

# **ACTIVITY THEORY: A FRAMEWORK FOR ETHNOGRAPHIC RESEARCH FOR INDUSTRIAL DESIGN**

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## **ABSTRACT**

While ethnographic research has gained wide acceptance in the Industrial Design (ID) profession, its inclusion in design education is problematic. The main reasons are the lack of a structured approach to ethnographic research resulting in lengthy and intensive periods of observation and analysis which fail to inform the design process in any meaningful way. In response, this paper suggests the coupling of ethnographic methods with Activity Theory (AT) in design studio exercises. The process is illustrated through the adaptation of an ethnographic case study, for the design of classroom furniture in India. Finally this paper claims that AT, with its emphasis on human activity as the fundamental unit of study, is an appropriate methodology for the development of a detailed design brief.

*Keywords: Activity Theory, Ethnography, Industrial Design, Furniture Design*

## **1 INTRODUCTION**

The Industrial Design (ID) discipline acts as the creative interface between *people* and *products*. Traditionally research has been focussed on the *product* category through studies into materials, product semantics, semiotics and cognition. However, in recent times design research has increasingly focussed on the *people* domain. Influenced by disciplines such as Human Computer Interaction (HCI) and engineering, the use of sociological methods such as ethnographic research within the design process, as a means of understanding the user have gained prominence. This paper suggests a coupling of ethnographic methods with Activity Theory as a way for its inclusion in the design curriculum.

## **2 ETHNOGRAPHY AND THE DESIGN PROCESS**

In recent years ethnography based techniques have been used in a number of design contexts [1, 2, 3]. Termed as Applied Ethnography, these techniques are a variation of traditional ethnography methods in that, they are “quicker, less expensive and can be less intrusive in the lives of those being studied” [4]. Both traditional and applied ethnography take place in natural surroundings with the researcher participating in the field and collecting data through a rich description of the proceedings ensuring that the data collection and its interpretation are contextual and not from the researcher’s cultural perspectives [5].

Applied ethnography has traditionally been used at the ‘Concept development’ [6] stage (Figure 1) or the ‘fuzzy front end of the new product development [3] as a means of informing design of critical functionalities and tastes of the user segment.

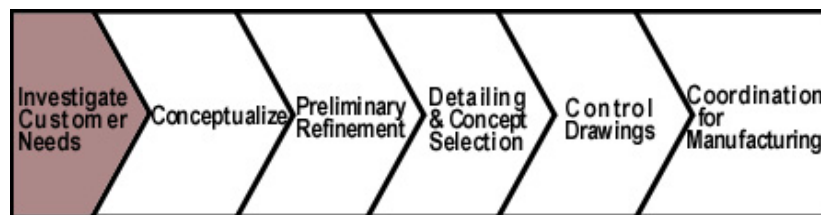


Figure 1 Design Process [6]

The ethnographic techniques commonly used in product design include understanding:

- What people say – by conducting interviews and conversations
- What people do – by observing and documenting individual and group behaviour
- What people use – By observing behavioural traces such as the wear and tear of objects or the use of post-it’s.

Applied ethnography is derived from traditional ethnography, the central mode of knowledge production for social and cultural anthropology. It involves the study and documentation of human cultures to gain insights into the ‘natives’ point of view. Pure ethnography involves spending significant periods of time with local people, making detailed observations of their practices to gain insights into their culture. According to Geertz [7], “man is an animal suspended in webs of significance he himself has spun and that these webs were culture”. Its analysis therefore helps decode the ‘meanings’ behind individual/ collective actions and beliefs that are ‘primary determinants of what people want and how they like it’ [3].

