CULTURAL AND DIDACTIC ANALYSIS OF PHYSICS LEARNING: A STUDY OF THE GOOD PRACTICES OF EDUCATION IN INDONESIA AND EGYPT

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Abstract: This study aims to examine and compare the practice of cultural-based and didactic physics learning between Indonesia and Egypt. This study is motivated by the importance of understanding local contexts in science education and the need to identify cross-border good practices to improve the quality of physics learning. This study uses a qualitative approach of literature study, by analyzing 50 selected literatures of 25 from Indonesia and Egypt each which include educational policies, teaching strategies, and the role of culture in physics learning. The data is categorized and compared in two main aspects: cultural and didactic. The results of the study show that Indonesia stands out in the application of contextual learning based on locality and method flexibility, while Egypt excels in curriculum consistency and strengthening of basic concepts of physics. Good practices from both countries can complement each other in creating more meaningful and relevant physics learning. This study suggests the development of physics learning that considers a balance between cultural approaches and didactic strategies. These findings are expected to be the basis for the development of curricula and learning practices that are adaptive to the diversity of global educational contexts.
Keywords: *cultural, didactic, good practice, indonesian physics, egyptian physics.*

INTRODUCTION

Physics is a branch of science that essentially consists of a collection of knowledge, methods of thinking, and research processes. The science in question is related to the study of the properties and phenomena that occur in various objects in nature that can be observed through the human senses. In the process of learning physics, abstract material is often found. This causes physics to still be considered a difficult subject to understand, since its concepts tend to be abstract and are not always easily associated with events in daily life (Malina et al., 2021).

Culture is a collective mindset that is socially formed and differentiates between community groups (Hotstede et al., 2011). Then didactics is defined as a framework of systematic analysis that includes fundamental questions about content, learners, and learning objectives (Gundem & Hopmann, 1998). In its application, physics, which is a difficult subject, turns out to be very common in daily life such as in culture. In this regard, physics learning can be obtained from local culture or wisdom, by accompanying it in its application. Thus, culture can provide a student's perspective in understanding physical phenomena.

Physics as a subject that is often considered abstract can be more easily understood by students if it is associated with the context of culture and daily life. A culture-based approach allows physics learning not only to focus on theoretical concepts, but also to connect them with local knowledge, traditional practices, and natural phenomena that students are already familiar with in their cultural environment (Aikenhead & Michell, 2011). For example, the concept of mechanics can be explained through traditional boatbuilding techniques, thermodynamics through the processing of regional foods, or astronomy through traditional dating. Thus, cultural integration in physics learning not

only enhances conceptual understanding, but also makes science more relevant and meaningful for students from different cultural backgrounds.

Each country has unique cultural characteristics, which in turn influence students' teaching approaches and understanding of physics concepts. An analysis of physics education best practices in different countries can reveal how cultural factors play a role in shaping effective pedagogical strategies. By comparing cross-cultural physics learning systems, we gain valuable insights into the linkages between cultural context and learning effectiveness. Findings like these not only enrich teaching methods, but also confirm that a deep understanding of students' cultural backgrounds is a key component in designing optimal physics learning.

Indonesia and Egypt have different cultural backgrounds and educational systems, which influence the way physics is taught in both countries. Indonesia, with its collectivist culture and a more flexible curriculum approach, provides space for teachers to adapt learning to students' abilities. This flexibility allows teachers to design more student-centered learning, choose essential materials, and apply varied learning methods according to the needs of students (Nasser et al., 2024). In contrast, Egypt, with its Middle Eastern cultural background and a more structured and rote learning education system, tends to adopt theory-oriented learning methods. The preparation of the curriculum in Egypt is carried out by a team of experts, education professors, supervisors, and experienced teachers. Each subject has a special committee in charge of designing the curriculum before it is endorsed by the pre-university education board. Although this curriculum can be adapted to the needs of the region, its implementation still relies heavily on teaching methods that are explicit and emphasize the understanding of concepts through the use of mathematics in physics. In addition, the textbooks used in learning are prepared based on the outline of the curriculum, but in practice there are obstacles such as limited teaching aids, variations in the quality of teachers, and the dominance of verbal learning methods. As a result, physics learning in Egypt emphasizes more on systematic mastery of theory than practical exploration in understanding physics concepts (Sulaiman et al., 2021). These differences reflect how education policies in each country are influenced by cultural values and the curriculum structure applied. While Indonesia provides more flexibility in learning, Egypt maintains a strict education structure with a focus on measurable academic standards.

