

MAMOTY AS A MANUAL HANDLING TRADITIONAL AGRICULTURE TOOL; IMPACT OF ITS FORM AND STRUCTURE FOR USER EXPERIENCE

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Abstract: The industrial farming labourers suffer from highly intensive manual labour efforts in Sri Lanka today, that results in low individual productivity. The form and structure of traditional tools along with indigenous knowledge possess the potential to support utility effectively. This is due to the fact that it has been a long-term practice to effectively optimize through long term use. This research focuses on how the form and structure of mamoty as a traditional manual handling agriculture tool, influences user experience in the current context. To evaluate formal properties of user experience responses through physiological and psychological aspects, narrative interviews and observation methods are used. For sampling, low country small-holder vegetable farmers from a selected grama niladhari division in Kalutara district is selected. An Interpretative Phenomenological Analysis (IPA) is conducted to discover the relationship between independent and dependant variables. The study revealed critical parts, elements of the mamoty and their impact on concentrated user experience segments. The key elements of the form and structure of the tool, such as material, shape, and size were identified. The study revealed that elements from each part of the tool contributes to the overall experience by highlighting specific capabilities of each element.

Keywords: Agriculture tools, Manual handling tools, Mamoty, User experience.

1. Introduction

The use of manual handling tools in farming was sustained along with reservoir-based civilization in the island through colonial period and the cultural deviation occurred during the mid-20th century, to the present day. During the past, and even today in villages, farmers buy blades from a blacksmith and make the handle himself according to his body morphology. Therefore, it can be considered a self-customized tool. Some tools and parts of tools are made by material experts in the village (Dalupotha, 2016). The uniqueness of the traditional farmer lifestyle is distinctively transformed into modern industrial farming labour, employed in industrial farming today. Labour is associated with manual tasks in the field with different types of farming tools. Most of these tools which originate from traditional farming practices in Sri Lanka are manufactured and cater for common industrial consumption in modern day farms. They are stored and shared among several labourers. The difference between these two modes of work (traditional and modern), can be discovered through the characteristics of work, nature, and purpose. The Overarching Agricultural Policy of the Ministry of Agriculture (2019) points out productivity loss in manual labour and decrease in agriculture employment in the past few years as challenges for the next executions of economic infrastructure. It is a proven fact that by retaining positive feelings connected with emotions, helps uplifting certain practices. It consciously helps to avoid frustration with quality experience (Norman, 2013). Many studies have investigated the ergonomic aspect of agriculture tools and traditional practices in Sri Lanka and the world. However, user experience of tools (with a special focus on their elements) in agriculture practice is rare. This study focuses on the form and structure of Mamoty based on a pilot study as a traditional manual handling agriculture tool, widely used in the current context. User experience responses to formal properties through physiological and psychological aspects are hereby looked into.

2. Literature Review

2.1. FORMAL PROPERTIES OF A TANGIBLE PRODUCT AND THEIR EXPRESSION

Humans are used to having assistance of products that are produced by an industrial process or raised (Cambridge University Press, 2020) to perform tasks, incapable or difficult to handle with bare body. A tangible (real and not imaginary; able to be shown, touched, or experienced) product consists of a body and a function, allowing users to

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access it through the exterior form (Townsend et al., 2011). Deng & Kan (20a19) has described the potential of exterior form of a product as an entity that can deliver a visual experience through its elements such as colour and shapes (of details) in various mediums. The pleasure of engaging is heightened when those elements intersect affective needs of the user. A study conducted by Djajadiningrat et al. (2004) has noted the expressiveness considered by participants in representing the product form. These are the elements combined with dimensions such as size, weight, robustness, material, and texture. Every interactive physical object inherits the capability of delivering elementary attributes such as weight and texture because of its material, in contrast to total visual expression. They create relationships with the human body through sensory organs. Patrick Jorden (cited in Chou & Conley 2009) identifies product properties as two formed; tangible (that are further defined as objectively measurable formal properties) and intangible, that are subjective experiential type. Luchs & Swan (2011) defines the product form, as the physical output of tangibility and function in an aesthetic form. These objective and subjective aspects together construct the holistic nature of product properties, when investigating the 'expression' as a human capability in interactions.

