



Understanding 'Tunjuk Ajar Melayu Riau': Integrating local knowledge into environmental conservation and disaster education

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ABSTRACT

Disaster education remains crucial in building resilient communities, especially in natural disaster-prone areas. An essential element of the educational strategy in this paper involves local wisdom integration into teaching and learning processes. As such, the 'Tunjuk Ajar Melayu Riau' (TAMR) offers valuable insights with its profound knowledge of nature and environmental conservation. The research in this paper explores local wisdom integration values in TAMR into disaster education to enhance knowledge and didactic transpositions. The main research objectives in this paper include understanding the perspectives and values of local wisdom in TAMR concerning nature conservation as an investment in disaster preparedness values and knowledge (RQ1) and examining how a prototype model of nature conservation values in TAMR could guide local knowledge about disaster integration into disaster education (RQ2). The descriptive qualitative research studied in this paper contains four stages: data collection, data reduction, data display, and conclusion drawing. The study reveals three forms of knowledge transposition in TAMR: expressions, advice, and taboos. These aspects underline the TAMR values as guidance and local knowledge about the disaster - the keeping, utilizing, and preserving nature. The further findings split this preservation concept into land and water areas, which is crucial for spatial planning to reduce disaster risk. TAMR forms the foundation for knowledge and didactic transposition in disaster education to emphasize preventing floods, landslides, droughts, and forest and land fires. The meanings and values of TAMR necessitate further academic exploration to create a more comprehensive understanding and preservation. Integrating TAMR values as knowledge and didactic transposition based on local wisdom into disaster education emerged as a viable strategy for building a community resilient to disasters.

1. Introduction

Riau is one of the provinces in Indonesia with high disaster risk, with a risk score of 147.27, and ranks twelfth out of thirty-four

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provinces. The distribution of disasters in Riau Province are floods, forest and land fires, extreme wave disasters and abrasion, drought disasters, extreme weather disasters, liquefaction disasters, tornado disasters, and landslide disasters. Furthermore, the natural disasters that most often occur are forest and land fires, floods, landslides, and tornadoes. Hence, it can be said that Riau Province is an area that has a high risk of disasters, namely forest and land fires and flood disasters. One of the causes of the forest and land fire disaster in Riau Province is that most of Riau's territory consists of peatlands with an area of 3.89 million hectares [1,2]. Therefore, efforts are needed to minimize the impact of disasters and damage caused by forest fires and floods by conducting socialization on disaster mitigation through education and public awareness by integrating local wisdom owned by the Malay community.

Riau is a land of Malay with a culture and customs influenced by Islamic values. The current values make Islam thick in the life of the Malay community [3]. Hence, Malay culture is guided by "*adat bersendikan syara* (syara based-tradition)" and "*syara bersendikan kitabullah* (syara based on the book of Allah)". The population majority of Riau Province are Malays. Riau has various cultures from each region. The culture of the Riau Malay community cannot be separated from nature, which provides various beauty and benefits for humans [4]. Nature that the Creator has provided must be maintained and not damaged by humans. Various natural environments such as rivers, forests, lakes, swamps, seas, and grasslands are the cultural formations of the Riau Malay community. Cultural preservation is necessary to avoid disappearing from human civilization [5]. Riau Malay culture has values, rules, and norms as guidelines for the Riau Malay community [6].

The Malay cultural system, as described above, aims to ensure that the next generation of the Riau Malay community has excellent or bad measures under the basic Malay ideas to avoid harmful elements. However, other cultural elements constantly challenge and influence the Malay generation. Accordingly, the next generation needs to know cultural values passed down by their ancestors so that they are believed to be able to bring the next generation to adapt to world developments. They always remain civilized and equal to other humans [7]. Thus, the nature conservation values in the '*Tunjuk Ajar Melayu Riau* Malay Teaching), or TAMR, are one of the means to increase cultural values.

Nature conservation value in TAMR is a cultural value from the Riau Malay community. TAMR is a form of guidance for the Malay community to act and behave in daily life [8]. One of the masterpieces in Malay literature, which has become a reference for the Malay community, is TAMR. TAMR contains tips, instructions, advice, trust, teaching, and exemplary examples that are beneficial to human life in a broad sense. According to Malay elders, TAMR is advice, trust, role model, and advice that leads humans to the straight path. Accordingly, it would bring blessings to save people in the world and after that [9] because the Malay people believe that life depends heavily on nature. Nature is a source of livelihood as well as a source of cultural elements and beliefs. Recognizing the close relationship between human life and nature, the Malay community seeks to maintain the sustainability and balance of their natural environment.

The value of nature conservation in TAMR is used as guidelines and local knowledge about environmental preservation and effort to understand and protect the natural environment [3] and culture [5] to be processed and used wisely [10]. TAMR value is advice that provides knowledge about nature conservation and knowledge of disasters. TAMR contains values used as local knowledge of the Malay community in managing and preserving the environment [4], which are used to deal with disasters [11]. Therefore, the local knowledge approach of nature conservation values in TAMR is essential to develop knowledge transposition and didactics in disaster mitigation education.

The value of nature conservation in local wisdom, which is subsequently used as a form of environmental management, has been carried out by the Riau Malay community, including in the form of *lubuk larangan* (prohibition *lubuk*) in the Kampar Community [12–14]. The management of the *lubuk larangan* is carried out using environmental communication patterns through spreading myths, sayings, proverbs, and traditions with various rituals to strengthen the preservation of forest, river, fish, and ecosystem natural resources conducted by traditional leaders (Ninik Mamak). In the Talang Mamak Community, namely in the form of *melambas/basolang menugal* (clearing land for farming), *manumbai* (harvesting wood from the forest), and *manjumbai* (harvesting honey) [15]. Traditions or customs carried out by the Talang Mamak tribe aim to protect and maintain biological resources and create a balanced relationship between humans and nature. In addition, peatland ecosystem management is based on local wisdom focused on socioeconomic and cultural development strategies [16]. Application examples of nature conservation and environmental management values that indigenous peoples have carried out as part of local wisdom in various countries include the belief in the Kodama Spirit in Shinto teachings as local wisdom towards forest sustainability in Japan [17,18]. Through this belief, people in Japan help each other in preserving the forest and reject illegal loggers, so they have a cooperative attitude toward preserving trees in Japanese forests. Therefore, traditional leaders (Ninik Mamak) and stakeholders are essential in conveying messages of environmental concern in preserving nature, especially in utilizing natural resources like forests, rivers, and their ecosystems by maintaining environmental balance and sustainable development based on local wisdom.