While large design firms like IDEO and technology corporations like Intel, Sony and Microsoft use ethnographic research as a means of understanding consumer needs, some have questioned the traditional understanding of ethnographic research ‘informing the design process’. It has been argued that ethnographers with a poor understanding of either design, culture or technical knowledge, generate huge amounts of data which fails to inform the design process in any meaningful way [8, 9]. The response to this has been the development of tools such as the designer’s notepad in the field of HCI [1], and a pattern language [2]. Increasingly, there has been calls for a more structured format for design specific ethnographies away from the holistic descriptive approaches now used[8][9]. This has implications for the nature and type of ethnographic methods to be introduced in design education. As a response to the identified issues, this paper suggests the integration of ethnographic research within the framework of the Activity Theory (AT).

### 3 ACTIVITY THEORY

Vygotsky originally introduced the idea that human beings interactions with their environment are not direct but are instead mediated through the use of tools and signs [10]. This is represented by the *activity system* as shown in the Figure 2.

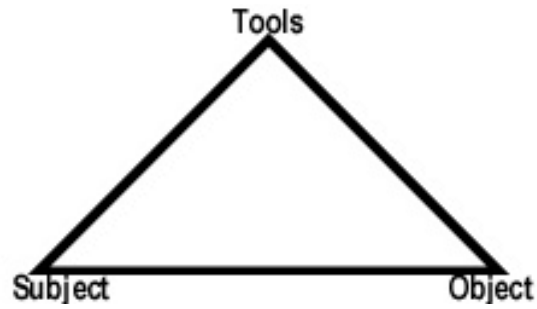


Figure 2 Basic Mediation Triangle [10]

Engestrom [11] expanded this activity system by placing human activity within a social and cultural context. The *expanded triangle model* incorporates the community and mediators of human activity such as *tools* (mediates relationship between subject and object), *rules* (mediates subject-community), and *division of labour* (mediates community and object). The different components are shown in Figure 3.

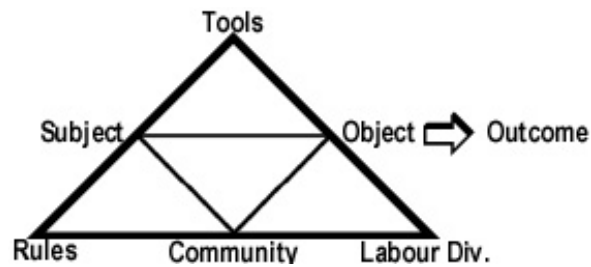


Figure 3 Engestrom's Expanded Triangle Model [11]

*Subject* is the human activity, both social and individual that satisfies objectives by the mediation of tools. These *tools* could be physical, as in a screwdriver or a mental model such as thinking or language. Physical tools help manipulate things while the conceptual tools influence behaviour. The *object* component reflects the purposeful nature of human activity classifying them into a hierarchy while the *community* component places all human activity within a social and cultural context. Finally, the *rules* component highlights the regulations that come into play when the allocation of responsibilities (*division of labour*) results from the mediation of tools and its consequent complexity.

### 3.1 Operationalising the Activity Theory

As a means to operationalising the theoretical structure of AT to a practical application, Kaptelinin and Nardi [12] propose the use of checklists. The checklist is a conceptual tool for identifying the most important principles of AT that influence the use of tools in a particular setting and include:

- **Mediation:** All human activity is mediated by cultural signs: words and tools. These tools are created and transformed during the development of the activity.
- **Hierarchical structure of activity:** This principle helps us conceptualize work activities. In AT, the unit of analysis is an activity directed at an object. Activities focus on *motives*. These are composed of *actions* which are goal directed. These actions are implemented by automatic *operations*.

- **Internalization/ Externalization:** Internalization is the transformation of external activities into internal ones through the processes of attention, memory and thinking. While, externalization is the physical expression of a mental model. The activity itself, the tools and the internal thoughts all constitute an activity.
- **Object Oriented:** Activities take place within an environment that combines all kinds of objective features which, in turn determine the way people act on these entities.
- **Development:** According to activity theory, to understand a phenomenon is to map the evolution to its existing form. These can be undertaken through ethnographic methods.