The basic concept of didactic in physics learning is an important foundation for increasing the effectiveness of the teaching and learning process. Didactic deals with teaching theory and practice that includes the strategies, methods, and approaches used to deliver learning materials. In the context of physics, the proper application of didactic concepts can help students understand abstract and complex concepts in physics.

In Indonesia, learning physics faces various challenges, such as abstract concepts and the need for mathematical skills to understand them. In addition, less attractive teaching methods and limited laboratory facilities are also obstacles. To overcome this, an interactive conceptual learning approach has been applied. This approach emphasizes understanding of concepts through discussion and active interaction between students and teachers. A study shows that this approach can improve students' understanding of physics concepts (N. Sari et al., 2024).

In addition, other factors such as the language of instruction, the affordability of technology, and the role of teachers and communities in education also affect the approach to teaching physics in both countries. This comparison is important to see the

extent to which cultural and didactic elements in each education system can have an impact on students' understanding of physics.

The ethnophysical approach is one of the effective ways to relate physics concepts with local knowledge owned by the community. In the context of education, this approach provides a space for students to understand scientific concepts through cultural experiences and everyday practices that are relevant to their environment. In Indonesia, for example, ethnophysics is applied in the learning of energy and waves through traditional activities such as the game Seurune on u from Aceh, which represents the principle of resonance. The use of this cultural media not only bridges the understanding of abstract concepts, but also strengthens students' attachment to their local identity (Rahmadani & Nurmasyitah, 2022). In Egypt, the integration of cultural elements in the learning of physics can be found in the use of ancient architecture and the technology of past civilizations as a context to explain the principles of mechanics and optics. Thus, ethnophysics opens up opportunities for the development of more meaningful, grounded, and contextual learning, without having to sacrifice the accuracy of modern science. This approach shows that science does not always have to be taught in the abstract and apart from the real life of the student.

This research was conducted to fill the gap in the physics education literature by conducting an in-depth comparative analysis between Indonesia and Egypt. Most previous studies have tended to compare Western education systems with developing countries, or focus on policy aspects without in-depth cultural analysis. By focusing on two Muslim-majority countries with different cultural roots, this research is expected to make a new contribution to understanding the dynamics of science education. The findings of this study are expected to provide practical recommendations for the development of more effective and culturally sensitive physics curriculum and learning methods in both countries.

This study aims to identify and analyze good practices in physics learning in Indonesia as well as explore how culture-based approaches can improve the effectiveness of physics learning. In addition, this research also aims to provide recommendations for educators and policymakers in designing physics learning strategies that are more interactive and contextual. With this research, it is hoped that it can make a real contribution to improving the quality of physics education in Indonesia and provide recommendations for the development of more effective education policies.

According to D. Saputro and L. Hartono in the Journal of Media Didaktika (Vol. 13 No. 2, 2021), physics learning combined with local wisdom can increase students' interest and understanding of abstract physics concepts. Their research shows that by utilizing local culture as a learning medium, students become more enthusiastic and are able to combine physics material with everyday experiences. For example, the use of traditional musical instruments to explain the concept of waves or the use of traditional water wheels to understand the principles of kinetic and potential energy.

It is further explained that the didactic approach used must be able to accommodate the social and cultural context of students, so that the learning process is not only cognitive, but also affective and contextual. Didactics in this case plays a role as a basis for thinking in developing learning strategies that touch on local aspects. This is in line with the concept of ethnopedagogy, namely learning based on local culture as a source of learning to shape students' character and scientific knowledge holistically.

By using this approach, teachers are required not only to be transmitters of material, but also as facilitators who are able to connect physics theory with the reality of

students' lives. The culture-based contextual learning model has been proven to build deeper meaning in learning, as well as increase students' active participation in the learning process. Therefore, the application of local culture-based physics learning strategies is a form of didactic innovation that is relevant in the context of multicultural education such as in Indonesia.

LITERATURE REVIEW

Physics learning is an educational process that aims to develop students' understanding of natural concepts and physical phenomena through scientific approaches and logical thinking. In the context of 21st century education, physics learning focuses not only on mastery of the material, but also on the development of critical thinking skills, problem-solving, and the ability to apply concepts in daily life. According to (Bruner, 1960), the learning process should be active and allow students to build their own knowledge through direct experience with physical phenomena. Therefore, physics learning should be designed in such a way that it is relevant, contextual, and facilitates students' exploration of the natural world. This is the basis for the development of various adaptive learning models oriented towards the achievement of holistic competencies in physics education.