2.2. PERSPECTIVES OF USER EXPERIENCE

Circumstances of user experience of a product is subjected to debate in different perspectives among the scientific community. It has become a vital element in design focus at interaction associated industries. Organization, User, Context and Product are the major components (cited in Zarour & Alharbi (2018)) of user experience which can be identified by tracing the consequences after making changes to a certain system (Springett, 2008).

Another perspective of user experience, based on an emotional component; 'affordance' of the object, generates a relationship between the user and physical object. Affordance determines how to guide users to act with functionality of the object which is promoted by the 'signifier' (communicative elements) (Norman, 2004). This argument partially provokes the semiotic perspective of user experience to investigate the relationship of experience segments with the generation of cognitive stimuli. Recently, the designer perspective outlined by Hassenzahl (2018) has described this scenario as 'intended product character' generated via two directions as 'pragmatic' and 'hedonic' attributes. He has further explained the user perspective through the 'apparent product character' based on the user experience model by Mark A. Blythe (2003). The two elements; 'pragmatic' and 'hedonic', corresponds to physiological and psychological perspectives. Law (2011) too has suggested two aspects, objective and subjective, which are measurable, fostering the ISO definition as an umbrella term for user experience. The user experience is then subjected to perceptions and responses of the user as consequences of use or anticipated use of a certain product. (Mirnig et al. 2015).

2.3. SEGMENTS OF USER EXPERIENCE

The researchers who examined user experience beyond functionality have described the potentials of studying experience by mapping user experience factors with parameters of activity, performance, stage, property, and character (Chou & Conley, 2009). The property and character parameters together hereby outline the role of form and structure. Mirnig et al. (2015) has emphasized that user experience acts in between the user and the product. It creates a distinctive impact on attitudes, including every psychological response that results before, during, and after the product's use. It is important to define all these layers of user experience as user related factors, system related factors and context related factors. Beside the time factor, they convey the complexity of factors by demanding improvements for the definitions depending on the application of user experience predicates. The user related factors are emotion, preference, belief, perception, response and behaviour.

Emotion as a segment of user experience has prompted by Norman (2004) through a comprehensive perspective by addressing three stages: before during and after use of a product leading a further construction as realistic factors upon three components as visceral, behavioural, and reflective. They demonstrate respectively, the immediate emotional impact, long term emotional states caused by physical contact and the overall impression by retrospective memory and assessment. Being attached to products for a long time is a key factor discussed and investigated in developing this concept on the strong relationships with design. Haines-gadd et al. (2018) has outlined a developed framework focusing on nine factors; relationships, narratives, identity, imagination, conversations, consciousness, integrity, materiality, and ability to evolve to improve 'emotion centred' user experience which leads emotional durability of design.

The preference: "the fact of liking or wanting one thing more than another" (Cambridge University Press, 2020) plays a major role in many practices related to 'user centred' information. Jung et al. (2005) have described an algorithm for user preference for an 'item' depending on the user history and profile as key variables through function of an item and has further clarified with the influence of minor factors in variables. Sanderson et al. (2010) has mentioned adaptive use of diversified measures even when narrowing results of preference by allowing users to choose by options and allowing them to rank the systems they have been using. It could be clarified by allowing users to provide information that affected the selections.

Beliefs of the users in an experienced based system is a key aspect in nonverbal interactions of humans that leads other mental states such as perception and desires, to stabilize the mentality which determines the dimensions of

social cognition (Baker et al., 2017). Salite (2019) has mentioned the alliance between historical context and farmers towards the existence of 'beliefs' which mutually benefit them to confront challenges in livelihood.

The levels of human perception are widely incorporated in the field of industrial design in order to overcome the communication requirements of designs, process and outcomes. The perception follows awareness of thing through sight, sound, smell, touch, taste and movement that drives user over the structure of the product towards a comprehensive understanding (Rosen et al., 2016). In proposing a framework named 'perceptual product experience', which explains the involvement of users to the product experience through all five human senses, Warell (2008) has indicated three major aspects of perception as (1) sensory, (2) cognitive and (3) affective. He further explains sensory mode consists of five senses; vision, hearing smell, taste, touch, that generates major functional reactions according to Mather (2006). As to Reisberg (1996), the cognitive mode has explained as the incident of processing knowledge after gaining the sensory inputs. The affective mode deals with prior experience and generates judgmental states.

