Uses of Common Tools: Is Affordance a Base?

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ABSTRACT

A tool is a device that is used to achieve a task, but not consumed in the process. When in use, a tool works as a part of the user's own body not the environment. The most important point of evolution in human history was development and use of tools. The first tool was made out of stone. Thus, historians refer to the period of time before written history as Stone Age. A study is planned in which the objectives were to know the commonly available and useable tools in present day semi-urban environment, enlisting frequently used tools and their uses, categorizing the uses in terms of commonness- uniqueness and identifying the affordance in their tool. To achieve these objectives 70 samples were taken from age groups of 21-35, 36-50 and 51-65. Findings reveals 142 common human used tools, on the basis of frequency tools were divided in four categories. In these categories second and unique uses were also found. It was found that affordances enhances the efficiency of less precise, less costly, forms of social learning strategies in the acquisition of novel tool use.

Keywords: *Tool use, Affordance and Uniqueness.*

A tool is a device that can be used to produce an item or achieve a task, but that is not consumed in the process. When in use, a tool is a sort of extension of the hand, almost an attachment to it or a part of the user's own body, and thus is no longer a part of the environment of the user. But when not in use, the tool is simply a detached object of the environment, graspable and portable, to be sure, but nevertheless external to the observer (Gibson, 1979).

One of the most exciting issues in psychology is what are the psychological mechanisms underlying human tool use? Surprisingly, this question has received very little attention from psychologists (Johnson-Frey, 2004; Le Gall, 1992). A certain number of attempts have nevertheless been made to model how humans perform tool behavior (referred to hereafter as the HOW issue). These attempts fall into two categories. The first category assumes that tools have no inherent meaning, and thus the meaning must be created internally and stored by the user. The

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other category assumes that tools have inherent meanings, which is detected and exploited by the user without mental calculation.

They all are computational models, based on the core assumption that the use of a tool (e.g., a hammer) requires the extraction of sensory information about object properties (heavy, rigid), which can then be translated directly or indirectly into appropriate motor outputs (grasping, hammering). J.J. Gibson's ecological approach to perception falls into the latter category. For J. J. Gibson (1979), we do not perceive the properties of tools but what they afford (a heavy, rigid object affords pounding). This is the theory of affordances.

The concept of affordance proposed by perception psychologist, Gibson (1979) expounded that in the ecological environment animals can perceive instinctively if the objects around the environment can provide the necessities for surviving. When organisms perceive the physical properties of the environment, such as: shape and dimension, in the same time, they can perceive the functions provided by the environment as well. Gaver (1991) pointed out that the concept of affordance emphasizes human body dimensions, physical shape, the relation between properties and shape, and the perceptive information provided by objects.

An affordance is a particular kind of disposition, one whose complement is a dispositional property of the organism". (Turvey, 1992)

The common terms in the above definition of 'affordance' are: relations, possibility, opportunity, immediacy, and interaction. So, it can be understood that affordance refers to anything that is available to the person to do something with. For example, if a person is left alone near a creek and wants to get across, a rock on the water signals to step on it and cross the creek. This affordance directly signals its relevance from an adult person on that situation but it doesn't signal for a small child who cannot see the rock (Van Lier, 2004).

There are two types of affordances: natural and cultural. The example of natural affordance is the case of flower that is relevant to bee and a flat hard surface is 'walkable-on' to the human being. The example of cultural affordance is that in the case of manufactured object or cultural artifacts, the purpose or the intended use of the object signals its purpose. In fact, the features of an object signal a kind of relevance. Cultural affordance refers to the specific meanings and values. Shotter and Newson (1982, cited in Van Lier, 2004) defines affordance in terms of all types of constraints and enablement's that are indirect and mediate.

Review of literature indicates relationship between affordance and tool uses by human. Keeping in view the thinner review of literature, present investigation was planned to check the links between uses of human tools and affordance.

There has been rapid change in the daily life activities of the rural and urban community in India owing to the availability of abundant tools and machines. With the help of affordance a person can use one tool in a multipurpose manner. It enhances the ability to conduct work in a different and novel way.

The present investigation aims to study when, why and how does affordance guide tool use in human adults.

OBJECTIVE:

Objectives of the present study are as follows:
- To know the commonly available and useable tools in present day semi-urban environment.
- To enlisting frequently used tools and their uses.
- To categorize the uses of tools in terms of commonness/frequency of uses.
- To identify the affordance in their tool.