The integration of cultural values in physics learning is an important approach that aims to make the learning process more contextual and meaningful for students. This approach is known as culturally relevant pedagogy, as stated by Ladson-Billings (1995), which emphasizes the importance of associating students' cultural identity with the content of learning so that they feel represented and valued in the learning process. In the Indonesian context, many studies have shown that the use of local wisdom in physics learning, such as local natural phenomena, traditional tools, and folklore, can increase students' interest and understanding of science materials. Meanwhile, in the context of countries such as Egypt, the scientific heritage of ancient civilizations and figures such as Al-Haytham is often raised as part of the study of optics and astronomy. Cultural integration in physics learning not only strengthens national identity and appreciation of one's own culture, but also makes physics more relevant to students' experiences and environments.

Didactic in the context of education refers to the art and science of teaching, which includes strategies, approaches, as well as the selection of effective learning methods to achieve learning objectives. In physics learning, the didactic aspect is very important because physics is an abstract science that requires logical reasoning and a strong conceptual understanding. Learning models such as problem-based learning (PBL), guided inquiry, contextual teaching and learning (CTL), and discovery learning are widely used in physics teaching to encourage active student participation. An effective didactic approach should encourage exploration, experimentation, and reflection on the physical concepts being taught. Thus, the right didactic strategies can help students build a deeper understanding, while also developing the scientific skills and scientific attitudes necessary in the face of real-life challenges.

In Indonesia, the practice of learning physics has undergone significant development, especially in efforts to integrate local values into teaching materials. One of the widely used approaches is the application of learning based on local wisdom, where teachers associate physics concepts with natural phenomena, regional culture, and local community habits. For example, the concept of pressure and fluid can be attributed to traditional drink-making traditions or local irrigation systems. In addition,

the national curriculum encourages the use of active learning models such as guided inquiry, project-based learning, and collaborative learning tailored to the needs of students. Research by Nurpatri et al. (2023) shows that the integration of local culture in physics learning can significantly improve students' understanding of scientific concepts and attitudes. The practice of physics education in Indonesia reflects a combination of a scientific approach and a balanced and contextual cultural preservation effort.

Physics education in Egypt has a strong characteristic of integrating historical and scientific heritage into the learning process. Egypt is known as one of the early civilizations that made great contributions to the development of astronomy, mathematics, and natural sciences. In the practice of learning physics, several educational institutions in Egypt have raised Islamic scientists such as Ibn Al-Haytham who is widely known as the pioneer of modern light and optics theory. The use of this scientific history not only provides a contextual dimension in learning, but also strengthens students' cultural identity and national pride. According to Dadang Abdau (2024), an introduction to the contributions of Arab scientists in the science curriculum can increase students' sense of belonging to science and foster motivation to learn. In addition, the learning of physics in Egypt also shows the adoption of a constructivist approach, although its application still varies depending on the type of school and local policies.

Comparative studies in science education provide valuable perspectives in understanding the strengths and challenges of education systems in different countries. Through this approach, educational practices in one country can be used as a reference to improve or complement practices in other countries. In the context of physics learning, cross-border research such as that conducted by De Vries et al. (2015), shows that there are striking differences in pedagogical approaches, time allocation, and cultural integration between one system and another. The studies emphasize that there is no one-size-fits-all model, but good practices from different countries can be a source of inspiration. In this study, the approach to learning physics in Indonesia and Egypt was compared from cultural and didactic aspects to see the potential for value and strategy collaboration. Thus, comparative studies are not only descriptive, but also reflective and solutive to today's educational challenges.

RESEARCH METHODS

This study uses a literature study approach or literature study to analyze and compare the good practices of physics learning from a cultural and didactic perspective in Indonesia and Egypt, with the main data sources in the form of reliable secondary sources which include reputable scientific journals (indexed articles in databases such as Scopus and SINTA), reference books (texts and references relevant to physics education, cultural and didactic studies), education policy reports (official documents of the Ministry of Education and Culture of the Republic of Indonesia and the Ministry of Education of Egypt, as well as reports of related educational organizations), and other official publications (from research institutions, non-governmental organizations, and other relevant credible sources). The researchers intensively reviewed 25 documents from each country, which were systematically selected based on relevance, credibility, and up-to-dateness, to reflect valid and representative good practices. The literature selection process is carried out systematically based on the following criteria:

1. Publication timeframe: The selected literature is the publication published in the period 2015–2025 to ensure relevance to the current educational context.