Recent research practices which have been raised to investigate user experience segments bring forth two forms of responses as psychological and physiological. As response stands for "answer or reaction" (Cambridge University Press, 2020), Cugnata et al. (2018) has discussed the complexity in evaluation of human responses consists of intense physiological responses because of the occurrence of mental states in an experienced based activity. Bernal et al. (2018) has expanded the explanation of multi-model nature of human responses when it comes to user experience evaluation. Therefore, the understanding of responses from different modes are required suitable channels to detect responses. The responses can be derived as signs or predefined signals.

The behaviour of an individual person could be affected by external and internal factors of the related context. This influence single or multiple behaviours in the user that can be traced within the multi-model nature of responses. Even different persons with the same characteristics may demonstrate contrasting behaviour (Balabanis & Siamagka, 2017; Fishbein & Ajzen, 2005).

Karapanos et al. (2010) has derived three approaches for measuring user experience, identified as longitudinal, retrospective, and cross-sectional methods. Zarour & Alharbi (2017a) has further pointed out that the range sheltered by each approach is variable as the user perception depends on context and technological dimensions. Further studies reveal that usability as a subset of user experience as it contains a series of psychological aspects of the user (Bevan, 2009). In addition to usability, it is evident that user experience contains satisfaction factor and helps in evaluating how far the product is suitable for the user.

3. Methodology

3.1. THE CONCEPTUAL FRAMEWORK

The data collection plan follows the model of an ethnographic field study. The conceptual framework for the study is derived as shown in Figure 1, upon the research questions; (1) What is the form and structure of traditional manual handling agriculture tool (as selected) used in the current context? (2) What are physiological and psychological user experience responses to formal properties? (3) What are the relationships between formal properties and the user experience of the selected tool? Moderator variables usually construct the connection platform for dependent variables and independent variables, thereby in this scenario, it is played by functional activity. Mediator variables are the types of environmental aspects; natural, physical, social, cultural, political, and organizational. These environmental aspects influence dependent variables according to the background of the context.

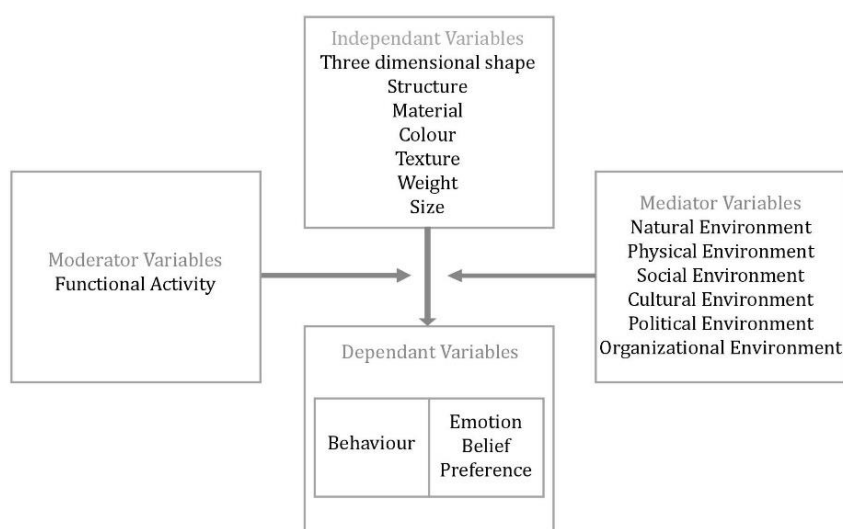


Figure 1. The Conceptual framework (Source: Author)

3.2 RESEARCH PLAN

Artioli et al. (2019) follows the approach of narrative interviews used by previous scholars to gather individual states of experience. These specifically aims at health issues because of its effectiveness in revealing stories that were unique to each person. Therefore, in this study, the major psychological variables are collected through Observation and Narrative Interview. For certain variables, observation and user feedback assisted in extraction. The context of product use in the data collection is a hybrid type (both the natural use of the product and specified use are considered) (Rohrer, 2014).

The strategies and techniques were identified based on the findings from the literature review to collect responses to dependant variables upon the research questions. Figure 2 shows the phases of research, and the ultimate findings are planned to discover in the analysis.