Various studies and research have been conducted in the management of nature conservation. As stated by Marnelly et al. [19], providing a theoretical understanding of customary forests and local communities through ecological and socioeconomic knowledge has implications as a guide for sustainable forest resources. Furthermore, the research on the preservation of land and forests through eco-culture, namely the protection of the existence of customary law communities along with their land and all the wealth of their cultural traditions to protect biodiversity, must be recognized, guaranteed, and protected as a form of customary land management in environmental preservation through a cultural approach [20]. Other research indicates that local communities have effectively carried out customary forest management practices in managing and conserving forest resources [21]. Community-Based Forest Management also requires complex governance arrangements between communities and partners [22].

Nevertheless, this practice is increasingly being eroded, negatively impacting the people's and their forests' welfare. Even the government of a country and local governments that protect forests by labelling them as forbidden forests do not necessarily guarantee the sustainability of the existing ecosystems. In contrast, forests are managed under customary systems or those protected by

indigenous peoples [23]. Nature conservation is generally assumed to go hand in hand with sustainable development. Therefore, nature conservation activities are likely to require careful monitoring. Various conservation management interventions aim to address the need to support nature conservation and human well-being, particularly in low-and middle-income countries [24]. Forest conservation will be successful if it is based on the community's cultural customs and strengthens government regulations. In addition, this community-based conservation regeneration cannot be separated from the communication role of local traditional leaders in the mandate to protect the forest.

Based on the explanation above, an application of nature conservation values as a form of environmental management based on local wisdom carried out by indigenous peoples is to maintain environmental balance and sustainable development. However, the values and the application of nature conservation have not been discussed and connected with disaster education. Disaster education is essential in building a resilient community, especially in natural disaster-prone areas. An essential element of the educational strategy in this paper involves integrating local wisdom into the teaching and learning process. As such, TAMR offers valuable insights and deep knowledge about nature and environmental conservation. Therefore, integrating local wisdom values in TAMR as local knowledge in disaster education is essential [25] in developing knowledge transposition and didactic transposition [26] as a component of disaster education. The transposition of knowledge is knowledge or understanding that individuals must possess based on local wisdom values in TAMR, which can be used as a form of disaster preparedness knowledge. Meanwhile, didactic transposition is a competency that individuals possess through transferring knowledge on disaster content and disaster mitigation by integrating local wisdom values in TAMR, which were obtained through education, courses, and training.

The research in this paper explores integrating local wisdom values in TAMR into disaster education to improve knowledge transposition and didactic transposition. The main research objectives in this paper include understanding the perspectives and values of local wisdom in TAMR concerning nature conservation as an investment in disaster preparedness values and knowledge (RQ1) and examining how a prototype model of nature conservation values in TAMR could guide local knowledge about disaster integration into disaster education (RQ2).

2. Methods

The research method used in this paper is descriptive qualitative research. Qualitative descriptive research aims to conduct a complete and in-depth description of social reality and various phenomena that occur in society to present the research object in detail so characteristics and models can be comprehensively known [27]. The research stages consist of four stages: data collection, data reduction, data display, and conclusion drawing.

3. Data collection

Research data were collected through literature and documentation. In addition, the data sources are books, online manuscripts, or scientific articles that discuss TAMR. Furthermore, the researcher recorded all forms of TAMR from the data source. The types and forms of data sources are described in Table 1 below.

3.1. Data reduction

Data reduction is a data processing stage carried out by selecting data, which focuses on simplifying, abstracting, and transforming raw data that emerges from various research records. Moreover, the researcher selects, concentrates, and simplifies the data to obtain a classification based on TAMR expressions related to nature and environmental conservation. Researchers carried out data classification from the data reduction process in the form and value of TAMR. The classification of TAMR consists of expressions, guidelines, advice, teachings, taboos, and punishments. Meanwhile, the TAMR value consists of maintenance, utilization, and preservation values.

Table 1
Types and forms of data sources.

No	Types	Title	Author (s)
1.	Book	Tunjuk Ajar Melayu: Butir-Butir Budaya Melayu Riau	Tenas Effendi, Mahyudin Al Mudra, Muhammad Irfan Shofwani, 2004.
2.	Book	Tunjuk Ajar Melayu	Tenas Effendi, 2006.
3.	Book	Ensiklopedia kebudayaan Melayu Riau	Datuk Mogeek Intan & Taslim F., 2012.
4.	Book	Tunjuk Ajar Melayu dalam Pantun, Gurindam, Seloka, Syair, dan Ungkapan	Tenas Effendi, 2013.
5.	Book	Lambang dan Falsafah dalam Seni Bina Melayu	Tenas Effendi, 2013.
6.	Book	Pendidikan Budaya Melayu Riau	Taufik Ikram Jamil, 2018.
7.	Online Manuscripts	Tunjuk Ajar Melayu dan Tenas Effendy	Dedi Arman, 2018.
8.	Articles	Tunjuk Ajar Melayu dalam Syair Karya Tenas Effendy sebagai basis Pendidikan Karakter	Alber, 2017.
9.	Articles	Nilai Kearifan Lokal dalam Tunjuk Ajar Melayu Karya Tenas Effendi	Marlina, 2020.

3.2. Data display

Data display is a stage of research results arranged in detail to provide a complete picture. Before describing the research data, the researcher checks and validates the informants. The informants refer to traditional community leaders, humanists, and academics. It is carried out to obtain valid research data. Furthermore, TAMR expressions are classified as expressions, advice, and taboos. Meanwhile, the TAMR value consists of maintenance, utilization, and natural and environmental conservation linked to the disaster.