2. Thematic relevance: The literature should significantly address cultural (social values, local wisdom) and/or didactic (methods, learning strategies) aspects in the context of physics learning.
3. Source credibility: Priority is given to literature written by authors with a good reputation in their field and/or published by a credible institution. The selection process involves searching for relevant keywords in scientific databases and reviewing abstracts and article content to ensure fit with the research focus.

The data analysis stage uses a descriptive-comparative approach with the following steps:

1. Data categorization: Information from the collected literature is categorized based on the main themes, namely cultural aspects (including social values, local wisdom relevant to physics learning) and didactic aspects (including learning methods, teaching strategies, assessment approaches, and the use of learning resources in physics learning).
2. Creation of a comparative matrix: The data that has been categorized is then mapped into a comparative matrix to identify similarities and differences in the practice of physics learning between Indonesia and Egypt in both aspects (cultural and didactic). This matrix helps in systematic visualization and comparative analysis.
3. Interpretation of findings: Findings from comparative analysis are interpreted through the lens of ethnophysical theory and critical pedagogy. Ethnophysical theory is used to understand how cultural context influences the understanding and learning of physics concepts, as well as how local wisdom can be integrated in learning. Critical pedagogy is used to analyze how the practice of physics learning empowers students, develops critical thinking, and considers relevant social issues.

The validity of the results of this study is maintained through triangulation of sources. Each conclusion drawn is supported by information from a minimum of three different literature to ensure the consistency and reliability of the findings. In addition, the researcher recognized and listed the limitations of the study, including the potential bias that may arise due to dependence on English, Indonesian, and Arabic literature (depending on the researcher's language ability) as well as the absence of field data that allows direct observation of learning practices.

FINDINGS AND DISCUSSIONS

Physics Learning in Indonesia

Physics learning in Indonesia takes place in a very rich social and cultural context. As an archipelagic country with hundreds of ethnic groups and diverse local wisdom, the approach to education in Indonesia cannot be separated from the cultural roots of its people. In the last two decades, the Indonesian government through the Ministry of Education and Culture (Kemendikbud) has encouraged the integration of local cultural values into the learning system, including physics subjects.

One of the characteristics of physics learning in Indonesia is the effort to relate physics concepts with the context of daily life that is typical of Indonesia. For example, natural phenomena such as earthquakes, volcanic eruptions, or monsoon wind patterns are used as contextual material to teach basic physics principles such as force, pressure, and fluid dynamics. As stated by Nurrohman (2016), the use of local wisdom as a contextual medium helps students build a deeper understanding of physics concepts, as they can relate them to their own life experiences.

From a cultural perspective, an ethnoscience-based approach has begun to be applied in various regions, especially in schools that develop a curriculum based on local culture. The concept of ethnophysics, which is a derivative of ethnoscience, allows the integration of cultural concepts such as traditional house structures, traditional agricultural techniques, and people's life patterns into part of physics learning. This is in line with the idea of Afnan et al., (2024) who state that local science can be a bridge to more contextual scientific understanding, without negating modern science.

In addition to the cultural aspect, the didactic practice of physics learning in Indonesia also shows diverse dynamics. Teachers have the flexibility to choose learning strategies, although the national curriculum remains the main reference. Inquiry-based learning models, problem-based learning (PBL), and discovery learning are widely used to encourage students to actively build concepts. According to A. R. Sari et al. (2020), inquiry-based learning strategies combined with local contexts have been proven to be able to improve students' science literacy while strengthening their cultural identity.

However, there are challenges in the implementation of contextual and progressive didactic physics learning in the field. One of them is the limited learning resources and in-depth teacher training on culture-based approaches. There are still many teachers who rely on conventional textbooks without adapting to the local character of students. This is in accordance with the findings of Pratiwi & Asyarotin (2019) which highlight the need to increase the pedagogic capacity of teachers in developing teaching materials based on the environment and surrounding culture.