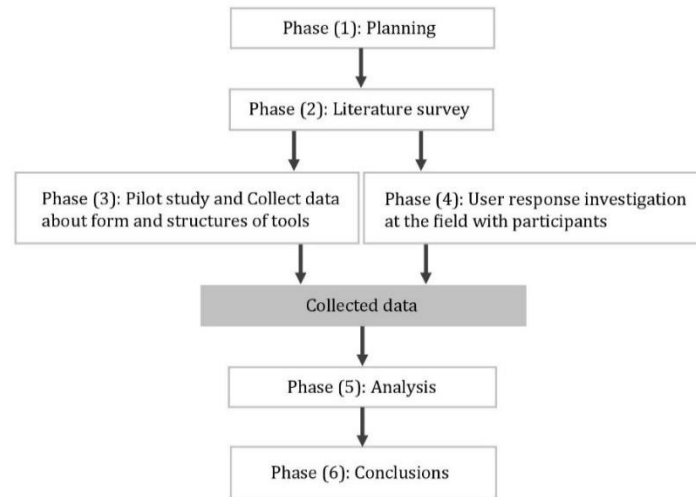


Figure 2. Structure of the research plan (Source: Author)

As shown in Table 1, The methods of data collection were two formed; (1) Collecting data about forms represented by independent variables and (2) Collecting data from farmers represented by dependent variables.

Table 1. Structure of components, attributes, and modes of results

Components	Data of Form	User Response	
Subcomponents	Elements	Physiological	Psychological
Variables	Components 3-dimensional shape 3-dimensional Layout Material Texture Weight Scale	Behaviour (Postures & Movements)	Emotions Beliefs Preferences
Modes of Results	Sketch notes, photographs	Video, written	Videos, written

Source: Author

As shown in Figure 3, findings from the pilot study highlighted both the frequency and critical state of mamoty as a manual handling agriculture tool in the current context. Therefore, this research concentrates on mamoty in the current local context for major data collection, aligning elements of forms and user experience responses.

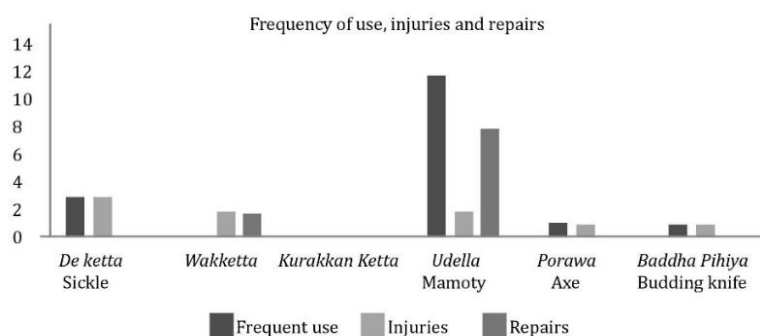


Figure 3. Frequency of use, injuries, and repairs (Source - Pilot survey conducted by author in October 2020)

3.3 SAMPLING PROCEDURE AND PARTICIPANTS

A pilot survey is conducted to understand the environment, possibilities, and constraints to arrange the mechanism of field and investigational executions. Around 15 participants (professionals in the agriculture field such as supervisors, managers) from different farms in the country are selected for the study. Major aspects in the smallholder farm structure which is sustaining in the field of farming is considered for further sampling procedure of participants. As to Damayanti (2012), the small holder farm structure was emerging in the Sri Lankan agriculture context in 2012, with a minimum number of workers. Due to the land use pattern of the country, it spread widely besides the development of physical environment. Participants for the major data collection is chosen from a group of farmers who are engaged in agriculture as a career. They have been engaged in market-oriented farming as a full-time career for several years of vegetable farming in the low country. Specifically, three adult farmers were selected who possess experience in full time farming respectively, for 2 years, 7 years and 15 years. They are in the age group of 40 - 70 years old. They are not from the majority but from the average set of age groups who were actively working in the current context in smallholder farm structure which is most impactful in the field.

3.4 PROCEDURE OF ANALYSIS

All narrations were transcribed and taken forwarded into the Interpretative Phenomenological Analysis (IPA) of this qualitative study. Table 2 shows the stages of analysis as primary, secondary, and final. The transcriptions were read repeatedly several times observing the nodes and diversions in the narration in the primary analysis.

