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Pottery craft development: Upgrading the traditional combustion management patterns for product quality and aesthetics in *Pagelaran* Village, Malang

Pengembangan kerajinan gerabah: Peningkatan pola pengelolaan pembakaran tradisional untuk mutu dan estetika produk di Desa Pagelaran, Malang

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KEYWORDS

aesthetic innovation, combustion process, pottery, *Pagelaran*

ABSTRACT

This study examines the process of improving the quality of pottery products from Pagelaran village in Malang mainly by improving the traditional combustion process. The traditional pottery craftsmen in this area have faced issues with both the aesthetic values and quality standard of their products, even having defective products due to poor processes. Despite these challenges, pottery craft in Pagelaran is considered a cultural heritage that has contributed to the welfare of craftsmen and the local community, as well as the preservation of local wisdom. To improve the quality of their products, the craftsmen in Pagelaran have focused on the way they use tools and materials, the technical production process by linking technology and the environment, the method used, and the effect on future environmental changes. This study employs a descriptive qualitative and action research, which involves the craftsmen community in *Kampung Edukasi Wisata*. Data is collected through observation and in-depth interviews and analyzed using the 6P simultaneous stages technique proposed by Winarno and Robfiah (2020). The findings of the study show that while the tools and materials used in the pottery production are still traditional, the pottery of Pagelaran is leading to innovative aesthetic products. Pottery production activities have an impact on the physical environment, requiring technology, methods, and cultural impact in the exploitation of the environment under the cultural ecology perspective. Despite the traditional production process, it has been integrated with user demands so that the quality of the product is improved through the standardization of the combustion process, product decoration, and additional touches of aesthetic values on the products. Overall, this study provides insights into how traditional craftsmen can improve their product quality through a focus on both the technical production process and cultural impact.

KATA KUNCI

estetika inovasi, proses pembakaran, gerabah, Pagelaran

ABSTRAK

Penelitian ini mengkaji proses peningkatan kualitas produk gerabah di desa Pagelaran Malang terutama dengan perbaikan proses pembakaran tradisional. Pengrajin gerabah tradisional di daerah ini menghadapi kendala baik dari segi nilai estetika maupun standar kualitas produknya, bahkan produknya seringkali cacat karena proses yang kurang baik. Terlepas dari tantangan tersebut, kerajinan gerabah di Pagelaran dianggap sebagai warisan budaya yang berkontribusi terhadap kesejahteraan pengrajin dan masyarakat setempat, serta pelestarian kearifan lokal. Untuk meningkatkan kualitas produknya, para pengrajin di Pagelaran menitikberatkan pada cara penggunaan alat dan bahan, teknis proses

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produksi dengan menghubungkan teknologi dan lingkungan, metode yang digunakan, dan pengaruh terhadap perubahan lingkungan di masa depan. Penelitian ini menggunakan metode deskriptif kualitatif dan action research yang melibatkan komunitas pengrajin di Kampung Edukasi Wisata. Data dikumpulkan melalui observasi dan wawancara mendalam serta dianalisis menggunakan teknik tahapan simultan 6P yang dikemukakan oleh Winarno dan Robfiah (2020). Hasil penelitian menunjukkan bahwa meskipun alat dan bahan yang digunakan dalam pembuatan gerabah masih tradisional, namun gerabah Pagelaran mengarah pada produk estetika yang inovatif. Kegiatan produksi gerabah berdampak pada lingkungan fisik, membutuhkan teknologi, metode, dan dampak budaya dalam pemanfaatan lingkungan dalam perspektif ekologi budaya. Meskipun proses produksinya tradisional, namun telah terintegrasi dengan kebutuhan pengguna sehingga kualitas produk ditingkatkan melalui standarisasi proses pembakaran, dekorasi produk, dan tambahan sentuhan nilai estetika pada produk. Secara keseluruhan, penelitian ini memberikan wawasan tentang bagaimana pengrajin tradisional dapat meningkatkan kualitas produk mereka melalui fokus pada proses produksi teknis dan dampak budaya.