Furthermore, at the policy level, the government has shown a commitment to strengthening contextual aspects through the Merdeka Learning curriculum. In this policy, teachers are encouraged to differentiate learning and utilize local potential in the preparation of teaching modules. This is in line with the principle of culture-based education stated by Ki Hadjar Dewantara, that education must be rooted in the nation's culture and aim to humanize humans.

Overall, physics learning in Indonesia shows a synergy between efforts to preserve local culture and strengthen students' scientific competence. Despite the challenges in implementation, many good practices can be developed and replicated, especially in terms of integrating cultural values into didactic learning strategies.

Physics Learning in Egypt

Physics learning in Egypt developed in an educational landscape characterized by a long scientific tradition and a centralized educational structure. Egypt is a country with a strong history of scientific civilization since ancient times, and this legacy still influences the way of looking at science education, including physics, to this day. The Egyptian Ministry of Education plays a major role in drafting the national physics curriculum, which is oriented towards strengthening students' scientific concepts and logical reasoning.

In terms of curriculum, Egypt adapted a competency-based curriculum with strong emphasis on mastery of basic concepts of physics and quantitative analysis skills. Based on the National Strategy for Education Reform document (Egyptian Ministry of Education, 2018), the physics learning system in Egypt covers key topics such as mechanics, waves, electricity, and thermodynamics, with an emphasis on practical applications and laboratory experiments (Developments, 2019). Physics lessons at the upper secondary level are geared towards equipping students for highly competitive

national exams, such as Thanaweya Amma, which determine graduation and access to higher education.

In classroom practice, physics teachers in Egypt still dominate the learning process through lectures and direct explanations, but there are efforts to adopt an inquiry and exploration-based approach. According to a study by El-Deghaidy & Mansour (2015), although active learning approaches such as inquiry-based science education (IBSE) have been introduced, challenges in teacher training and school resources are still major obstacles. However, there are excellent schools that have begun to develop STEM-based science learning programs that are more collaborative and applicative.

Culturally, the study of physics in Egypt was also shaped by strong social norms and religious values. In the context of the classroom, the teacher is often respected as an authoritative figure, and the classroom structure tends to be formal. Nevertheless, there is great potential to develop physics learning that takes into account Egypt's cultural heritage, such as the application of optical and architectural principles in the pyramids or the use of mechanical concepts in ancient irrigation systems. Research by Rima et al. (2019) shows that incorporating cultural elements in teaching can increase students' interest and understanding of complex physics concepts.

From a didactic perspective, the physics learning system in Egypt shows similarities to the European model in terms of structure and content of the material, mainly due to the historical influence of British colonialism and the adoption of the modern education system. Physics material is delivered systematically and follows a logical sequence from basic concepts to advanced concepts. Although the constructivist approach has not yet been fully implemented, physics teachers in Egypt are beginning to be trained to use problem-based methods and virtual labs, as learning technology develops.

The main challenge in teaching physics in Egypt is the disparity in resources between schools, especially between public schools in the countryside and private or international schools in large cities. Access to physics labs, simulation devices, and modern textbooks is uneven. As stated by UNESCO (2022), there is a gap in the quality of education between urban and rural areas that affects the effectiveness of science learning in general.

Nevertheless, the Egyptian government has shown its commitment to education reform by launching the Education 2.0 initiative, one of whose main focuses is on improving the quality of science learning and the use of information technology in education. In this context, physics learning is directed to be more applicable and relevant to modern life, such as by relating the material to renewable energy issues and digital technology. This initiative shows a positive policy direction towards the development of more meaningful physics learning and in line with the demands of the times.

Overall, physics learning in Egypt reflects a transition from traditional approaches to more constructivist and contextual learning models. Although there are still structural and pedagogical challenges, innovative efforts have been made, especially at the level of policy and teacher training. Physics education in Egypt has great potential to develop into a learning system that integrates the strengths of local culture and global technological advancements.