Placing the ethnographic research within the framework of the AT gives us insights into the whole of the work activity where the object will be utilised as well as the functionality of each activity. It also provides insights into the tool user's cultural and psychological behaviour when using the tool.

#### **4 CASE STUDY: SCHOOL FURNITURE DESIGN**

In order to put AT principles into practice, an ethnographic study for the design of classroom furniture at a primary school in the remote Dang district of Gujarat, India was adapted. Learning patterns are often a reflection of deeply held cultural values. Viewed from this context, education enables students to engage in *meaningful social practices*. By placing the process of learning within an AT framework the furniture was envisaged as a mediating tool that is effected upon and, affects the process of learning and education, thereby informing its design process.

##### **4.1 Checklist**

The checklist was applied to the key relationships in the activity system. In the interests of saving space, only three of the most relevant checklist components are reproduced hereunder.

##### **4.1.1 Internalization/ Externalization**

This checklist focuses on the internal and external components of learning. An ethnographic research that compared traditional learning patterns with the classroom environment revealed how the mediation of the classroom furniture influenced and transformed learning. The traditional concept of 'education' involves instilling moral values through story telling and the imparting of vocational skills from father to son. These stories then found expressions as symbolic motifs on the products of vocationally imparted skills such as textile printing, toy making, handicrafts and songs during agriculture harvesting. In this way, traditional education involved the integration of shared, explorative and overlapping modes of thinking, distilled through all the sense perceptions towards a composite 'experience'.

On the other hand, the classroom environment with its narrow aisles, limited the teacher-student and student peer interaction. The students learning skills now depended solely on their ability to quickly jot down verbal instructions of the teacher. In effect, it reduced the shared and multi-modal inputs of traditional education, into a singular one of writing. The ability for practical working, abstraction, logical and critical thinking are replaced by an overwhelming need to memorise, which in turn promotes rote learning. The external manifestation of this mental model prescribed longer writing durations and higher concentration levels. However, the ergonomically poor design of the furniture

meant that this was not possible. Students were found to be inattentive and constantly seen shifting in their seats.

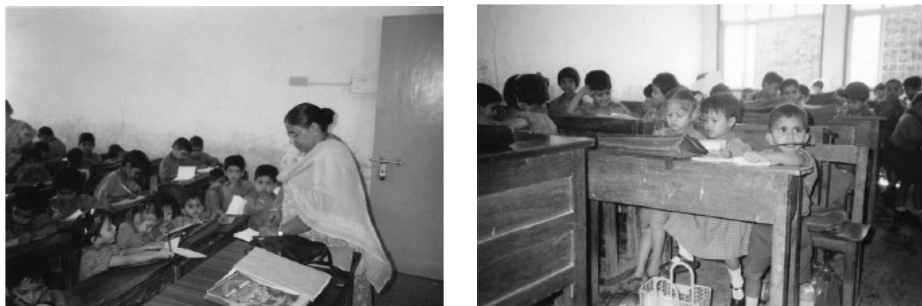


Figure 4 Poor Aisle Spaces and ergonomics of existing furniture

The study called for the mediation of a new flexible furniture system conducive to the objective and goals of the activity.

#### **4.1.2 Object Orientedness**

The school had poor retention rates coupled with huge swings in the students yearly attendance patterns matching the agricultural sowing and harvesting seasons. Parents had ambivalent views to the school education in its current form, with a feeling that the only value generation were the inculcation of reading and writing skills. The lack of practical and vocational skills in the curriculum meant prioritising family vocations such as farming, over the school education.

Reduced attendances translated into assimilation of various classes with teachers utilizing this 'lean' period for professional upgradation or community services. This meant Class 2 students were often seated with year 5 students. Tables and chairs were either too high or too low. As a result, the children were either seen leaning heavily on the tables, or standing and writing, in the case of shorter children (Figure 4).