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Introduction

The variety of pottery products in Pagelaran village, Malang regency, is the potential of preserved natural resources and cultural heritage in addition to the art activists and art performances. Pagelaran village is a center for producing traditional kitchen utensils in Malang. The pottery center is 40 km from the city to the southern part of Malang, the tourist area of Balekambang Beach, Kondang Merak, Ngliyep, Sendang Biru, Mosque of Tiban Turen, and Bantur. Pottery, or "*tambikar,*" is a universal cultural expression in almost all regions worldwide in glassware made of burnt clay. As a manifestation of cultural expression, it contains ideas, notions, values, norms, meanings, symbols, and beliefs; and is a social activity, economy, politics, science, technology, and art (Kemendikbud, 2016).

The craftsmen in Pagelaran village have firing challenges due to the absence of quality standards and temperature control during firing. Since the firing temperature is not regulated, it produces undesirable effects and imperfect firing results. Without a cone, these craftsmen rely on experience and instincts in determining the maturing temperature during firing. This is a practice that has been passed on from generation to generation. A meaningful creative exploration of creativity to produce new creations of artworks is needed to encourage the realization of the industrialization of pottery art or craft art (Sukarini et al., 2019). According to Iriaji (2019), because local areas have different cultural expressions, pottery crafts can vary depending on the needs, attitudes, insights, functions, and aesthetic values. Therefore, various innovations have to be made by the pottery craftsmen of Pagelaran village, for example, the creativity level supported by complicated finishing, as well as newer clay production and combustion methods to improve product quality to fit in market demand (Wardani, 2014).

Pottery production is accomplished from various mixtures other than clay, such as sand, rice husks, straw, and other materials. The mixtures of these materials are useful for improving clay's properties when formed and can also facilitate the combustion process (Nastiti, 2001). The pottery combustion process is undertaken with various temperature variations. Temperature indicates the degrees of heat objects. The higher the temperature, the more thermal the object is. Microscopically, the temperature demonstrates the energy of the object. The combustion temperature in pottery reaches 600°-

800˚ by using low-burnt soil. The burning of pottery, in addition to the process of hybridization and oxidation of carbon, is also accompanied by the liberation of heat energy and the emission of light (fire). It means if it produces a high temperature, there will be a melting of minerals (reaching the melting point) of the constituent elements of earthenware that fill the pores minimizing the air spaces (pores) of the earthenware (Nastiti, 2001).

Pottery is one of the local cultural products of craft and household utensils that competes in the modern equipment era. However, pottery is still favored by certain communities because it uses raw materials that are not harmful (Susilowati et al., 2021). What is unique about Pagelaran's pottery products from other pottery production centers is the cultural characteristics in the unique work system, which is home-based and carried out by family members. Working on firing together with other family members whose products are almost the same can lead to innovative pottery quality. This is accomplished by firing twice to get an aesthetic color. However, another uniqueness also needs to be highlighted as a potential village in this locality.

The pottery uniqueness of Pagelaran village needs to be raised in terms of its shape characteristics. It is in line with the opinion of Wardani (2014) that the characteristics of the pottery shape must be based on local wisdom so that the creation carries a unique character. As the uniqueness lies in the raw materials of the pottery, which is a competitive advantage, it can function as a natural shape that is in demand by today's modern society who want to live a healthy natural life, such as organic food or herbal medicine. It is possible that pottery with natural clay materials can be highly competitive (Purwanto et al., 2020). The demand for pottery is low, and there is strong competition from other products. For this reason, pottery craftsmen must always comprehend and understand the trend in today's market and the consumer's will, as well as various changes in the business environment, to compete. In addition, craftsmen also need to decide and establish strategies that can be utilized to face the competition (Hindasah & Astuti, 2019).

In burning pottery in Pagelaran, Malang, the craftsmen use instinct or feeling to measure product maturity. It is gained from the insight of the society from generations derived from their ancestors. The mature temperature is believed to be adequate, which appears from the soil used after the combustion process, resulting in a very bright color (bright brick red) (Pratiwi, 2019). The absence of temperature measuring tools makes the quality of pottery burning in Pagelaran village unstandardized. It fails post-combustion products. The result of the pottery combustion is very bright, and in the centre, there found black colors left. The black color is usually formed because the pottery-burning process does not occur completely. The combustion process that reaches a combustion temperature point between 600˚- 800˚ has passed through the stages of dehydration, reduction, and oxidation (Nastiti, 2001). When the earthenware product is at an ideal hardness level, it can be ascertained that the combustion temperature point is perfect. Pottery with less perfect combustion will be fragile and easily broken. To anticipate this, it is necessary to manage the burning of standardized pottery.