Comparative Analysis

1. Comparison of cultural aspects

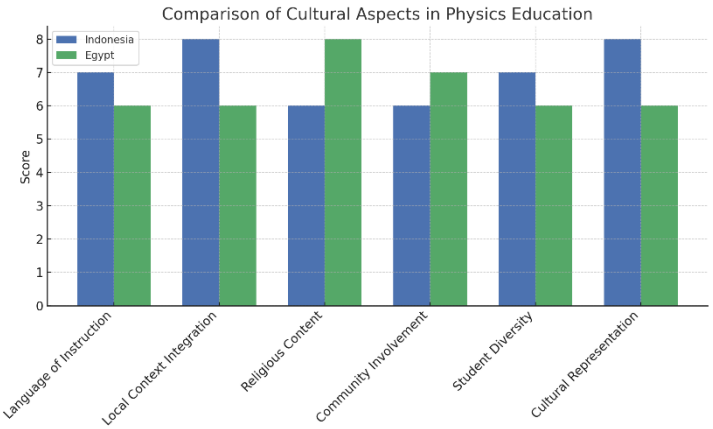
From a review of the education system in Indonesia and Egypt, we obtained a comparison of the cultural aspects of the two countries. By categorizing literature from both countries into the same topic, we obtained the following data.

Table 1. Comparison of Cultural Aspects of Physics Learning in Indonesia and Egypt

Aspek	Indonesia	Egypt
Integration of Social and Cultural Values in Learning	Physics learning in Indonesia began to adopt a local culture-based approach, such as associating physics concepts with traditional activities, local wisdom (e.g. traditional irrigation, earthquake-resistant traditional houses), and the daily practices of local communities.	Physics learning in Egypt also accommodates local socio-cultural values, incorporating themes appropriate to the context of students' lives, such as the desert environment, Nile irrigation agriculture, and the technological heritage of ancient civilizations such as pyramid architecture.
The Contribution of Cultural Context in the Understanding of Physical Concepts	Cultural context is often used to explain abstract concepts. For example, the use of traditional equipment or folklore to explain vibrations and waves.	Egyptian students were introduced to the concept of physics through phenomena close to their lives, such as the effects of heat in a desert environment or mechanics in ancient construction. This helps ground abstract material to their reality.
The Role of Local Wisdom in Learning Practice	Local wisdom such as traditional dating systems, seasonal calculations, and traditional house construction are used to link science to real life.	Local knowledge related to ancient Egyptian science is used as a bridge to understand the principles of modern physics, for example through discussions of Ancient Egyptian technology and its application in today's science.
Curriculum Responsiveness to Cultural Diversity	The Independent Curriculum provides space for teachers to associate learning with the local culture of their respective regions. It encourages	Egyptian curriculum has also begun to provide flexibility in the preparation of teaching materials based on local needs, as well as

	contextual learning and respects diversity.	encouraging the use of cultural contexts in a more humanistic approach to learning.
Student Empowerment through Local Culture	Students are empowered to explore local cultures through inquiry-based projects relevant to their culture. It also builds an identity and a sense of belonging to science.	Learning in Egypt encourages students to explore their nation's intellectual heritage, increase a sense of pride and make learning physics a means of strengthening national identity and civilization.
Use of Media or Local Context in Learning	Teachers often use videos, pictures, or local culture-based props to explain physics concepts. It also helps students in building meaning.	Teachers in Egypt use local sources and historical stories that are relevant to students to create a more real and meaningful learning experience.

Figure 1. Comparison of cultural aspects of physics learning in Indonesia and Egypt



The results of cultural analysis on physics learning in Indonesia and Egypt show that both have peculiarities in integrating cultural values into the educational process. In Indonesia, cultural-based physics learning tends to prioritize a contextual approach through the introduction of local wisdom such as subak in Bali to explain the principle of fluids or traditional houses as a representation of the concept of structural mechanics (Satriawan & Rosmiati, 2017). This is in line with the ethnopedagogical approach, which according to Annisha (2024), emphasizes the importance of making local culture a source of learning to increase the relevance and meaning of education.

Meanwhile, Egypt integrates cultural aspects through scientific and historical heritage, such as the use of ancient Egyptian astronomical knowledge and the introduction of figures such as Al-Haytham in optical learning (Alpaten et al., 2024). This reflects efforts to preserve the nation's historical identity as well as appreciation for

the contribution of past civilizations in the development of modern science. This is in line with Ladson-Billings (1995) view of culturally relevant pedagogy, where students are positioned as part of their history and culture, and empowered through a learning process that respects their identity.

Both approaches have similarities in terms of making learning more meaningful and contextual through cultural integration, but differing in the primary sources used. Indonesia emphasizes more on contemporary local wisdom, while Egypt focuses more on historical heritage and classical Muslim scholars. Both reflect each nation's unique way of maintaining cultural continuity through education.