Table 2. Stages of Analysis

Immediate analysis	Narrations were transcribed
Primary analysis	Initial coding to gain main thematic areas and initial codes. Appointed special terms and phrases under headings extracted from the narrators' context. Grouped them into overall , handle and blade based on relevance. Codes for environmental impact (EI); Environmental Impact (EI), Natural Environment (NE), Physical Environment (PE), Social Environment (SE), Cultural Environment (CE) and Personal organization (OE).
Secondary analysis	Analysis of the responses from all participants by part of the tool Classify the positivity or negativity states of impact by element
Final analysis	Identify relationships among elements, user responses and environment.

Source; Author

The three stages of analysis created three standpoints that elements of the tool can be investigated over the impact on user experience segments. The first analysis constructed the clear structure of data which helped to identify the roles. The secondary analysis pointed out the holistic influence of elements and roles of codes. The final analysis supported the discussion on the influence from each part of the tool. Therefore, the discussion is carried out synthesising all three stages of analysis.

4. Impact of form and structure for user experience

4.1 BACKGROUND OF THE SELECTED TOOL FOR THE INVESTIGATION: MAMOTY

Mamoty (Udalla) is a manual handling tool which is used for centuries in agriculture activities in the local context. It is also used in the present small scale farming structure. It is not limited to industrial farming but also used frequently in many other soil related activities. According to Dalupotha M. K., (2020), the discussion revealed that there are around 28 different types of mamoties are found in Sri Lanka. They are specifically for unique functions and purposes. They differ to their geographic locations and practices.

The mamoty investigated in this study as shown in Figure 5. has been inspired from *Poru udalla* (with a blade around 254mm wide) which is mainly used for land preparation. It is widely used in low country farming adapting to its geography and functions expected (Kariyawasam, 2021). In Sinhala language, mamoty is called *udalla* and different parts of the mamoty are named as follows; handle (*mita*), blade (*thalaya*) and neck (*udalu mala*). The blade is separately available in the local market which is made of steel. The handle is self-customized by the farmer. There are three main materials used for the handle of the mamoty in the selected region of Haltota of Kalutara District: Pond apple (*Annona glabra* / *Wel aaththaa*), Cork-leaved bayur (*Pterospermum suberifolium* / *Welung*) and Rubber (*Hevea brasiliensis*). According to the farmers of the village these materials are selected due to strength and lightweight.

There are many different mechanical and manual tools available for agriculture activities. However, these farmers largely rely on manual tools such as mamoty in their activities and obtain the support of machinery at minimum level. They travel by foot, bicycle, or motorcycle to their farming field early in the morning daily, carrying the mamoty. They perform most of the activities alone and owns an average of two acres. Their focus is on vegetable farming with a variety that can be harvested every quarter of the year. These market-oriented farmers are self-sufficient with the benefits of farming, and their products settle the demands in the region too.

As demonstrated in Figure 4, the wooden pole, which is around 136mm long, is shaped properly until it is smooth to a certain extent for the grip of hand. These farmers prefer to keep a slight curve in the handle instead of keeping it

straight. Even the diameter of the handle has a minor variation between the ends. Some of the farmers use a small piece of wedge at the neck of the blade to ensure the handle's tight fit.

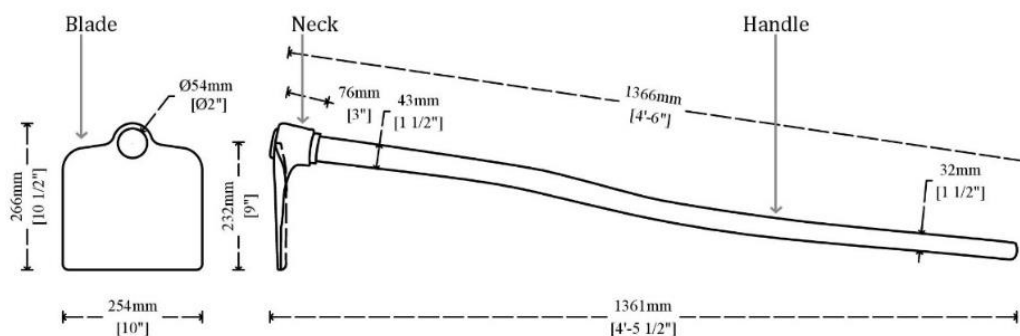


Figure 4. Dimensions and components of the mamoty (Source: Author)



Figure 5. From left- Close up view of the texture of the handle, neck, and blade. (Source: Author)

The mamoty is used for several activities in the field by these farmers,

- To shape soil – Tasks such as rolling soil, digging and trench making.
- To remove weeds – These farmers call this activity as *Udalu gaanawa* in Sinhala. *Athuruyath gaanawa* is another term used when removing weeds between two plants.
- To harvest root crops – The mamoty is used to loosen the soil in this task.