Though competitors from other industrial products can create similar products, some pottery craftsmen can adapt – in the sense of being able to survive, preserve, and forward the science of pottery to the next generation and develop it as necessary (Aini,et

al., 2022). Pottery crafts of Pagelaran experience innovations and shifts in their development: within the shape, technique, and function. Such changes are made with the aim of resurrecting pottery crafts that demonstrate an advanced industrial transformation. Since community empowerment is one of the secrets for the changes to consider to reach success, this study attempts to upgrade the pottery production and management in Pagelaran towards quality. The outcome of this study can provide important and interesting information to be explored, especially for craftsmen and village authorities in improving the quality of pottery products with an economic impact.

Method

This research employs a qualitative design with action research. The design is utilized to find the standardization of product quality improvement processes through traditional combustion and aesthetic innovation, which focuses on the way people use tools and materials, as well as the technical production by linking technology and the environment (technoenvironmental relationship), the method used (exploitation relationship), and the effect on the environment in the future (effects of technological-exploitation). The main informant in this study is the pottery craftsmen community of Pagelaran, namely Pak Wi and Pak Indra Setiawan. The subjects are located in Pagelaran village, Malang. Data are excavated and explored using in-depth interviews and observations. Interviews were conducted to obtain information related to the standardization of the traditional firing process and production techniques. The researchers and respondents were involved in social life for a relatively long time. The observation was conducted on the use of tools and materials, production techniques, methods used, and the effects of equipment on environmental changes. Triangulation of sources and methods is implemented to obtain accurate information. The analysis is performed with 6p simultaneous stages proposed by Winarno and Robfi'ah (2020), which include (1) approach, (2) excavation, (3) deepening, (4) matching, (5) meaning, and (6) presentation, as in Figure 1.

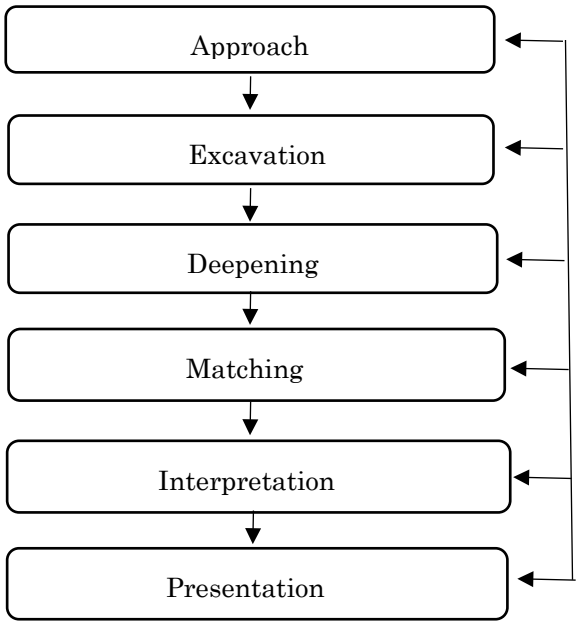

Figure 1. The stages of simultaneous component analysis

Results and Discussions

Pagelaran Clay Materials, Processing, and Methods

Almost the entire community in Gethakan, Pagelaran village, is engaged in pottery production. It is associated with the history that the village has been familiar with pottery production for over 60 years. A craftsman can make up to 210 mortars and pestles or small barrels a day. The potteries produced by the potters in the village have also been sold and shipped throughout East Java, even to Bali, Malaysia, and the Middle East. The stoneware products from earthenware used by the Middle East as one of the tools of shisha or a typical Middle Eastern way of smoking because the stoneware derived from clay is believed to neutralize the content of chemicals in shisha. Handicraft products produced in Gethakan village are mostly functional, such as mortar and pestle, small vases, large vases, and places that can be used as home displays. Pottery products range from thousands to tens of thousands, except for large vases that require a long manufacturing process, so the price can reach five hundred thousand dollars. The marketing of handicraft products is undertaken by collectors who take them directly to the craftsmen's homes.