The implications of these findings show that good practices from Indonesia can provide inspiration for Egypt in the exploration of contemporary local wisdom, while Egypt can be an example for Indonesia in the involvement of Muslim scholars and figures and historians in learning. This is important because, as Nieto, (2017) affirms, multicultural education is not only about tolerance for differences, but also about the recognition of the contribution of culture to science.

Thus, the culture-based physics learning approach in both countries reflects the form of adaptation of education to their respective national identities. Cultural integration in physics learning can be a path to education that not only intellectually educates, but also strengthens the cultural roots and character of learners.

1. Comparison of didactic aspects

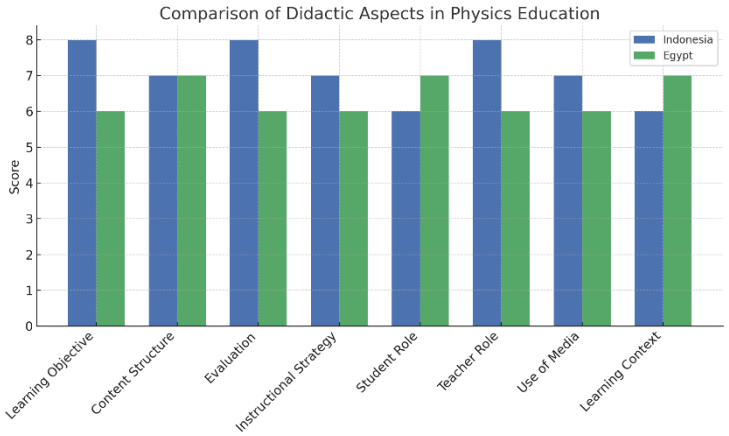
After a comparison of the cultural aspects of Indonesia and Egypt. So it is continued to compare the didactic aspects of the two countries. From the literature that we have obtained, the results are found, namely.

Table 2. Comparison of Didactic Aspects of Physics Learning in Indonesia and Egypt

Aspects	Indonesia	Egypt
Learning Approach	Using a scientific, inquiry-based approach, and starting to implement project- and phenomenon-based learning (PjBL and PBL) in the Independent Curriculum.	Apply a constructivist and problem-solving-oriented approach, with an emphasis on understanding concepts rather than memorization.
Learning Strategies	Strategies vary between group discussions, simple experiments, and the use of the surrounding environment as a learning resource.	The strategy includes case studies, demonstrations, and integration of digital technologies such as simulations and interactive videos.
Learning Model	Models such as Discovery Learning, Problem Based Learning, and Project Based Learning are applied at various levels of educational units.	Active learning models such as Inquiry-Based Learning and Guided Discovery are the focus in the development of physics learning in Egypt.

The Role of the Teacher	Teachers act as facilitators and guides, encouraging students to actively build their own knowledge.	Teachers also function as mediators in the active and critical learning process, with regular training from the government to improve competence
Learning Assessment	Asesmen mencakup formatif dan sumatif. Di Kurikulum Merdeka, asesmen diagnostik dan asesmen berbasis proyek mulai banyak digunakan.	Asesmen menitikberatkan pada keterampilan berpikir tingkat tinggi (HOTS) dan aplikasi konsep dalam kehidupan sehari-hari, serta penggunaan rubrik kinerja.
Use of Technology	Increasing the use of digital media and online learning platforms, especially after the COVID-19 pandemic.	The Egyptian government is actively encouraging the digitalization of schools and the integration of e-learning platforms in physics learning.
Professional Development	Program pelatihan dan komunitas belajar guru seperti Program Guru Penggerak (PGP), serta pelatihan implementasi Kurikulum Merdeka.	Teacher training is carried out centrally by the Egyptian Ministry of Education to improve pedagogic mastery and science content.

figure 2. Comparison of didactic aspects of physics learning in Indonesia and Egypt



Based on the results of the analysis of didactic aspects, it can be seen that both Indonesia and Egypt have shown significant developments in physics learning strategies, albeit with different approaches according to the context of each country's policies, cultures, and pedagogical habits.

In Indonesia, physics learning is driven by a competency-based curriculum and a scientific approach, with an emphasis on active, inquiry, and project-based learning

(Septyaningrum & Lestari, 2023). This is in line with the principles of constructivism, where students are considered as active agents in building their knowledge through experience and interaction (Liu & Matthews, 2005). Learning strategies such as the problem-based learning (PBL) and project-based learning (PjBL) models are widely used in an effort to grow 21st century skills and scientific literacy of students.

