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Affordance, a concept for a measurable Design - Fitness furniture, a case study

Sousa, Ana Isabel[a]; Sarmento, Teresa[b]; Borges, Afonso[c]; Mendonça, Rui[d]

[a] FBAUP/FEUP, Universidade do Porto, Porto, Portugal
[b] Universidade do Porto, Porto, Portugal
[c] LabCom, Universidade da Beira Interior, Porto, Portugal; ID+, Universidade de Aveiro, Aveiro, Portugal
[d] FBAUP, Universidade do Porto, Porto, Portugal; ID+, Universidade do Porto, Porto, Portugal

Bearing in mind the population growth, Design follows economy's pace by choosing multifunctional solutions. However, this reality challenges the usefulness of products, making us question the extent to what all functions are perceptible and feasible in a positive manner. Moreover, by a functional design, one expects an intuitive use advocated by the concept of *affordance*, which in practice translates unconscious actions into well-designed aspects. When referring to a multifunctional design, where different contexts coexist, many items must be clearly communicated. Throughout this paper we try to establish a relationship between the concept of affordance and multifunctional design, having as an argument the development of furniture that enhances sports practice, and so fulfils a twofold functionality. The conceptual definition of affordance is exposed first, by using examples of design that validate its relevance, and then tackles the hybrid design in an analytical setting. The discussion stands for affordance as a concept able to measure the hybridity of a product through its latent functions, which established by the user's unconscious interaction, contribute to the multifunctionality of the objects. It is also understood that affordance serves as a generative element in product design, by translating it into more concrete purposes.

Keywords: Design, Affordance, Multifunctionality, Fitness furniture

1   Introduction

"Good design always explains itself naturally, without the need of an instruction manual, without provoking the phrase 'What's that for?'" (Moggridge, 2014).

According to a United Nations report, by 2050, cities will have an increase of population of 66% leading housing space to reduce (Thøgersen, 2017), making sure design will save space and the selection of multifunctional solutions where one appliance serves several purposes. Conscious of this need, and making it coexist in two different contexts, it was proposed in academic context, by a furniture company, the development of home furniture that simultaneously enhances the practice of sports. Nevertheless if, in one hand, the multifunctional design proves advantageous in the face of current needs, on the other hand, the hybridity creates doubt in the perception of its practical utilities. It is thus questioned, whether a multifunctional object positively fulfils all the functions, and communicates them in a clear way. One way to accomplish that would be by making the design as simple and

intuitive as possible, so that the user won't think about the diverse functions and can enjoy it in the most natural way (Thøgersen, 2017).

The concept of *Affordance* is deeply rooted with the instinctiveness of an interaction in the Design field. By being focused on the user, it describes how products communicate with people through its shape and usefulness (Norman, 1988). This idea is present in our daily life from user's interaction with products in a dynamic and almost unconscious way. The individual doesn't need to recognize the product's presence or being aware of its utility in detail but rather that he/she intuitively enjoys its possibilities (Gibson, 1986). Design must provide noticeable *Affordances*, so that the user can easily understand the functionality of objects, following physical, cognitive and sensorial principles (Hartson, 2000). Furniture design focused on multifunctionality might find, in the concept of *affordance,* a tool to identify new purposes (Broch, 2010). This way, the concept might change a multifunctional product by suggesting other interaction possibilities and simultaneously be used as an ideation concept in design (Broch, 2010).

This paper endorses the relevance of a hybrid design through functional issues by suggesting *Affordance* as a qualitative measure for multifunctionality. This approach is enlightened through several perspectives of different authors about the concept that are subsequently challenged with multifunctional design. The ultimate point of this report is focused on the viability of fitness furniture as a concept.

2   The *Affordance* Concept

Initially introduced by the psychologist James Gibson (1986), and later recovered by Donald Norman (1988) the concept of *Affordance* "explains the connection between users' tasks and products' physical characteristics" (You, 2007), being essentially an intuitive interaction. This said, the functionality of objects by revealing the possibilities of use through their formal characteristics. However, *affordances* don't promote the action, they only make it possible and endorse its readiness (Reed, 1996 You & Chen, 2017). The potential uses for an object are massive and belong to it, the user only subconsciously perceives the actions the object "affords". Conversely the *Affordance* concept is still not clear, there are - real *affordances* - those that exist in the object in their physical form - and the perceived *affordances* (or signifiers) the clues or hints that transmit a possible action (Norman, 1988).