Figure 2. Products after firing and drying

The profound characteristic of the pottery products from Pagelaran lies in the tools, materials, and techniques used in the manufacturing process. The equipment used is a brick furnace that has different sizes. Different furnace sizes cause the combustion temperature not to reach its optimum.

Figure 3. One of the furnaces contains more processed pottery

The material used in firing is "gedeg" (woven bamboo) and tobacco ex-wrappers, which produces a stable fire. The type of soil used cannot be used for high-level firing. The craftsmen producing traditional pottery are supported by technical capabilities acquired for generations (Satrio, 2013). The technique's ability that has been mastered in the past is to formulate pottery with the rotation technique, which craftsmen do. The technique is in the form of oblique rotation with one leg (right leg) boosting technique. The other technique used is the throwing technique (slow rotation), formed on the table of *pelarik* (perbot) (Ponimin et al., 2016). Some earthenware products that function as a receptacle (pottery containers) in this region have been produced by slow rotation production techniques from clay materials in the surrounding fields mixed with Lesti river sand close to the production houses.

Figures 4 & 5: Pottery craftsmen using traditional techniques

Further processing is the entire field, or the clay is dug and brought to the working site pit, where it is soaked through an aging or seasoning process to make it homogenous. This material must be in an elastic state to ensure that the clay does not have problems cracking or breaking during combustion. Furthermore, the main material for clay is placed flat on the surface of woven bagor or bamboo braids.

Production, Techniques, and Firing

The materials used in firing are gedeg (woven bamboo) and tobacco ex-wrappers, which produces a stable fire. After the forming technique is completed, they finish local clay polish (craftsman term, *dibang*) with a red ground color which is different from the color of the body or ornament technique engobe, and ended with the burning of the field furnaces and open-tub furnaces. Engobe is the name given to a ceramic coloring technique. The final aspect returns to the origins of the raw material – the clay. The engobe technique is the mixing of colored soils or a mixture of one or more oxide color materials used to decorate ceramics (Utomo et al., 2012). For clay raw materials, the soil that goes through the combustion produces a very bright color because the oxides in the clay will account for this reddish brick. Especially in the type of soil used, the clay cannot be used for high-level combustion. This soil type is appropriate for combustion techniques with medium temperatures (Pratiwi, 2019).

Based on the technical aspects, pottery craft products have developed over time, from plain rotation techniques to pottery creations with decorating techniques. The last type of technique includes natural decoration, burnish decoration (rubbing), combing decoration techniques, relief decoration techniques, piercing decoration techniques

(*terawang*), *engobe* decoration techniques, and painting decoration techniques (brush strokes) (Ponimin, 2010). Such techniques develop due to physical environmental factors. The decoration technology utilized is a physical environmental factor as the cause of the application or technique of giving decoration on the outer surface of the earthenware. Based on the results of interviews with craftsmen, some resulted in pottery products being cracked and damaged (20%). Besides, it is caused by the type and quality of the clay soil is not good and hence the crack. Some damaged products also cannot be proceeded with the stage of decorative pattern application on the outer surface of the earthenware. The combustion temperature used until now is based only on feeling or instinct and not on the temperature of the thermometer. It has been going on for generations.

The combustion process is one of the essential stages in the pottery production process. Clay is a product of the clay vessel. It was clay but has been processed, and the potters have created a vessel. The vessel will now be fired to make it hard and permanent. Before then, the vessel can dry under controlled temperature or sometimes under the natural sun to remove excess water. In most cases, it is preheated to avoid cracks during firing. The clay will then undergo physical and chemical changes to become hard and dense (Rifai & Hartono, 2016). The process changes cannot be argued that clay that has gone through combustion with a certain temperature is completely mature. The maturity temperature of clay soil varies in accordance with its type. The burning process is undertaken when it has dried. Drying is an activity to remove the water content within the pores of the walls of pottery candidates. If we burn the clay along with the water content within the pores of the body wall, it results in cracking or rupture (Nastiti, 2001).