Meanwhile, Egypt also showed efforts to improve pedagogical quality by encouraging STEM-based curriculum reforms and digital technology-based approaches (Nasr, 2014). Physics learning in Egypt integrates a lot of digital visualization, simulation, and blended learning approaches, especially since the COVID-19 pandemic. This is in line with the principles of digital pedagogy, which allow for flexibility and student involvement through online and interactive media (Anselmo, 2024).

However, a striking difference can be seen in the focus of the approach: Indonesia emphasizes a more grounded contextual approach, while Egypt is more focused on digital transformation and modernization of learning infrastructure. Even so, both seek to strengthen teacher capacity through professional training and development, which is an important indicator of transformative didactics (Sulaiman et al., 2021), which is the ability of teachers to transform content knowledge into an effective form of teaching.

Another noteworthy similarity is the attention to interdisciplinary approaches and problem-based learning, although the context of implementation is different. In Indonesia, this is often associated with the integration of local values and cultural practices, while in Egypt it is more often coupled with the application of technology and contemporary scientific innovation. This shows that both countries are trying to strike a balance between preserving educational identity and adapting to global challenges.

These findings show that good practices from Indonesia in the use of cultural-context-based learning models can inspire Egypt's approach in bringing science closer to daily life. On the contrary, digital and STEM approaches in Egypt can be valuable lessons for Indonesia in strengthening the integration of technology and innovation in science education. As stated by Rahmayuni Jusar et al., (2023), a responsive education system is one that is able to innovate without losing its cultural roots.

A comparative analysis of physics learning in Indonesia and Egypt shows that cultural approaches greatly influence teaching strategies and orientations in both countries. Indonesia integrates local wisdom into learning to create contextual and meaningful learning experiences, while Egypt shows great concern for the continuity of traditional values by strengthening formal mastery of science. Although their approaches are different, both place culture as an important foundation in the development of physics learning.

From a didactic perspective, physics learning practices in Indonesia emphasize more on participatory approaches and collaborative projects, while Egypt tends to emphasize a systematic structure with a focus on scientific experiments and evidence-based approaches. Both have their own advantages that can complement each other. Good practices from Indonesia can strengthen aspects of local relevance and participation, while the Egyptian approach makes a major contribution in terms of pedagogical order and students' scientific skills.

Thus, these comparative results do not aim to compare quality hierarchically, but to explore good practices that can be an inspiration across cultures. The potential for mutual learning between these two countries is enormous, especially if cultural values and didactic approaches are developed in a more open and collaborative direction. The

ideal physics learning is one that is able to unite local and global forces, and shape students into critical, contextual, and characterful individuals.

CONCLUSIONS

The results of the study of 25 literature from Indonesia and 25 literature from Egypt show that physics learning in both countries has characteristics that are influenced by socio-cultural conditions, educational policies, and pedagogical approaches of each country. In Indonesia, physics learning integrates a lot of local values and the context of daily life, and is driven by a curriculum that makes room for scientific and project-based approaches. Meanwhile, physics learning in Egypt highlights the rich scientific history and heritage of civilization, with an emphasis on consistency in curriculum application and in-depth strengthening of physics concepts. Both countries display distinctive ways of adapting physics learning according to their cultural values and educational systems.

From the results of the comparative analysis, it was found that several good practices that can be adopted with each other to strengthen the quality of physics learning. Indonesia can take inspiration from Egypt in terms of consistency in curriculum implementation and depth of discussion of physics concepts, while Egypt can learn from Indonesia in the application of locality-based contextual learning, as well as the flexibility of methods that bring physics closer to students' lives. In addition, the integration of cultural values, the strengthening of scientific literacy, and the use of innovative media such as technology and local visualization, are relevant good practices to be applied cross-country in order to increase the effectiveness and meaning of physics learning.

As a recommendation, this study suggests that the development of physics curriculum and learning methods in both countries should be carried out by paying attention to cultural and didactic aspects in a balanced manner. Further research can be conducted with a field approach or case studies to evaluate the implementation of good practices that have been identified. In addition, international collaboration in the development of culture-based physics learning can be an important strategy to encourage physics education that is more inclusive, adaptive, and relevant to today's global challenges.

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