"The development of the concept of affordance in design practice has not yet matured, and the differentiation between affordance and signifier seems unclear" (Hsiao-chen You). It is understood: For Gibson (1977), affordances need not be perceived or even known. They exist independently of the user's perception or the existence of signals (Rizzo, 2006). In contrast, Norman (2008) argues for perceived affordances, stating that "the perceivable part of an affordance is a signifier" (Donald Norman, 2008). These, when intentionally designed in a product, provide clues and indications for the different possibilities of use (Donald Norman, 2008). In this way, "the difference is in the user's consciousness, clearly present in the Significant, and desirably not present in Affordance" (Borges, 2015); "In Affordance, action is transmitted from unconscious knowledge, and the result may be unexpected; contrary to the clarity of conscious communication implied in Norman's discourse "(Borges, 2015). In short, the Signifiers exhibit no control over the interpretation of the user, whereas in Affordance perception is achieved by manipulating the physical properties of the artifacts (Hsiao-chen You).

In practice, the concept arises "for designers to guide behaviours indirectly" (Sasaki, 2007), for which it is necessary for the designer to know the reality of using the product and to verify the different actions imposed by the user. Naoto Fukasawa believes that the user shouldn't think when is operating a certain product, and so he proposes the Without Thought concept from which he stresses the transformation of "unintended actions into visible things" (Ding, Cheng, Li, Xiong & Zhang, 2019). Fukasawa adopts the behavioural dimension to explore functional aspects of the objects "with the goal of designing what we can use without thinking" (Parsons, 2009 apud Author, 2015). The designer considers spontaneous behavioural human actions and transports these ideas into new products describing the method as "designing the unconscious". Products' never say 'to be used like that', at most, they offer subtle guidance to the fact that 'This use is also possible" (Sasaki, 2007). In The Umbrella (Figure 01) - the user acts intuitively by placing the bags in the concavity like a suitable space is provided to complete the action (Xu, 2013). "The idea seems to lie between the universes of invitation and permission, inviting to act in a certain way and allowing action" (Author, 2015).

Figure 01 - The Umbrella, Naoto Fukasawa (Fukasawa, 2014)

The "fallen tree in the forest allows you to seat" (Fukasawa,2007) is also an invite to do so. The image was translated by Jurgen Bey (figure 02) and Naoto Fukasawa (2007) (fig.03). This way, ironically the context involves comfort so the action might happen. The "Treetrunk Bench", the added back chair makes the trunk an improved piece of furniture, but in the "Swedese Log" cleanness contributes to an immediate recognition of purpose. Both, inviting for an unconscious interaction with the user.

Figure 02 - Treetrunk Bench, Jurgen Bey (Bey, 1999)

Figure 03 - Swedese Log, Naoto Fukasawa (Fukasawa, 2006)

3   *Affordance* and Multifunctional Design

The concept of Affordance refers to the perceived and real properties of objects (Norman, 1988). So, what happens when we manage products with multifunctionalities? How do we perceive the different goals of interaction? Can a product be considered multifunctional

beyond its apparent *affordance*? A multifunctional object must communicate effectively its potentiality. However, in the face of a possible conflict of functions, and against what Dieter Rams defines as honesty, design should not "manipulate the consumer with promises that cannot be fulfilled" (Lovell, Ive, & Kemp, 2011), it shouldn't indicate functions that aren't achievable.

Multifunctional design is only relevant when the user perceives the many different uses and can take advantages from them (Broch, 2010). A product can be considered multifunctional if it meets the demands that the user places on it and is only justified when all of them are necessary for the normal execution of the task for which the product is intended (Hashemian, 2005 apud Broch, 2010). The first approach would be, therefore, to make all the attributes relevant in the interaction. However, multifunctional design should be defined as well by the ability to respond to the objects several meanings. So, the concept of *affordance* acts over all the objects potentialities, its amplified purposes without a change of its physical shape.