These farmers are inspired hereditary to engage in farming activities since childhood. As to them, the beginners need to put in high effort to get adapted to the working environment and pattern as the tool demands physical exertion. Further, as to their explanations, different soil conditions are another challenge to overcome the consequences of climate. According to the Soils & Crop Suitability map of The Ministry of Agriculture (2019) the soil type in this region is red yellow podzolic soils, located in a steeply dissected, hilly and rolling terrain. This soil is suitable for tea, rubber, coconut, vegetables, fruit, cereals, onions, and many other varieties of crops.

4.2 SECONDARY ANALYSIS OF THE RESPONSES FROM PARTICIPANTS

4.2.1. Impact of elements for emotion

Collectively the elements have resulted a positive impact on the emotion of user. Codes such as 'respect', 'inspired' and 'precious' signified the emotional state of the farmer based on the traditional and cultural backgrounds. Elements of the handle were not triggered but a defect in material and texture of the blade have contributed to the emotion of the user.

4.2.2. Impact of elements for belief

Like the previous user experience segment, the overall tool has influenced the beliefs of the user. The codes convey the positivity of the influence. Other elements except texture and colour of the handle have contributed and that has focused on the 'curve' shape of the handle. The elements of blade have a positive impact on belief except colour.

4.2.3. Impact of elements for preferences

The codes 'lightweight' depicts the influence from material, weight, and size of the overall tool. The other farmers have other concerns related to 'perfect angle' and 'adjustability'. The overall preferences are not relied on colour but heavily on shape, weight, and size. The handle is preferred with 'self-customized' shape and size. 'Durable', 'common' and 'sharpness' are the key codes for the preference with blade.

4.2.4. Impact of elements for behaviour

Regarding the behaviour with the overall tool, every farmer's concern is shape. It is distinctive with the responses to handle as well. Misusing behaviour of the blade was highlighted due to the context of overall tool management in the personal organization.

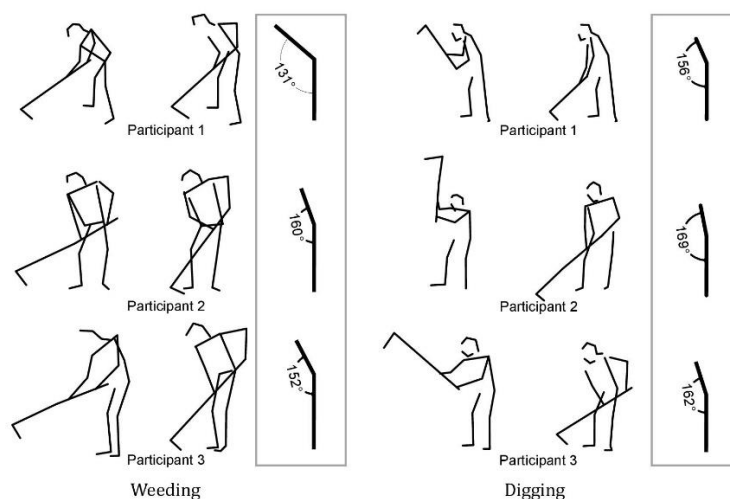


Figure 6. Posture and movement observation. (Source: Author)

Bending angle during the weed removal activity as shown in Figure 6, varies in between 131° – 152° from the vertical axis of the users' standing posture. They avoid exceeding 131° expressing the discomfort in that posture. They refuse to hold the handle of the mamoty near the neck. That gripping distance is a quarter from the total length of the handle from the top edge.

Bending angle as shown in Figure 6, during the digging activity varies in between 156° – 162° from the vertical axis of the users' standing posture. They avoid exceeding 152° expressing the unusualness in that posture which is not supportive enough for a hard hit on the ground. Their gripping distance is less than a quarter from the total length of the handle from the top edge. The gripping distance increases when dragging the soil along the ground and that distance does not exceed half a long from the top edge.