3.3. Conclusion drawing

Concluding or conclusion drawing is the stage of conveying information obtained from data compiled and grouped, subsequently presented. Conclusions could be placed at the end or as a cover so that the reader could find the conclusions of the entire research.

4. Results

Nature conservation values in TAMR are a local wisdom form of the Malay community. Three terms are often used in interpreting the meaning of local wisdom: local knowledge, local wisdom, and local genius. Local wisdom is divided into two concepts, social and ecological wisdom. Social wisdom emphasizes the formation of social beings to become wiser and wiser, while ecological wisdom is a guide for humans to be wise in interacting with the environment. The social and ecological wisdom contained in TAMR provides guidance and local knowledge in disaster mitigation education in the community. A permanent and integrative disaster reduction culture could be built through education and public awareness. The value of social and ecological wisdom in TAMR would be collected, reduced, analyzed, and presented to determine the form of instilling the value of preservation as a form of knowledge on disaster preparedness, which would eventually form a prototype model of local knowledge on the disaster that is integrated into disaster education.

RQ1. Perspectives and values of local wisdom in TAMR concerning nature conservation as an investment in disaster preparedness values and knowledge

Etymologically, wisdom is intelligence in carrying out an action or deed based on knowledge [28]. Taboo for the Malay community is a threat and would cause damage to the perpetrators [29]. The Malay community threatens and humiliates those who break the taboo. The concept of the wisdom of the Malay community regarding taboo violations contained in TAMR can be shown as follows.

4.1. *Jika rasa malunya hilang, hidupnya Akan seperti binatang*

(If his/her shame goes away, his/her life would be like an animal)

Based on the expression above, it is clear that Malay teachings provide shyness advice, which reflects morality [29,30]. Malay people are ashamed to make mistakes, ashamed to act rudely, ashamed to boast, ashamed to lie, ashamed to betray, ashamed to rebel, and ashamed to destroy the environment [31,32]. Furthermore, being ashamed of environmental damage is the Malay community's way of preserving the environment to avoid natural damage and disasters [3]. The Malay community believes disaster will befall when they violate taboos [9]. For example, by destroying forests, various disasters would occur due to these actions: floods, droughts, and forest and land fires. In addition, a Malay expression related to nature conservation can be described as follows.

4.2. *Tanda ingat kepada Tuhan*

(A sign of remembering God)

4.3. *Menjaga alam ia utamakan*

(Protecting nature is the priority)

4.4. *Apa tanda hidup beriman*

(What are the signs of a life of faith?)

4.5. *Tahu menjaga kampung halaman*

(Know how to take care of hometowns)

The expression above describes that the Malay people rely on the power of God and the universe as a basis for forming traditions and customs in protecting and preserving nature. It can be seen that the Malay community's efforts to state that a good attitude toward nature is a form of good action toward humanity [33]. In addition to protecting and maintaining nature, the hometown also has an essential position for the Malay community. The Malay community formed the hometown based on the spatial orientation that follows the sea and river lines [3]. Protecting and caring for nature and your hometown is a valuable concept of disaster preparedness. The landscape as a form of protecting and caring for nature and the hometown as a form of disaster preparedness can be shown in the

following Fig. 1 below.

The traced Malay phrase is related to nature, and the target is none other than how the future of society is guaranteed from a human perspective. Malays explain that the concept of the future is not only limited to the short term or one generation but also from one generation to another, even after someone dies [34]. Malay expressions used as teachings or advice related to nature to be conveyed to the next generation can be described as follows:

Tanda ingat ke anak cucu (A sign of remembrance for posterity)

Merusak hutan hatinya malu (Ashamed to destroy the forest)

Tanda ingat ke hari tua (A sign of remembering the old days)

Laut dijaga, bumi dipelihara (Protect the sea, protect the earth)

Tanda ingat ke hari kemudian (A sign of remembering the afterlife)

Taat menjaga laut dan hutan (Obedient to protect the sea and the forest)

The Malays say that the space of life is a vast expanse as far as the eye can see, which is guarded in tradition by the state [4]. As a natural-forming element, in Malay culture, the land forest is a communal living space with its respective functions [5]. An essential element of the Riau Malay traditional territory is the land and the forest on the ground [3,35]. The spatial pattern of traditional territory follows the cosmological elements of the Riau Malay traditional territory, namely land for life and forest as a home for the 'Malay spirit' [30–32].

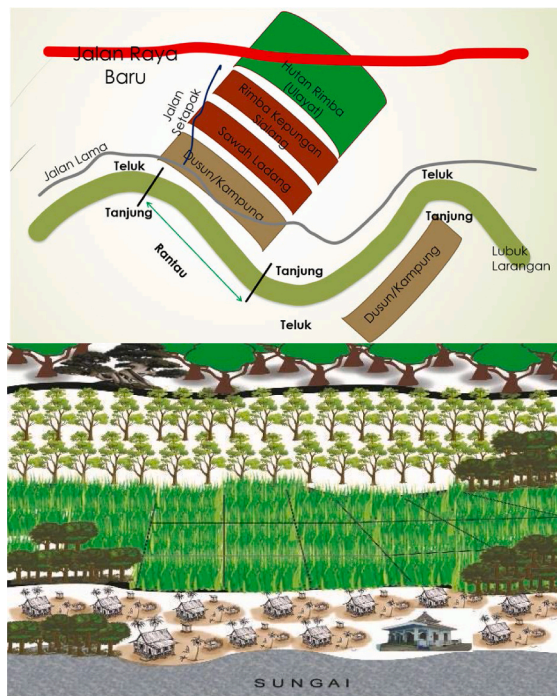
Malays do whatever is related to their lives. The concept of "*alam muncul seperti guru* (nature emerges like a teacher)" is a verbal and visual memory referring to nature, which indicates a harmonious relationship between humans, society, and the environment [4]. Various economic activities like land clearing reflect one form of Malay ecological wisdom. The Malays cut down forests or cleared land for agriculture over time. Starting from cutting bushes, felling trees, felling, sweeping, burning, felling, cleaning, and levelling are parts of the land clearing process. It is different from "*adab melukah ikan* (catching fish)." The Malays always use fishing nets with holes large enough to catch only large fish [9]. The TAMR that provides advice to be used as a guide in utilizing, processing, preserving, and preserving nature can be described as follows:

Tanda orang memegang amanah (Signs of people holding trust)

Pantang merusak hutan dan tanah (Abstain to destroy the forest and land)

Beramu tidak merusak kayu (Beramu does not damage wood)

Berotan tidak merusak hutan (Having rattan does not destroy the forest)



Mainland Area

Jalan raya baru (new highway)

Jalan lama (old street)

Jalan setapak (footpath)

Dusun/kampung (hamlet/village)

Sawah ladang (farmland)

Rimba kepungan sialang ('sialang' tree forest)

Hutan rimba (forest)

Water Area

Teluk (bay)

Tanjung (headland)

Lubuk larangan (prohibition lubuk)

Sungai (river)

Fig. 1. The landscape pattern of nature conservation in the Malay community.

Bergetah tidak merusak rimba (Gummy doesn't destroy the jungle)
Berumah tidak merusak tanah (Having house doesn't destroy the land)
Berkebun tidak merusak dusun (Gardening doesn't damage the village)
Berkampung tidak merusak gunung (Camping doesn't destroy mountains)
Berladang tidak merusak padang (Farming does not destroy the field)
Adat hidup memegang amanah (The custom of life holds the trust)
Tahu menjaga hutan tanah (Know how to protect the forest land)
Tahu menjaga bukit dan lembah (Know to protect hills and valleys)

Malays learn from the universe. Presumably, someone should avoid destroying nature. Related to the expression above, Malays view nature as an essential living space. Therefore, Malays would live in harmony with nature. In addition, Malays see nature as a way to earn a living and as related to culture and beliefs [3]. Malay expressions of the relationship between the Malays with nature in the care and preservation of nature can be clearly stated as follows:

Kalau tidak ada laut, hampalah perut (If there is no sea, the stomach will be starving)
Bila tak ada hutan, binasalah badan (If there is no forest, the body perishes)
Kalau binasa hutan yang lebat (If the dense forest perishes)
Rusak lembaga hilanglah adat (The institutions are broken the custom is lost)

The truth of the above expression's contents can be seen in everyday life. Traditionally, the Malays have lived from seafood and forest products or cultivated the land for generations. For generations, forests were produced for various purposes, including making buildings, household equipment, fishing and hunting, farming tools, and so on, as well as traditional medicinal ingredients. Malay wisdom to preserve nature is presented in social values, customary norms, environmental ethics, belief systems, traditional spatial planning patterns, simple equipment, and environmentally friendly technology. The interrelationship between nature and the Malays is characterized by productivity, sustainability, equity, wisdom, correctness, accuracy, harmony, and harmony.

Malay culture expresses environmental relations through referential adherence. The Malay culture in a pattern moves following the ecological movement. This cultural expression form displays acceptance of the universe as it is interpreted in a spirit of obedience through various traditional or ritual ceremonies.

RQ2. Prototype model of nature conservation values in TAMR can guide local knowledge about disaster integration into disaster education

The dynamics of Malay culture in which the living space environment affects Malay culture means that the development or inhibition of the development of Malay culture depends on the environment, both the physical environment, biological environment, flora, fauna, and social environment [35]. As a result, there are various teachings, the advice of the elders related to prohibiting children and grandchildren from destroying forests, and knowing which forests are allowed to be cut down and which are prohibited areas [36]. Guidelines on forest use are carefully defined. Regarding cutting down trees, it is explained what is allowed to be cut, how much, and what is not to be cut. The expression of TAMR as a guide in the use and conservation of nature as local knowledge about disasters can be shown as follows:

Tebang tidak merusakkan (Cutting does not destroy)
Tebang tidak membinasakan (Cutting does not destroy)
Tebang tidak menghabiskan (Cutting does not spend)
Tebang menutup aib malu (Cutting to shut down the shame)
Tebang membuat rumah tangga (Cutting makes a household)

In addition, the abstinence values contained in the TAMR are described as follows:

Pantang menebang kayu tunggal (Abstain to cut a single wood)
Pantang menebang kayu berbunga (Abstain to cut down flowering wood)
Pantang menebang kayu berbuah (Abstain to cut down fruitful wood)
Pantang menebang kayu semina (Abstain to cut down semina wood)
Pantang menebang induk gaharu (Abstain to cut down the mother of gaharu)
Pantang menebang induk kemenyan (Abstain to cut the mother of frankincense)
Pantang menebang induk damar (Abstain to cut down the main resin)

The forest is an essential element in the formation of Malay culture. Forest is a source of life for all creatures. Therefore, it is essential to establish a harmonious relationship between living things, especially humans and forests [37]. Forests for Malays are natural resources essential to the community's economic life [38]. Forest and land are two terms related to the rights and dignity of the Malay community. The owner's dignity is disturbed if these rights and dignity are disturbed. The Malay community recognizes forest land belonging to a specific group, person, or community, which is commonly referred to as "forest land" or "ulayat land" and managed according to customary law and subject to state law (Ramli, 2016; Thamrin, 2015).