METHODS

Sample:
A total of 70 (40+20+20) subjects of both gender age range from 21 to 65 were selected.

Design:
A multi-task design was employed to achieve the objectives.

Multitask procedure was used (N-70)

Task-1	Task-2	Task-3	Task-4
T-1 Sample of 30 individuals (both male and female) of three age groups (i.e. 21-35, 36-50, and 51-65) were asked to enlist the name of tools they are familiar.	**T-2 Same sample** revisited and presented with a list of 142 tools and asked to arrange the tools in three categories as: **(a) Frequently used**, **(b) Occasionally used,** and **(c) Do not use but they know the tool**	**T-3**: **A sample of 20Ss** was asked to endorse the tools three responses: common use, second use and the other uses.	**T-4**: **A sample of 20Ss** was asked to describe the physical properties of the selected tools.

Purpose: Human tool uses and its affordance in daily life. To achieve purpose of the study four tasks were planned.

Task-1: prepare a list of common tools used by a person in daily routine.

Task-2: find out participants used which human tools as frequently, occasionally and how many times. This survey was conducted on same age group and participants.

Task-3: find out most frequently uses, second uses and unique uses of common human uses tools. For this purpose same age and different participants were used. This survey was conducted to find out way of dialectical novel uses on human tools.

Task-4: find out the Affordance on human used tools. For this purpose participants were given list of randomly selected tools to note down the physical properties from the list. This survey was conducted on different age and participants.

Procedure:

Participants were contacted individually and clearly informed about the purpose of the study. After establishing the rapport with the participant, he/she was asked to understand the general instructions, however the instructions for specific human tools/task were provided separately. When the subject was comfortable and ready for the task, he/she was asked that which tools were used in commonly. They noted down the name of tools.

Task based study with each individual subject was separately done. Every effort was made to complete the job in a single sitting. How many tools were used and which tools were used in particular situation/responses also noted down. There was no time limitation for the completion of task. After completion of task participants were appreciated for their help and support.

RESULTS:

To achieve main aim of the study use of human tool and its affordance. For this purpose four surveys were conducted and results are as follows:

Primary Survey 1; results reveal that there was a list of 142 common human used tools. (List attached in appendix-I). On the basis of Survey 1, survey 2 was conducted. Results shows that 114 tools were remained on this list, on the basis of frequently used, occasionally used and unused tools but they know the tools. At the end of Survey 2, 28 tools were such as that were endorsed by subjects (listed on; Unused but they know the tool).

After Survey 2, on the basis of frequency tools were divided in four categories such as such as category 1 (frequently uses), category II (occasionally uses), category III (frequently uses + occasionally uses) and category IV (frequently uses + occasionally uses). In the end out of 114, a total of **35 highly frequent** used tools were thus identified.

Table-1: Result of Survey 2

Category of tools uses	Identified tools
I. Frequently used tools **(frequency 20)**	Total 3-tools were identified Tooth-brush, Comb and Razor
II. Occasionally used tools (**Frequency 15**)	Total **3-**tools were identified Scissor, Knife and Blade
III. Frequently + Occasionally (**Collective frequency 20**)	Total **12-**tools were identified. Example: Hammer, spoon, mobile, calculator, pen, nail-cutter, ball, lock's key, watch, fork and remote T.V.
IV. Frequently + Occasionally (**Collective frequency 15**)	Total **17**-tools were identified. Example: Camera, stapler, screwdriver, press, earphone, wiper, matchstick, bottle, saw, basket, mug, rope etc.

On the basis of 35 highly frequent used tools, Survey 3 was conducted. Purpose of Survey 3: to find out the second uses and unique uses. For this purpose same sample revisited and presented with a list of 35 tools. Results revealed that the list of tools had unique and second uses present.

Table-2: Result of Survey 3

Tool name	Second uses	Unique uses
Toothbrush	Hair colouring and dusting	Transforming something liquid and dry powder
Comb	Solving untidy threads	Marking more than one straight line with ink
Pen	Self defense weapon	Decoration
Hammer	Putting nails on wall, self defense, breaking locks	Paperweight, decoration
Blade	Surgery, paper cutting	Rubbing written content
Mobile phone	As camera, as recorder	Lighting fire
Scale	Cutting vegetables	Making decorative tree of vegetables
Knife	As a screwdriver	Making wooden spoon
Razor	Cutting cloths	Cleaning woolen cloths

At the end the purpose of Survey 4 identified the affordance in human tool use for the purpose sample of 20 subjects were asked to describe the physical properties of the randomly selected tools.