#### **4.1.3 Hierarchy of activity**

This component analyses the extent to which the current furniture facilitates or constrains attaining the user's goals. The thought here was to document the *activity*, *actions* and *operations* so that operations may be made as efficient as possible through design allowing for greater goal directed actions and objectives.

Operations: The frequent assimilation of classes and individual desks and benches meant the spaces in the aisle or between the furniture pieces were never optimum. This affected the ease of egress and ingress from and to the furniture as well as the inability of the teacher to supervise the students to the rear end of the class. Taller students also found it difficult to access the inbuilt storage space, leaving their backpacks on the bench. The high frequency of furniture shuffling also damaged the wooded furniture leaving students susceptible to injury.

Actions: Each class was 45 minutes in duration with a bulk of the activity dominated by writing and discussing. These long periods of actions demanded a comfortable work space that aided the student's concentration. However, most of the students were observed to be fidgeting, or constantly shifting in their seats due to the inappropriate furniture dimensions.

Activity: The furniture, through its poor design was found to be inhibiting the objectives of the learning activity.

## 5 CONCLUSION

The above case successfully demonstrates the effectiveness of an ethnography-AT hybrid model and the possibility of its integration in a design studio through the use of checklists. It can be a very effective tool for the creation of a contextualised brief as well as mapping shortcomings in existing products through a detailed activity hierarchy. The model however cannot be used in studios for new product development as it necessitates customer interaction with an existing product.

## REFERENCES

- [1] Hughes, J., King, V., Rodden, T., and Anderson, H. CSCW 1994. *Moving out of the Control Room: Ethnography in Systems Design*, pp.429-438 (Chapel Hill, North Carolina, 1994)
- [2] Erickson, T. Towards a Pattern Language for Interaction Design. In Luff, P., Hindmarsh, J., and Heath, C., ed. *Workplace Studies: recovering Work Practice and Informing Systems Design*, pp. 252-261 (Cambridge University Press, Cambridge, 2000).
- [3] Cagan, J., Vogel, C. ASME Design Engineering Technical Conferences. *Clarifying the Fuzzy Front End of New Product Development: Teaching Engineering and Industrial Design Students Ethnographic Methods to Foster Interdisciplinary Inquiry into Consumer Needs*, pp. 1 (Carnegie Mellon University, 1999).
- [4] Sanders, E. *Ethnography in NPD Research: How “applied ethnography” can improve your NPD research process.*, [HTML] pdma. Available: <http://www.pdma.org/visions/apr02/applied.html> [Accessed on 2007, 17 March], (2002).
- [5] Brewer, J. *Ethnography*. (Open University Press, Buckingham, 2000).
- [6] Ulrich, K. and Eppinger, S. *Product Design and Development* (McGraw Hill/Irwin, New York, 2004)
- [7] Geertz, C. *The Interpretation of Cultures: Selected Essays*. (Basic Books, New York, 1973)
- [8] Normark, M. *Some Thoughts on Ethnography Aiming for Design.*, [PDF] HMI Workshop. Available: <http://www.nada.kth.se/hmi/Past%20Events/workshop2003> [Accessed on 2007, 10 March], (2003).
- [9] Crabtree, A., Rodden, T. International Workshop on Interpretative Approaches to Information Systems & Computing Research. *Ethnography and Design?*, pp. 70-74 (The University of Nottingham, 2002).
- [10] Vygotsky, L. *Mind In Society – The Development of Higher Psychological Processes* (Harvard University Press, Massachusetts, USA, 1978)
- [11] Engestrom, Y. *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research* (Orienta-Kosultit Oy, Finland, 1987)
- [12] Kaptelinin, V. and Nardi, B. *Activity Theory: Basic Concepts and Applications.*, [HTML] CHI 97 Tutorials. Available: <http://acm.org/sigchi/chi97/proceedings/tutorial/bn.htm> [Accessed on 2007, 6 March], (1997).

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