learning process: Students are active learners with unique and different learning styles from one another. This is in line with the principle of no one left behind in the sustainable development goals (SDGs) education sector, namely ensuring the quality of inclusive and equitable education and increasing lifelong learning opportunities for all. This means that our education must ensure that none of its citizens are left behind, forgotten, or marginalized from their right to a quality education. Every student has the same rights, regardless of their potential, interests, talents, and different learning styles; no student is neglected or marginalized. The method chosen and used must be able to facilitate all the intelligence possessed by students.

All levels of education have the same goal, namely to make the student a complete human being while taking all the uniqueness and intelligence of each individual into account. To realize this, we need an approach that can accommodate all the uniqueness possessed by students and be applied at all levels of education. So that the learning that will be carried out can facilitate students' various intelligences and uniqueness. Educators also need to pay attention to the principles of using learning strategies, namely: First, goal-oriented; second, students' learning activity, which is not just memorizing a number of materials but also interactive activities between teachers and students as well as among students themselves.

Developing the multiple intelligences possessed by students can make learning more interesting and improve the student's academic achievements. Multiple intelligences help in the process of evaluating students' cognitive stages and help teachers understand better the students' intelligence. The theory of multiple intelligences can reveal the way each individual learns depending on the combination of intelligences used by the individual ([Abenti, 2020](#)). [Alhamuddin and Bukhori \(2016\)](#) suggested that in the application of multiple role-based learning, the teacher is not only to transfer knowledge based on their competence but also based on the characteristics of students that reflect their learning style. Thus, the results of the study show that intelligence-based learning has a significant effect on students' critical thinking skills. [Malapad and Quimbo \(2021\)](#) recommended that the teacher and the students were watched during implementation to gauge how useful they thought the module was. The study found that using the inquiry-based multiple intelligences instruction module to create lessons helped students become more engaged because they were seen to be paying attention and participating during the implementation. Since the teacher could integrate enrichment activities that were based on the students' predominant inquiry-based multiple intelligences instruction, lesson planning was made simpler. This study offers guidance to teachers on how to incorporate multiple intelligences into lesson design and curriculum integration.

Through these activities, students will experience an inspiring learning process that allows them to try and do something. Third, individualistic, namely, the strategy can facilitate the uniqueness of each student so that it brings students into behavior change and high success. Fourth, integrity means that the chosen learning strategy must be able to develop all aspects of students' potential, including cognitive, affective, and psychomotor aspects. All of these aspects can develop well if the chosen strategy is fun, challenging, and motivating. It is through these four things that students' awareness of how to become better individuals will be achieved. Several learning strategies can be used to develop the multiple intelligences possessed by students and create fun, challenging, and motivational learning.

#### 4. Conclusion

The outcomes of the aforementioned study can serve as the foundational basis for an educational paradigm that prioritizes the utilization of diverse forms of intelligence. Each student possesses a unique amalgamation of nine discrete intelligences, with the relative prominence of each intelligence varying from individual to individual. Given this divergence in the distribution of cognitive aptitudes, it is untenable to assert the primacy of any single intelligence over others. The adoption of the multiple intelligences approach has consequently informed the adoption of a contextualized pedagogical strategy as the preferred mode of instruction. This approach necessitates active student engagement at every stage of the learning process, culminating in the practical application of assimilated knowledge through the creation of a tangible product at the conclusion of each instructional session. As a consequence, the realization of a human-centric education, which accentuates the untapped potential inherent in students, has been rendered attainable through the multifaceted framework of multiple intelligences.

#### Acknowledgment

This research project is an academic collaboration between Thai and Indonesian researchers and the research is financially supported by Mahasarakham University.

#### Compliance with ethical standards

#### Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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