Table-2: Result of Survey 4

Tool Name	Affordance
Toothbrush	Light, flexible, long and thin
Comb	Spines, thin, light and easy to carry
Pen	Pointer, long, Light and easy to handle
Hammer	Hard, rigid, strong and heavy
Blade	Sharp, thin, light shape
Mobile phone	Light, smooth, fast, easy to carry and use
Scale	Long, light , easy to carry and use
Razor	Light weight, easy to handle and carry, sharp in use
Screwdriver	Easy to handle and carry, rigid, light and long in shape
Rope	Cotton and plastic made, long, light and flexible
Clock	Three spines, plastic and iron made, various shapes
Scissor	Spines, sharp, steel made and easy to handle
Stapler	Shape , heavy, plastic and aluminum made
Pen drive	Light in weight, plastic made, light shapes
Spoon	Long, light, easy to handle and carry, etc.

CONCLUSION:

Keeping in view the entire findings above on the basis of all the four tasks it can be testified that various tasks were meaningful. The objective of the study was achieved. To our knowledge, the present study provides the first evidence that object affordances play a major role in the learning

and prediction of observed tool-use behaviors. This could arise in the absence of high-level, faithful social transmission mechanisms such as true imitation of observed action goals and means Affordances could enhance the efficiency of less precise, though less costly, forms of social learning strategies in the acquisition of novel tool use, like emulation learning or stimulus enhancement and increase ability how to work and effect of a affordance on uses of tools.

REFERENCES

Gibson, K.. (1991). Tools, Language and Intelligence: Evolutionary Implications. *Man*, *26*(2), 255–264. http://doi.org/10.2307/2803831

Johnson-Frey, S. H. (2004). The neural bases of complex tool use in humans. *Trends in Cognitive Sciences, 8*, 71–78.

Le Gall, D. (1992). Apraxiesidéo-motriceetidéatoire: Revue critique de la littérature. *Revue de Neuropsychologie, 2*, 325–371.

Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston: Houghton-Mifflin Co.

Gaver, W. W. (1991) Technological Affordances. *Proc. CHI '91*. NY: ACM, 1991.

Turvey, M. T. (1992). Affordances and prospective control: An outline of the ontology. *Ecological Psychology, 4*, 173–187.

Van Lier, L. (2004). *The ecology and semiotics of language leaning: A sociocultural perspective*. Boston: Kluwer Academic Publishers.

APPENDIX-I

List of common human used tools

Sr. No	Tool Name	
1.	Knife	Pkkdw
2.	Hammer	gFkkSMh
3.	Fork	DkVk
4.	Spoon	Peep
5.	Mobile	Qksu
6.	Calculator	ifjdyu ;a=
7.	Hand Grinder	हाथ की चक्की
8.	Camera	dSejk
9.	Pen	iSu
10.	Remote Controller	दरस्थू ननयोंत्रक
11.	Stapler	क ेः ़गानेवारा़डीयोंत्र
12.	Screwdriver	Ikspdl
13.	Press (iron)	bL+=h
14.	Shovel	QkoMk
15.	Vacuum Cleaner	वैक्यूमसपाई उऩकरण
16.	Ear Phone	कान पोन
17.	Lighter	़ाइटर
18.	Wiper	ऩोंचा
19.	Tooth Brush	टूथब्रश
20.	Comb	da?kk
21.	Nail Cutter	Ukk[kqu dkVus dk
22.	Hair Drier	Ckky lq[kkus dk
23.	Hair pin	Ckkyks esa yxkus
24.	Lock Key	PkWch
25.	Matches	Ekkfpl
26.	Ball	Xksan
27.	Tweezers	NksVh fpeVh
28.	Sewing Needle	lqbZ /kkxk