We can assume there are latent *affordances* that the user unconsciously evidence. Other functions might be presented in the object involving the interaction with the user (Broch, 2010). Likewise, Jane Fulton Suri (2005), explores the product potentials when facing the real use – a railing with a square section, for example, invites you to land a packet of milk, as well as a pencil offers the possibility of attaching your hair (fig.04). The concept of "Thoughtless acts?" claims that a product might be different from the goal it was designed for – and there is no control for all the variables (Author, 2015).

Figure 04 - Thoughtless Acts? Jane Fulton Suri (Suri, 2005)

"Stacking books on a chair is a way to use this chair" (Hara, 2007) and use this same chair as a step or to land clothes are equal possibilities of use. "Gestures might be the accurate *affordance*, truthfully working for and revealing a multitude of functions of an object beyond its main goal" (Borges, 2008). Given these possibilities, Morelato Design (2018) conceived two multifunctional pieces based on a chair (figure 05-06): the first can be used as a ladder and the second as a hanger, thus providing means for actions to be possible. However, this is still metamorphosis, where it demands a change in the configuration and so it doesn't reveal an immediate purpose.

Figure 05 - Scala Zero Chair, Morelato (Morelato Design, 1998)

Figure 06 - Metamorfosi Chair, Pietro Barcaccia (Morelato Design, 2014)

4   Fitness Furniture, a case study

Fitness and household might overlap in the same object if in an adequate manner. The effectiveness of objects' communication stands in the understanding of what and how their morphological features really communicate their functions. "(…) understanding how and what they communicate their functions for which they were designed for" (Volli, 2007 apud Laburú, 2017).

Affordances, are conveyed by physical attributes and their distinctiveness on shape and materials as well as their different purposes (Broch, 2010). Albert Au and Glory Tam (2018), in "The Habit", clearly show through a "V" shape and material, enunciating the fitness goal. In addition, it is still possible to use the user memory, taking ownership of objects with which, they are familiar and / or serving the same functions, encouraging their recognition. This approach to the concept of affordance, conveys meaning using metaphors, for example another form of relating the product to that field (Hsiao-chen You).

Figure 07 - The Habit, Albert Au e Glory Tam (Au and Tam, 2018)

Departing from the proposed briefing by a Portuguese furniture company - the aim was to reach new concepts towards different publics and lifestyles. Challenged by this method and its practical application, an analysis of the projects under development was made. In order to gather information, a questionnaire was prepared to the respective designers as well as to the coordinator of the project, in a total of 14 interviewees. From the recorded data, literally transcribed and qualitatively analysed (Ritchie, J. and J. Lewis 2003). - It was readily noticeable the existence of different perspectives before the assumption defended throughout this paper - Will the designer have a conscious concern with *affordances* when considering the different purposes while is creating and developing the product? Although projects make use of the concept of *affordance* to their supplementary function, they don't assume it exclusively in its main shape, they do so by distinguishing parts and materials.

Figure 08 - Multifunctional stool, focused on the practice of attentiveness activities such as Yoga, Pilates and Meditation (Author et al, 2017)

Figure 09 - Stool/coffee table with a movable bar that allows the practice of several exercises (Author et al, 2017)

Figure 10 - Bench or table with a interior lining that works like a rug to do some exercises, such as sit-ups (Author et al, 2017)

Figure 11 - Sideboard with hanger and elastic bands for practicing low intensity exercises (Author et al, 2017)

During the process of designing the products, the majority were not concerned with the concept of *affordance*. However, they revealed adjacent concerns, that is, although they haven't done it consciously, by instilling concerns regarding dimensions, ergonomics and distinction of the parties they tried to enable an easiest perception of the functions a consequent and immediate interaction. However, while 57% of respondents said there was concern about these issues, only one respondent mentioned that were "made full-scale prototypes" and tested with sports practitioners for hands-on validation. Moreover, as stated, in all the examples the function *home furniture* is the most evident, whereas the *fitness character* demands previous explanation. Sometime after the project, it was asked whether the products communicate their purposes in a clear way and only 35% of the answers was affirmative, while the all the others mentioned the main function as being home furniture. One mentioned (figure 08-11) "It is a simple shape that could be used as a side table. It doesn't induce you to do other activities"

This way, the fitness character offered by several elements demands explanation in advance. Necessary actions are required to enjoy the fitness features of each product, which doesn't contribute to a direct interaction with both purposes. In contrast, the elements from the mat to the rubbers "deconstruct and differentiate the link between home furniture and fitness".