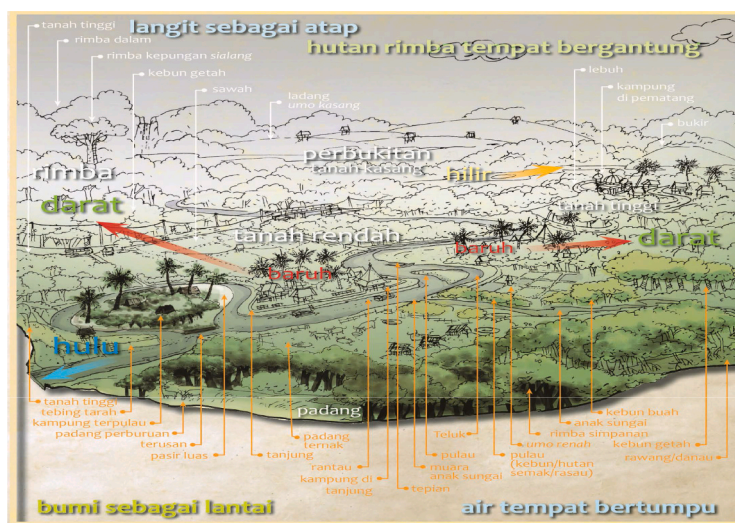
Forests in the context of the Malay community consist of saving forests and forbidden forests. This customary law creates the compliance of the Malays to cultivate and utilize the natural environment. In customary forests, approval must be obtained from customary leaders or traditional leaders to cut wood; subsequently, they must plant similar types of wood before logging. The allotment of wood may not be used as merchandise and only for houses of worship, public facilities, social assistance to underprivileged families, and state uses [39].

The openness of the Malays to protect the natural environment has been going on for a long time—the dialogue between Malays and nature on utilization and conservation [40]. For example, Malays do not kill bees that protect honey in their hives in tasting activities. On the contrary, they consider the bee an animal that should be guarded and admired. *Manumbai* is the activity of taking honey from the bees on the Sialang tree, which is carried out in a series of processions. This activity is carried out on a dark moon night, in a location where the growth of a cross or a tree where bees nest [39].

Malay culture is substantial and apparent in managing space. In TAMR, it has been firm and clear to provide management and spatial planning instructions. TAMR contains values used as guidelines for nature conservation in the form of spatial planning so that it is used as a guide and local knowledge of the Riau Malay community as a form of disaster preparedness, as shown in Fig. 2 below.

The landscape depicted in Fig. 2 describes the Malay community as having an interrelationship with nature, resulting in a philosophy of protecting the environment as a form of nature conservation. With this philosophy, parts of nature have been divided based on their respective functions and benefits. It is a form of local values and knowledge that can be integrated into teaching and learning to enhance knowledge and didactic transposition in disaster education.

Fig. 2 depicts the division of space as a form of environmental preservation and the following explains the division of space in question.



Philosophy about nature conservation

- *Langit sebagai atap* (the sky as the roof)
- *Hutan rimba tempat bergantung* (jungle as a place to depend on)
- *Bumi sebagai lantai* (earth as floor)
- *Air tempat bertumpu* (water as a base)

Water area (River)

- *Hulu* (upper river)
- *Hilir* (lower river)
- *Teluk* (bay)
- *Muara/ anak sungai* (creek)
- *Terusan* (canal)
- *Tanjung* (headland)
- *Tepian* (riverside)

Mainland area

- *Darat* (land)
- *Baruh* (lowland)
- *Tanah tinggi* (upland)
- *Rimba dalam* (deep jungle)
- *Rimba kepong sialang* ('Sialang (tree)' forest)
- *Kebun getah* (rubber garden)
- *Sawah* (Rice Field)
- *Ladang umo kasang* ('*umo kasang* [tree] field)
- *Lebu* (*jalan/ lorong*) (street / alley)
- *Kampung di pematang* (village in the embankment)
- *Bukit/ perbukitan* (hill)

- *Tebing tarah* (cliffs)
- *Kampung terpulau* (island villages)
- *Padang perburuan* (hunting field)
- *Pasir luas* (extensive sand)
- *Padang ternak* (cattle pasture)
- *Rantau kampung di tanjung* (villages on the cape)
- *Pulau* (island)
- *Kebun buah* (orchards)
- *Rimba simpanas* (forest savings)

Fig. 2. Landscape spatial arrangement of the Malay community.

■ Information of Fig. 2. (Source: Elmustian)

Tanah kampung (Village land), which means a place where houses stand in a row, is a place for people to make villages and countries. TAMR phrase says:

- Yang disebut tanah kampung* (The so-called village land)
- Tempat berkampung orang ramai* (A place for people to live)
- Tempat berkumpul sanak saudara* (A place for relatives to gather)
- Tempat berhimpun dagang lalu* (Past trade meeting place)
- Tempat berundi bermufakat* (A place of deliberation)
- Tempat beradat berpusaka* (Traditional place of heritage)
- Tempat gelanggang didirikan* (Where the arena is set up)

Another expression also states that:

- Yang disebut tanah kampung* (The so-called village land)
 - Berkeliling tanah dusunnya* (Walking around the village)
 - Berkeliling tanah ladangnya* (Walking around the farm)
 - Tanah bertentu pemakaiannya* (Specific land use)
 - Tanah bertentu letak gunanya* (Certain land is where the use is)
- (Effendy, 2013)

Tanah dusun (Dusun land) is land designated for gardens with hardy plants, which are utilized for reserves for expansion or addition of village areas. The TAMR expression states:

- Kampung ada dusunnya* (The village has a hamlet)
- Dusun tua dan dusun muda* (Old hamlet and new hamlet)
- Tempat tumbuh tanaman keras* (A place to grow perennials)
- Apalah tanda tanah dusun* (What the sign of the village land is)
- Jalin berjalin batang pinang* (Intertwine areca nut stems)
- Menghitam masakny manggis* (Blackened of mangosteen ripening)
- Memutih bunga buah keras* (Whitening hard fruit flowers)
- Mempelam bersabung buah* (Eating mango as mingled fruit)
- Buah pauh bertindih tangkai* (The fruit overlaps the stalk)
- Buah rambai masak berayun* (Swinging ripe rambai fruit)
- Buah durian masak bergantung* (Hanging ripe Durian fruit)
- Buah cempedak berlumut batang* (Cempedak fruit with mossy stems)
- Buah macang mematah dahan* (Tiger fruit breaking branches)

Tanah peladangan (Cultivated land), namely land provided, is a place to cultivate. According to tradition in the area, the Malays practice shifting cultivation, but it is strictly prohibited to move out of the area that has been provided. The TAMR phrase reveals:

- Apalah tanda tanah peladangan* (What the signs of a farm are)
- Tempat berladang orang banyak* (The place of the multitude's fields)
- Berladang menurut adatnya* (Farming according to the tradition)
- Setahun sedikitnya* (A year is at least)
- Tiga tahun naik panjatnya* (Three years is the increase)
- Cukup musim awak beralih* (Quite season to switch)
- Beralih ke belukar tua* (Switch to the old thicket)

Another expression also states that:

- Apalah tanda tanah peladangan* (What the signs of a farm are)

Tempat berladang berbanjar-banjar (A place for clustered farming)

Bukan berladang pencil memencil (Not farming in a simple way)

Bukan berladang bersuka hati (Not farming with joy)

Bukan pula menurutkan selera (Not following the desire)

Berladang menurut undang adatnya (Farming according to customary law)

Yang disebut adat berladang (The so-called farming customs)

Rimba larangan (The prohibited jungle) is a forest that cannot be destroyed but must be maintained and preserved. The prohibited jungle consists of two types (a) silang siege forest and (b) forest reserves. The TAMR phrase reveals:

Apa tanda kepungan sialang (What is the sign of the damn siege)

Tempat sialang rampak dahan (The place to cross the branches)

Tempat lebah meletakkan sarang (Where the bees lay their hives)

Rimba dijaga dan dipelihara (The jungle is guarded and cared for)

Rimba tak boleh ditebas tebang (The jungle cannot be cut down)

Table 2

Integration of the form and value of TAMR with the type of disaster.

TAMR	Value	Kind of Disasters
Expression		
<i>Tanda orang memegang amanah</i> (Signs of people holding trust)	Keeping, Preservation	Floods, landslides, droughts, and forest and land fires
<i>Pantang merusak hutan dan tanah</i> (Abstain to destroy the forest and land)		
<i>Apa tanda kepungan sialang</i> (What is the sign of the damn siege)	Keeping, Utilization	Forest and land fires
<i>Tempat sialang rampak dahan</i> (The place to cross the branches)		
<i>Tempat lebah meletakkan sarang</i> (Where the bees lay their hives)		
<i>Rimba dijaga dan dipelihara</i> (The jungle is guarded and cared for)		
<i>Rimba tak boleh ditebas tebang</i> (The jungle cannot be cut down)		
<i>Bila ditebas dimakan adat</i> (If it is cut, it is controlled by custom)		
<i>Bila ditebang dimakan undang</i> (If it is cut down, it is subjected by law)		
<i>Apa tanda rimba larangan</i> (What is the sign of the prohibited jungle)	Keeping, Utilization	Floods, landslides, droughts, and forest and land fires
<i>Rimba dikungkung dengan adat</i> (The jungle is protected by custom)		
<i>Rimba dipelihara dengan lembaga</i> (Jungle is nurtured with institutions)		
<i>Tempat tumbuh kayu kayan</i> (A place of Kayan wood growing)		
<i>Tempat hidup binatang hutan</i> (Where animals live)		
<i>Tempat duduk saudara akuan</i> (A seat place for siblings)		
<i>Tempat beramu dan berburu</i> (A place for gathering and hunting)		
<i>Tempat buah bermusim-musim</i> (A place of seasonal fruit)		
<i>Rima tak boleh rusak binasa</i> (Rhyme cannot be damaged or destroyed)		
Advice		
<i>Beramu tidak merusak kayu</i> (Beramu does not damage wood)	Keeping, Utilization	Floods, landslides, droughts, and forest and land fires
<i>Berotan tidak merusak hutan</i> (Having rattan does not destroy the forest)		
<i>Bergetah tidak merusak rimba</i> (Gummy does not destroy the jungle)		
<i>Berumah tidak merusak tanah</i> (Having house does not destroy the land)		
<i>Berkebun tidak merusak dusun</i> (Gardening does not damage the village)		
<i>Berkampung tidak merusak gunung</i> (Camping doesn't destroy mountains)		
<i>Berladang tidak merusak padang</i> (Farming does not destroy the field)		
<i>Adat hidup memegang amanah</i> (The custom of life holds the trust)	Keeping	
<i>Tahu menjaga hutan tanah</i> (Know how to protect the forest land)		
<i>Tahu menjaga bukit dan lembah</i> (Known to protect hills and valleys).		
<i>Tebang tidak merusakkan</i> (Cutting does not destroy)	Keeping	
<i>Tebang tidak membinasakan</i> (Cutting does not destroy)		
<i>Tebang tidak menghabiskan</i> (Cutting does not spend)		
<i>Tebang menutup aib malu</i> (Cutting to shut down the shame)		
<i>Tebang membuat rumah tangga</i> (Cutting makes a household)		
Taboos		
<i>Pantang menebang kayu tunggal</i> (Abstain to cut a single wood)	Preservation	Floods, landslides, droughts, and forest and land fires
<i>Pantang menebang kayu berbunga</i> (Abstain to cut down flowering wood)		
<i>Pantang menebang kayu berbuah</i> (Abstain to cut down fruitful wood)		
<i>Pantang menebang kayu semina</i> (Abstain to cut down semina wood)		
<i>Pantang menebang induk gaharu</i> (Abstain to cut down the mother of gaharu)		
<i>Pantang menebang induk kemenyan</i> (Abstain to cut the mother of frankincense)		
<i>Pantang menebang induk damar</i> (Abstain to cut down the main resin)		

Bila ditebas dimakan adat (If it is cut, it is controlled by custom)
Bila ditebang dimakan undang (If it is cut down, it is subjected by law)

Another expression also states that:

Apa tanda rimba larangan (What is the sign of the prohibited jungle)
Rimba dikungkung dengan adat (The jungle is protected by custom)
Rimba dipelihara dengan lembaga (Jungle is nurtured with institutions)
Tempat tumbuh kayu kayan (A place of Kayan wood growing)
Tempat hidup binatang hutan (Where the animals live)
Tempat duduk saudara akuan (A seat place for siblings)
Tempat beramu dan berburu (A place for gathering and hunting)
Tempat buah bermusim-musim (A place of seasonal fruit)
Rima tak boleh rusak binasa (Rhyme cannot be damaged or destroyed)

Based on the previous explanation, the value of nature and environmental preservation contained in TAMR can be used as a knowledge transposition and didactic transposition in the form of integration into disaster education. Forms of TAMR, values, and types of disasters that can be integrated into disaster education are shown in Table 2.