4.3 FINAL ANALYSIS - THE IMPACT FROM EACH PART OF THE TOOL

Table 3. Impact of the 'overall tool', 'handle' and 'blade' for the segments of user experience

Parts	Elements	Emotion	Belief	Preference	Behaviour
Overall	Shape	3	2	3	3
	Layout	3	1	3	2
	Material	3	2	3	2
	Texture	3	1	3	2
	Colour	3	-	3	2
	Weight	3	2	3	2
	Size	3	2	3	2
	Final codes	Satisfaction Positive Inspired Respect	Exertion Respect Consistent Unique Inspired Favourable	Lightweight Optimization Perfect angle Mechanical Adjustability	Respect Adaptation Consistent Excretion Consistent
	EI	OE SE	OE CE NE SE	NE OE	CE NE OE
Handle	Shape	-	1	2	-
	Layout	-	1	1	-
	Material	-	1	1	-
	Texture	-	-	1	-
	Colour	-	-	-	-
	Weight	-	1	1	-
	Size	-	1	1	-
	Final codes	-	Curve	Self-customized Curve	-
	EI		NE	NE OE	
Blade	Shape	1	1	3	1

	Layout	-	1	-	1
	Material	1	1	3	1
	Texture	1	1	-	-
	Colour	-	-	-	-
	Weight	-	1	-	-
	Size	-	1	1	1
	Final codes	Satisfaction Dissatisfaction	Sturdy Multifunctional	Durable Common Lasting sharpness Sharpness	Misuse
	EI	NE	NE OE	NE OE	NE

The responses for emotion and preference triggered from the overall tool are the extreme consequences and the least variation found. The response for preference shows a higher variation close to belief. Even though the handle performs as the direct tangible interface for the user, the emotional responses are not triggered. However, the emotion is provoked in the overall tool which conveys the impression on handle as a holistic impact. Even the texture is only provoked in preference. The colour is not triggered in any response except in overall tool. The 'curve' of the handle is the most highlighted and its benefits from 'self-customization'.

The shape of the blade has triggered in every user experience segment. The two codes convey in both ways of experience by 'satisfaction' and 'dissatisfaction'. The layout, texture and weight are poor with the experience of blade and the colour is totally silent. The size of the blade has performed hand in hand with the shape and material. The natural environment has been highlighted in every user experience segment according to these responses. That might because of the blade performs directly with the contact of soil and plant matter. The codes convey that the qualities of the blade such as 'sharpness' has mis leaded the user to perform irrelevant tasks using the mamoty due to its multifunctionality.

5. Discussion and research findings

Elements of the overall tool have an impact on the emotion. The handle alone seems not influenced. The shape of the blade is a satisfaction, but its surface or texture creates dissatisfaction due to different soil conditions in natural environments. Under belief, the blade is considered a multifunctional part of the mamoty. Farmers have established a practise in using elements of the blade except colour, for both appropriate and inappropriate activities. Overall elements of the tool are believed as 'unique' and 'respected' for a long period of time even though it consumes physical 'exertion' to operate. Use of mamoty for multiple activities would be the reason to expect 'durable', 'common' and 'long lasting sharpness' through the shape, material, and size of the blade. The 'self-customization' is preferred to determine their own form of handle, with the 'curve' shape and different diameters at the top and bottom edges of the handle. Depending on the advantage of natural environment, the farmers prefer the spontaneous 'optimization' in the elements of the overall tool. All elements: shape, layout, material, colour, texture, weight, and size are preferred to allow an upgrade if 'adjustability' and 'mechanical' modification can be integrated. The responses under 'behaviour' in relation to the handle, is expressed as a whole. The tool itself provide the experience without separating the handle from overall impression. Although it is not verbally expressed, is observed in postures and movements. The misused behaviour of the blade is apparent from its impact of shape, layout, material, and weight. As an overall object, the behaviour is pointed out through the codes; 'respect' 'adaptation', 'consistent' and 'exertion' which are influenced from cultural and personal organizations based on the natural context.