In short, as stated by the coordinator of the project, "Any of the products contains elements with standardized shapes that can subliminally convey their function. (...) It is easily understandable that we have parts that allow us to sit and others just to store contents and they quickly express the information of what they serve for. However, as far as fitness is concerned, that's not so obvious". Since the interaction between user-object occurs unconsciously and that many of the functions attributed by the user weren't previously designed by the designer - the products under study may offer other possibilities of use in addition to their main purposes; however, as stated by one of the interviewees, - "several hypothesis may "only be possible through user-interaction tests".

5   Conclusion

The appropriate *Affordance* denotes the possibilities of action of a product. It can be translated into the intrinsically behavioural relationship between user and object, and the expectable interaction only happens when its purposes are immediately perceptible. Thus, when referring to a multifunctional context, where a conflict played by the different means is possible, *affordances* must be communicated in a clear way so the user can intuitively enjoy all functions without significant changes in the product.

Based on this assumption and reflecting on the contribution of the concept of *affordance* to the development of fitness furniture, it is determined that the morphological characteristics of an object, when representing its functional meaning, must translate in a perceptible way all the possibilities of action, either through shape or materials. Thus, its application is aimed to increase the possibilities of using the furniture in a fitness aim, hoping that it responds primarily to its function as furniture and when exposed to a sport context allows the actions imposed by the user. However, given the natural use of objects a range of action options are not controllable by the design, a multifunctional object must communicate the purposes for which it has been designed in an inviting way, that is, should invite the user to the several tasks that it makes possible. Moreover, *affordance* may work as an impetus for interaction and not as a use instruction.

Considering the cases under study, the coexistence of different contexts in a single object, creates a barrier related to spontaneous interaction, since it requires a careful perception of all their possibilities. The results highlight one of the functions, as opposed to the need for previous explanation of the other options - as mentioned by the interviewees; In this case, the furniture purpose prevails over fitness for an easier perception. Furthermore, while in practice *affordances* are ideally generated during project development through observation and knowledge of potential users, it is in a final phase that these are effectively tested and validated through prototyping and usability testing, revealing other options of use in particular for designers who after a distance can identify numerous possibilities.

In short, this paper discusses how roles can be determined by an unconscious interaction. As such, it is determined that multifunctionality may not be defined by the number of tangible purposes, but rather by the actions that an object enables independently of the main role for which it was designed. Affordability, if properly designed, can show the multiple uses of a piece of furniture and promote multifunctional use. In this way, this hybridity is instituted by *affordance* and not by the inherent role of the object. Lastly, this paper seeks as well for a

concordant approach to fitness furniture and following the same it is expected a practical application of the concepts here advocated.

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About the Authors:

Ana Isabel Sousa: Graduated in Industrial Design from School of Media Arts and Design of the Polytechnic Institute of Porto. Master's student in Industrial and Product Design at the Faculty of Fine Arts and Faculty of Engineering of the University of Porto.

Teresa Sarmento: Assistant Professor at the University of Porto, in the areas of Human Computer Interaction and Ergonomics. She holds a PhD in Industrial Management and Engineering, from the University of Porto. Her current research focuses on multidisciplinary methods for Product Experience.

Afonso Borges: PhD in design, professor of product design at University of Beira Interior, director of master's degree, collaborates with the Faculty of Fine-Arts of University of Porto. Researcher of project in objects of daily use, is member of LabCom and ID+.

Rui Mendonça: PhD in design from the University of Porto. Professor and director of the master's degree in Industrial and Product Design at University of Porto. Researcher and founding member of ID+. Creative director of Common Design.