The combustion adopts a concept of two to three breaks in firing. The method belongs to the way of thinking based on instinct. The rest concept during combustion has a specific significance and purpose. At the stage of the pre-combustion preparation process, craftsmen prepare the required equipment, including dry earthenware products (raw), wood (*sengon* and others), a pit firing brick stove (large), furnace covers (straw/-bricks/zeng). Then, the earthenware is arranged in the furnace carefully according to the size and provisions. Furthermore, the furnace is tightly covered to trap heat and maintain constant heat during firing. After the furnace is covered, the prepared wood is put on fire. There are several stages to consider in the combustion process of two breaks. The first combustion process is undertaken by observing the burning fire. It is related to the next process. The instinct used by the craftsmen in Pagelaran village usually estimates the first combustion time of approximately an hour so that the fire reaches the maximum temperature limit. After 1-1.5 hours, the fire is stopped by keeping the furnace heat temperature stable. This is executed by rewinding the firewood slowly without turning off or drastically lowering the furnace's temperature. When the fire has reached the middle of the furnace and the product has begun to look half-baked, the craftsmen reduce the intensity of the firing. They rest for 1-1.5 hours and restart firing again. The post-combustion process also goes through several stages. After the combustion of approximately 4 hours, the pottery product is ready to be lifted by lowering all the temperatures of the furnace, starting with resisting the heating speed and allowing the furnace to cool off overnight. When the furnace has cooled completely, the

fired vessels are removed from the furnace. The potters apply a few finishing touches, such as cleaning and wiping it to prepare it for the market.

To determine the success of a burnt product, it must be at a percentage of 85 - 90% of the production as an accepted conventional practice. The pottery burning management of Pagelaran demonstrated that the percentage of product success shows 90% of the products made. This simple combustion method is considered effective and appropriate for producing pottery products. The following is the data obtained.

Table 1. Pottery Products and Success Rate

No	Product Name	Products		Percentage of Success
		Total	Furnace	
1	Cobek			
	Small	800		95%
	Medium	500	Large	
	Large	700		
2	Guci			
	Small	-	Large	-
	Large	-		
3	Kelowong			
	Small	500		95%
	Medium	350	Large	
	Large	150		

Table 1 explains that 95% of the products' success is determined by the *cobek* and *kelowong* products. With a large furnace, the amount of damaged pottery production is reduced. However, 5% damage to the overall production has implications for the firing process, which should reach a certain temperature point using measured firing. If the craftsman uses a large combustion furnace, products such as *cobek* from small to large can reach 2000 products in one combustion. From the 2000 products burned, there are generally some failed products, 40 were broken, and 50 did not attain the maturing temperature. In small furnaces, it can achieve combustion of as many as 1000 products, and only 20 products break or fail. Craftsmen reprocess the waste that can still be used. It is considered reasonable for a traditional combustion process using simple tools and power. Damaged or failed products become waste and are then recycled by the craftsmen. The processing is transformed into other useful forms. For example, pottery fragments are formed as souvenirs.

Pagelaran Pottery and the Environment

Technically pottery production is associated with the environment because human activities catering to life necessities are one cultural entity, so the process will also affect the environment (Purwasih et al., 2019). A culture that affects the environment or the environment affects culture is the concept and method of cultural ecology (Steward, 1955). The cultural ecology theory, according to Steward, is a cultural environment that cannot be seen separately but rather a mixed result that proceeds through two-way communication relationships. Ecological processes have a reciprocal relationship. Culture and the environment greatly influence each other, so they may influence human culture and behavior. Cultural ecology is the vantage point of understanding cultural issues from an environmental perspective. When humans adapt to their natural environment, the adaptation on the level of cultural ecology is the way humans adapt to their natural environment, culture affects the environment, and the environment affects culture. It means that the interaction between humans and the environment

develops through the empirical conditions of field research that continues to carry out (Desrianti, 2011).

Steward (1955) concludes three basic procedures of cultural ecology: 1) the relationship between technology and the environment (technoenvironmental relationship); 2) the behavior involved in the exploitation of territory in a certain way (exploitation relationship; 3) the extent to which behavioral patterns in the environmental exploitation affect other aspects of culture (effects of technological exploitation). To understand the environment in the utilization of natural and social resources for the survival of life, various experiences are discovered, which are then accumulated and assembled into a specific knowledge system, which is part of the culture (Maryone, 2017). The fact that technologies help human activity is realized in the pottery production process.