Table 2 illustrates that TAMR can be classified into three forms, expression, advice, and taboo. The three forms of TAMR have the value of keeping, utilizing, and preserving natural resources. The form and value of TAMR are the basis of disaster knowledge and preparedness. The analysis results conclude that the form and value of TAMR are used as a form of disaster mitigation knowledge at the stages of preventing floods, landslides, droughts, and forest and land fires. These disasters are caused mainly by human activities that destroy nature.

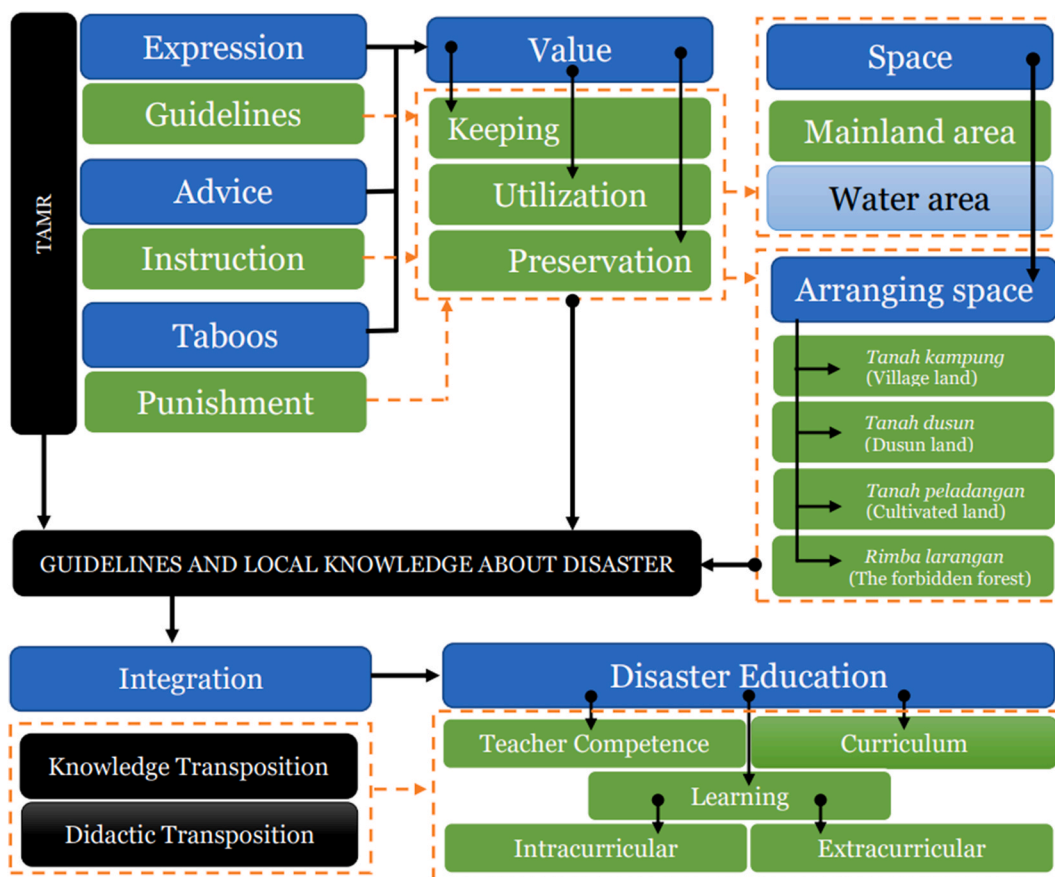


Fig. 3. The prototype model of nature conservation values in TAMR guides local knowledge about disaster integration into disaster education.

Based on the explanation described above, the prototype model for nature conservation values in TAMR as local wisdom in the form of local knowledge on disaster prevention, primarily floods, landslides, droughts, and forest and land fires integrated into the disaster education can be seen in Fig. 3 below.

Fig. 3 illustrates the prototype model of nature conservation values in TAMR as a guide and local knowledge about the disaster that is integrated into disaster education. The prototype model is a pattern of dissemination of disaster mitigation through education and community awareness based on local wisdom owned by the Malay community. TAMR is local wisdom in the form of expressions, advice, and taboos that value maintaining, utilizing, and preserving nature and the environment. Hence, TAMR is used as a guide and local knowledge about the disaster. TAMR is the basis for knowledge transposition and didactic transposition in disaster education, primarily floods, landslides, droughts, and forest and land fire disasters implemented into teacher competencies, curriculum, learning, intracurricular, and extracurricular.

5. Discussion

The form and value of TAMR are the basis of disaster knowledge and preparedness. The forms and values in TAMR are used as the basis for disaster mitigation knowledge to prevent floods, landslides, droughts, and forest and land fires. These disasters are caused mainly by human activities that destroy nature. Therefore, it is essential to socialize TAMR through education and community participation to reduce disaster risk through disaster prevention and preparedness.

The views and values of local wisdom contained in TAMR regarding nature conservation are the local knowledge of the Malay community regarding disaster prevention and preparedness. It is because the available nature is a source of life for the Malay people. The values contained in TAMR are a guide and local knowledge about the disaster. TAMR is the basis for knowledge and didactic transposition in disaster education [26,41], primarily floods, landslides, droughts, and forest and land fires. The knowledge in TAMR contains the maintenance, use, and preservation of nature, which indicates that the Malay community uses it to prevent disasters [42]. Human knowledge about disasters is essential [43]. Therefore, disaster knowledge needs to be disseminated through education and community participation in the form of disaster education. The impact of disaster education through local wisdom would foster cognitive abilities, solve problems, and improve perceptions and actions that must be taken in disaster management [28,44]. Bad events that occur in the community can be overcome through community knowledge regarding the values of keeping, utilizing, and preserving natural resources as a form of prevention [45].