Sr. No	Tool Name	
29.	Ear brush	कान ब्रश
30.	Locking Pliers	नचमटा ताऱा ऱगा
31.	Bar-shear	फार - कतरनी
32.	Clamp	dkaVk
33.	Loon	diMs cquus dh e"khu
34.	Razor	jstj
35.	Compass	fndlwpd
36.	Spade	dqnkyh
37.	Axe	dqYgkMh
38.	Gauge	Xkksyph
39.	Holder	gksYMj
40.	Paper Cutter	कागज काटनेका यॊत्र
41.	Bolt Cutter	lykl
42.	Chalk	pkWd
43.	Wire	Rkkj
44.	Rope	jLlh
45.	Tag	dkVsnkj rkj
46.	Oven	rUnwj
47.	Brush	czq"k
48.	Battle	cksry
49.	Pestle	Ekqlyh
50.	Stick	NMh
51.	Blade	CysM
52.	Clock	?kMh
53.	I-Pad	आई ऩैड
54.	Sharpener	तेजकरनेवाऱा
55.	Pencil	iSfUly
56.	Rubber(Eraser)	नऱखावट नमटानेका रफर
57.	Tester	टेस्टर
58.	Dagger	Nqjk
59.	Cold Caini	Nsuh

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Sr. No	Tool Name	
60.	Stone Chisel	Nsuh] Vkadh
62.	Balance	Rkjktw
63.	Bagging Hook	njkrh
64.	Rasp	eksVh jsrh
65.	Sickle	njkrh
66.	Oar	Ikrokj ¼MkaMk½
67.	Lancet	uLrj yxkus dk Nqjk
68.	Divider	Ikjdkj
69.	Syringe	flafjt
70.	Screw	fMcjh] iasp
71.	Spade	QkoMk
72.	Cleat	[kwaVk] dks;yk
73.	Blowpipe	Qqdauh
74.	Auger	Nsn djus dk cjek
75.	Drill	Ckjeh
76.	Tape	Qhrk
77.	Bolt	flVduh
78.	Funnel	dhi
79.	Handle	gS.My
80.	Roller	csyu
81.	Hand Saw	vkjh
82.	Hack Saw	Ykksgs dkVus dh vkjh
83.	Circular Saw	वृतीयआरा
84.	Jig Saw	ऩतऱा छोटा आरा जो मशीन सेचऱता है
85.	Pipe-wrench	ऩाइऩ ररोच
86.	Torpedo-Level	टारऩीडो स्तर
87.	Needle Nose Pliers	स ईजैसीनाक वाऱा प्ऱास
88.	Stripper	खाऱ उधेड़नेवाऱा
89.	Draw Hoc	Dqnkyh
90.	Hand draw hoe	हाथ खींॊघनाक दाऱ
91.	Hand Trowel	करणी

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Sr. No	Tool Name	
92.	Trug/Basket	टोकरी
93.	Lamp Scissors	रैंनसीज़सस
94.	Nail Scissors	नाखूनकाटनेकी कैं ची
95.	Button-Hole Scissors	फटन- होऱ कैं ची
96.	Tooling Plan	/kkjh jank
97.	Smoothing Plan	Ckkjhd jank
98.	Trying Plan	Ek>yk jank
99.	Jack Plan	jank
100.	Vice	laMklh
101.	Hand Vice	gkFkcad
102.	Needle Paint	fcajth
103.	Fishing -Rod	eNyh dkaVk
104.	Bellows	iEi
105.	Lever	Hkkjh rksyk n.M
106.	Pile	jsrh
107.	Anchor	Yakxj
108.	Hone	ekSgj
109.	Dibble	jaHkk
110.	Cone	yV~Vw
111.	Cleat	twrs ds Qhrs
112.	Spatulas	fipdkjh
113.	Lamp	ySEi
114.	Pincers	fpeVh
115.	Sieve	Nkyuh
116.	Broom	>kMw
117.	Inkpot	L;kgh nokr
118.	Chalk	pkWd
119.	Jar	जार
120.	Stove	pwYgk
121.	Stool	स्टूर
122.	Bodkin	मोटा स आ

Sr. No	Tool Name	
123.	Ruler	Ldsy
124.	Quill pen	ia[k okyk iSu
125.	Spanner	gFkdy
126.	Mallet	jcM okyk gFkkSMk
127.	Plumbine	
128.	Rudder	Ikrokj¼tgkt dk ia[k½
129.	Trying Angle	गोननयाॉः
130.	Hand Cuff	gFkdMh
131.	Stencil	ननक्रॊ त
132.	Haft- Axe	dqygkMh
133.	Jack Knife	tsc esa j[kus okyk pkdw
134.	Ladle	cMk pEpp
135.	Laptop	रैऩटॉऩ
136.	Keyboard	की फोडस
137.	Griddle	Rkok
138.	Funnel	dhi
139.	Tongs	fpEkVk
140.	Churner	e/kkuh
141.	Mug	MCck
142.	Kettle	DSryh
143.	Awl	स आ