This research also found that the pattern of innovation and development of the product's aesthetic value is based on experience, adaptation, and adoption of what is found in the field and learning from the consumer's demand. In this case, the pottery exploitation of Pagelaran in a certain way (exploitation relationship) is realized through updates in innovation in terms of a variety of products, art, and finishing process to the final product. The craftsmen's method has its specialty: the round technique using feet. They produce similar products but can make more refined products, and combustion is carried out more exclusively. Exclusive refers to the result of pottery products with aesthetic colors (Hasyimy & Hidajat, 2021). Pottery craftsmen increase the aesthetic value of their pottery by coloring. To produce a variety of colors, most craftsmen use a number of colorants and other products. (Hamdiani et al., 2018).

The undertaken combustion creates a blacker burning result or browner until the terracotta appears. Blacker burning results will depend on various factors, the clay type and the type of firing, and some even add sawdust and the rest to create effects. In addition, some undergo twice the combustion process to obtain an aesthetic pottery color. That way is an improvement in pottery production management and product quality. Every clay comes with its colour depending on the number of various oxides in their compositions. Black effects can be created.

Aesthetic improvements have also started to be developed by recognizing some processes. Variations in shape and size, as well as more mature firing colors, affect the aesthetic value of the pottery product itself. The development of such pottery is also called transition pottery (Irfan & M., 2018). At the same time, it is also supported by a conscious and caring behavior of self-improvement by the craftsmen with an innovative ability for self-reliance (Hasyimy & Hidajat, 2021).

Improving the quality of Pagelaran Pottery

The focus of pottery craft management also leads to environmental exploitation behavior patterns that affect other aspects of the culture. It is interpreted with the technology support in processing clay to shape pottery products. In addition, there is a shape transformation and developed product function. Guci, whose geometric shape is convex cylindrical, initially has a natural decoration function because they use the original color of burnt clay.

Figure 6. Guci

However, in its development, the design became more decorative, for example, using a combination of relief decoration techniques and patterned painting of various kinds. The shift in its function is to become a supporting function of decorating or interior beauty as a result of the development of the craftsman innovations that target new markets to build a more exclusive business space. Socio-cultural transformation is defined by meaning, values, and symbols (Iriaji, 2019). This is where the pottery craft production in Pagelaran village means profane, meaningful local culture, and customs. It is the result of the craft functions diversion that are oriented to physical and economic needs.

Several professionals and experts in the industry were invited to develop the quality of pottery products and the utilization of pottery waste. The village government, partnered with higher education institutions in Malang city, facilitates community empowerment. One of the developments of pottery design into decorative pottery products, interior accessory elements with the technique of application made from natural fibers, was implemented as a form of solving technical problems in the community (Ponimin et al., 2016). In the case of pottery waste processing, the community has also been trained in activities that prioritize the importance of the creative industry today as a form of idea creation and creativity by the crafts community as an economical product. Existing natural resources are developed to generate profits as part of the economic product. One of the activities that can be created from creative ideas derived from pottery waste is creating Wind Chimes made from Terracotta by combining pottery and macramé for the people of Pagelaran Village (Sidyawati & Prasetyo, 2022).

The optimization of natural resources for pottery has been utilized by the community well, as evidenced by the number of people who pursue books, conduct research, or other approaches through learning from more advanced crafters (Iriaji, 2019). In general, it can be stated that Geta'an village in Pagelaran still has good natural and socio-cultural environmental resources that can support the activities of pottery life both in the production and marketing processes.

Conclusions

The study demonstrates that the craftsmen in Pagelaran village still rely on traditional methods without any standards at the firing stage. Their firing process has been very traditional, and ascertaining the maturing of the vessels being fired is based on feelings, instinct, and experience. Though this comes with disadvantages and

undesirable effects, the potters of Pagelaran village can produce very interesting works for society's consumption. Their art of pottery adds perspectives to their cultural environment. When they adapt to the natural environment, the adaptation focuses on the cultural ecology level, which is about human adaptation to nature; culture affects the environment, and the environment affects the culture. Their practice, therefore, has brought considerable cultural changes and innovations, though there is room for more improvement in the aesthetic appeals of their works. Although the production process is still traditional, it has already been integrated into the users' demands to improve product quality through standardization of the combustion process, product decoration, and additional touches of aesthetic value.

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