The social and ecological wisdom contained in the TAMR provides local guidance and knowledge in disaster mitigation education in the community, primarily floods, landslides, droughts, and forest and land fires. Building a permanent and integrative culture of disaster reduction can be applied through education [28]. Educational efforts aim to change one's behavior [46]. Disaster education seeks to improve protective measures by providing information about hazards and risks [47]. If it is planned effectively and appropriately implemented, in the end, people will be familiar with safety practices in all disaster-related actions. Disaster risk reduction and prevention education should be designed to build a safe culture and resilient community. Disaster education is one of the internal solutions in the community to reduce the impact of disasters and familiarize the community to be responsive and alert to occurred disasters [48]. Disaster education has various forms, from community-based disaster management and education to disaster-aware communities and local wisdom in dealing with disasters. Local community-based disaster management increases communities' capacity to help themselves and their groups deal with disaster threats and hazards [28,49,50]. Therefore, integrating local knowledge through social and ecological wisdom contained in TAMR is essential to facilitate knowledge and didactic transposition in teaching and learning disaster education.

The disaster preparedness model through community-based environmental conservation includes prevention, mitigation, preparedness, emergency response, and recovery [46]. Community-based disaster management is essentially a local community-based response method. This approach accommodates the potential and social capital that exists in the community as a resource for implementing disaster management programs [28]. Hence, it is hoped that the community will be responsive and aware that they live in disaster-prone areas. TAMR is one of the disaster management models in the Riau Malay community and society, which is used as a guide and local knowledge in dealing with disasters. The TAMR model used for nature conservation consists of expressions, advice, and taboos containing maintenance, utilization, and conservation values to manage space and human-nature relations in land and water areas [4,33]. Ultimately, it would provide guidance and knowledge for the community or society in dealing with disasters [51]. Local instructions and knowledge about nature conservation in TAMR can be used as a source of material in teaching and teaching disaster education. As a result, disaster education based on local wisdom could be easily understood, absorbed, and implemented by teachers and students in the learning process. Thus, it provides knowledge in protecting the environment to minimize the impact of disaster risks expectedly.

The local wisdom contained in the TAMR as a guide and local knowledge about disasters has three adaptation processes, namely [1] pass on knowledge about disasters [2], community social control, and [3] real action. These three processes go hand in hand and complement each other and become a record that accompanies people's lives [45,52]. Apart from the transfer of experience, knowledge of disasters and natural phenomena owned by the community is often framed in a consensus or agreement. The community components mutually agree upon specific agreements, and the emergence of agreements indirectly raises social control in society, either formally institutionalized norms or only values that must be adhered to together [46]. Although there are various roles in the process, various parties are based on the belief that they live in the exact nature and environment. Violation of nature does not only affect the individual who violates it but is also experienced by the surrounding community as a whole.

Disaster education integrated with local culture or wisdom is expected to form a disaster-aware community [28]. The method is carried out by understanding concepts related to the disaster to develop the understanding and awareness needed to adapt to life in

disaster-prone areas. The meaning of disaster education is a conscious effort to create a society that cares, knows, and has the skills to overcome disaster problems and avoid disaster problems that may arise in the future [53].

The level of disaster vulnerability the community faces makes them study how to adapt to nature and the surrounding environment engaging. At this point, local wisdom is used as an object of study with a significant role in society [54]. The local wisdom of the community in planning disaster management is essential because transferring knowledge about disasters would be effortless if it utilizes local wisdom [55]. Various environmental changes as a result of a disaster would have an impact on their survival, either positive or negative. Hence, local wisdom emerges as an effort to manage the changes that may be encountered, increasing the opportunities for profits and minimizing the negative impacts. Therefore, the value of local knowledge and wisdom in TAMR, which provides instructions and guidelines in nature conservation, is essential as an approach and material content that could be integrated into disaster learning. Integrating local knowledge's value in TAMR could facilitate knowledge transfer and didactic transposition in disaster education, so that it can be used as a basis for preliminary studies in the design and development of didactic transposition in disaster education [56–61].

6. Conclusion

Success in dealing with disasters is implementing the conservation values model in the TAMR as an engaging guide and dissemination of local knowledge about disasters. The ability to utilize TAMR values in building togetherness values and wisdom in protecting and preserving the environment is one of the keys to success. In addition, building a resilient community by maintaining TAMR values would be a force in building disaster education.

Based on the research results of the values contained in TAMR, three forms of knowledge transposition were found: expressions, advice, and abstinence. Regarding the knowledge transposition, the values contained in TAMR are classified as guidance and local knowledge about disasters, namely maintenance, utilization, and nature conservation. In TAMR, the maintenance, utilization, and conservation of nature are divided into two spaces, land and water areas, which are used as the basis for spatial planning to reduce disaster risk. These aspects become essential in preventing and dealing with the threat of floods, landslides, droughts, and forest and land fires.

The meanings and values contained in TAMR need to be scientifically studied and developed so that they can be understood by the wider community and become an essential part of being preserved as an effort to build a community that is resilient to disasters. The action integrates TAMR values as knowledge transposition and didactic transposition of local wisdom in disaster education.

The limitation of the research is the acquisition of data sources only through a literature review of books and articles, so further in-depth studies are needed through focus group discussion (FGD), case studies, and field studies involving the local community directly.

Author contribution statement

Eddy Noviana, Hasnah Faizah, and M. Nur Mustafa: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed Reagents, materials, analysis tools or data; Wrote the paper.

Elmustian, Hermendra, Otang Kurniaman: Contributed reagents, materials, analysis tools or data; Wrote the paper.

M. Arli Rusandi and Dominikus David Biondi Situmorang: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Dominikus David Biondi Situmorang has the position to declare himself as one of Associate Editors in this journal. However, this article has been handled by another unidentified Associate Editor and reviewed by the Reviewers in an objective and double-blind manner, according to applicable regulations from Elsevier, Heliyon, and Cell Press.

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