The farmers' responses are highly relied on overall presentation of the tool, considering the blade and the handle as a holistic composition. According to the analysis, in the responses to overall impression, the colour has the minimum impact on the user experience and the shape has the maximum impact. Although the elements of the handle do not make an impact on emotion and behaviour through their verbal responses, observations of behaviour justify their beliefs and preferences. Their strategy by self-customizing the handle as a longer and curved interface is well emphasized in the statements related to other experienced segments specifically expressed by physical 'exertion' of work and 'consistent' nature of all activities in the field. The blade is a critical part of the mamoty according to the analysis, as it directly connects with the natural environment in the field. There are both satisfying and dissatisfying experiences with blade depending on the soil conditions. Belief in 'multifunctional' and personal organization due to the familiarity of using minimum tools to incorporate might be the reasons to mislead the use of blade in inappropriate activities. However, the material quality itself deliver benefit to the user to use the blade for a longer period even with such effects. The colour has not played any role to make an impact on user experience, but shape and material together play an active role.

According to the pattern of codes, the 'satisfaction' of emotion and 'exertion', 'consistent' and 'respect' of belief and behaviour are highlighted. They depict the core strengths to last for centuries as a manual handling tool in the agriculture sector. The codes such as, 'inspired', 'respect', 'unique' and 'adaptation' convey the core values that these farmers carry as a sustainable approach of farming practise. The codes such as, 'mechanical', 'adjustability', 'self-

customization' and 'optimization' suggest requirements they expect to be experienced in the farming field instead of high mechanization. The codes such as, 'light weight', 'perfect angle', 'curve', 'common', 'sturdy' and 'durable' demonstrate the key factors recommended. Some of them have been already applied, within the contextual limitations. The environmental resources and the prior experience are encouragements to integrate them within the context for the needs of farmers.

The pattern of generation of codes and scores of the impact points are upon the three components of the mamoty (overall, handle, blade). The handle and blade create an expression strengthening the interactive nature of the tool. The physically distant component of the tool (blade) constructs the impact in many segments on the user. The physically nearest component of the tool constructs an impact through a limited set of segments. However, this difference does not trigger the quantitative potential of each component of the tool in this study. Relatively, many codes emphasize the potential of overall tool, except for the handle or blade in interactive nature of the assembly. The lever mechanism may be a cause to the result of the overall experience when considering the relativity of the dimensional state of the tool and user.

6. Conclusion

This study focused on the user-experience responses to the formal properties of the mamoty through physiological and psychological expressions to form and structure as a traditional manual handling agriculture tool, widely used in the current context.

The emotional segment of the mamoty has triggered distinctively from the elements of the overall tool upon organizational and social environment. These emphasize satisfaction, positivity, inspiration and respect over mamoty.

A broader influence from belief patterns were noticed except from the colour of the tool. They largely emerge from the shape, material, weight, and size which are based upon organizational, cultural, natural, and social environment. They emphasized the impact through exertion, respect, consistency, uniqueness, inspiration, and favourability from the overall mamoty. The blade consists of cutting capabilities defined by the material, shape and size which are believed to be sturdier as much as the curve of the handle.

The preference segment has also been triggered distinctively from the overall tool upon natural and organizational environment. The shape of the handle, blade and the material of blade have their specific preferences similarly upon the previous environments. The experience of using the mamoty is recognized by the farmers as a composition of features such as sharpness and lightweights of the blade and handle. The codes: lightweight, optimization, perfect angle, mechanical, adjustability, self-customization, durability, and common factors such as lasting sharpness are the most important factors that they prefer in the tool in this type of context.

The impact towards behaviour from the tool in overall is stated through the codes, respect, adaptation, consistent and excretion. These codes are consistent within the cultural, natural organizational and social environment. The elements: shape, layout, material and size of the blade are recognised as negatively influencing factors to the farmer to be misused at certain occasions.

According to the final analysis, emotional and preference responses of these farmers on the overall mamoty are distinctive and positive. Their expression in continuing the manually intensive work is context specific. This is largely because they are used to adapt to the work norms by enjoying the natural environment and experiencing the spontaneous optimization of the tool. It proves that this unique inter relationship between the farmer and manual tool, to sustainably exist in this type of context. Therefore, the derived final codes against appropriate elements of mamoty in this study, demonstrate the act of user experience segments, higher than any other to support future implications in traditional manual handling agriculture tools.

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