# Inexplicit Learning:

## Transferring Knowledge through Visual and Emulative practices

**Koumudi Patil**

*This study attempts to understand how expert knowledge is transmitted in the absence or lack of explicit and formal means of knowledge acquisition, with particular interest in the evolved relationship of a master-apprentice, observable in pockets of traditional communities of practice. An ethnographic study based on content analysis of the transcriptions of members of a craft community from Varanasi, India has been used to strengthen the undermined pedagogical role of observation and emulation in the transfer of inexplicit knowledge. It is argued that in-situ observation and emulation foster situations for facilitating co-production of knowledge, further implying co-authorship. Gaining community membership in craft communities is not merely a matter of gaining a professional degree; instead, it is a slow process of enculturation.*

Keywords: Observation, Emulation, Inexplicit learning, Master-apprentice. Communities of Practice

### Introduction: Pedagogy of the Tacit

The central concern of this study is to develop a body of knowledge to understand how expert knowledge is transmitted in the absence or lack of explicit and formal means of knowledge acquisition, with particular interest in the evolved pedagogical practices of craft communities that centre around a master-apprentice relationship. The apprenticeship tradition was the main source of vocational training in craft communities for centuries (Wolf 2002, p. 58). Polyani (1958) elucidates the apprenticing relationship in terms of a master/novice relationship where the theoretical, generative as well as the evaluative principles of the practice are controlled by the master and not by the novice. Rogoff (1994, p. 213) explicates that less mature learners of a community learn through collaboration with adults while carrying out activities with purposes explicitly connected with the history and current practices of the community. This curricular mode, considered mainstream prior to the industrial revolution is today regarded an alternative system. In modern workplaces, such learning is often treated as a residual category to describe any kind of learning which does not take place within, or follow from, a formally organised learning programme or event (Eraut 2000, p. 114). Nevertheless, craft apprenticeship remains a rich curriculum resource, not despite but because of the current emphasis on flexible specialisation where knowledge practices are tacit, extensive, distributed and dispersed, developing in a co-ordinated network of people, tools and technologies, serving multiple, integrated and overlapping functions (Gamble, 2004). Thus, concepts of intuitive expertise and tacit knowledge have become increasingly important factors in discussions concerning knowledge and learning in practice of skill acquisition as well as its application (Nielsen, 2002). Furthermore, tacit knowledge accrued by a long practice of craft and instrumental practice of 'doing the job well for its own sake' (Sennett 2009, p. 9), suggests new ways of doing things (Muller, 2012).

Brown, Collins, and Duguid (1989) elucidate that craft apprenticeship enables apprentices to acquire and develop the tools and skills of their craft through authentic work and membership in their trade. So the term apprenticeship helps to emphasize the centrality of activity in learning and knowledge building and highlights the inherently context-dependent, situated, and enculturating nature of learning.

Pedagogical enquiry centred around the transfer and transformation of such skills and designerly knowledge is difficult to examine empirically, as a consequence of its intangible or inexplicit nature. Learning a skill involving bodily actions that reflects the mind, requires not only dexterity of the hand, but also body-mind coordination facilitated by sensory stimuli. The design process takes place inside the designer's head, and perhaps body, as well as outside in the observable outer world (Reitan 2014, p. 3). Such tacit knowledge is not easily conveyed by short courses or by non-apprenticeship modes such as distance education (Muller, 2000). This marks a strong divide between teaching theoretical concepts as against hand-based thinking skills. The latter demands the regulation, manipulation, and synchronisation of many more senses than the mind alone.

According to Nonaka (1995), knowledge is created through the interaction between tacit and explicit practices that postulate four different modes of knowledge conversion- (a) Tacit-to-Explicit is the process of externalisation to articulate tacit knowledge into explicit concepts, (b) Explicit-to-Tacit is the internalisation of explicit knowledge into tacit knowledge, (c) Explicit-to-Explicit is the combination of systematising concepts into a knowledge system, and (d) Tacit-to-Tacit is the socialisation of sharing experiences and thereby creating tacit knowledge such as shared mental models and technical skills. Pedagogical methods for knowledge conversion, from, and to explicit practices are fairly well known. However, studies on methods of transfer and acquisition of tacit knowledge are limited, often speculative, and rarely of a generative nature. The 'tacit' has become a stumbling block, both practically and conceptually (Gamble, 2004). But little is understood about how, in the absence or lack of any explicit communication, the master hands down his knowledge to the apprentice, and in turn, the apprentice imbibes this tacit knowledge. How is craftsmanly knowledge transferred from one craftsperson to another, retained, improvised, and changed over a period of time? From Nonaka's perspective, this paper enquires into the pedagogical methods that enable the completion of the knowledge spiral in craft communities.

## Methodology

Against the theoretical background of tacit knowledge, this study emphasises the 'invisible pedagogy' of transmitting knowledge through observation and emulation, obtained through 'thick descriptions' of the master-apprentice system of the Banarasi toymakers. After observing and emulating, apprentice learns-by-doing. Learning-by-doing is a reflective practice limited to self-learning by an individual and not to transfer of learning between individuals, therefore, beyond the scope of this paper.

The Banarasi community of practice (henceforth, CoP) of toymakers consisting of more than a thousand practitioners with varying skill sets is settled on the banks of river Ganga in the holy city of Varanasi, India. The workshops or Karkhanas have sporadically mushroomed across Varanasi, but the densest clusters can be found at Khojwa, Kashmiriganj and Laksha.

I have been participating in this CoP of Banarasi wooden toymakers since 2008. As an ethnographer, I approach the community in two roles- firstly, as a researcher attempting to learn about the community of practice, and secondly, as a learner attempting to learn from the practice. I am an observer at the periphery in the former, while in the latter, I participate as an active learning-member of the community, eventually blurring the line between the observer and the observed. Here, I can leverage my position as an insider as well as an outsider in the same community, creating an enriching environment for developing thick descriptions of the situation as-is, and as-is being created. The collected evidence is based both on observations of existing interactions, as well as interactions that were created by me in the process of participation. For the former, I became a regular visitor in 6 Karkhanas located in the craft hubs at Laksha, Khojwa, and Kashmiriganj, as well as the local market- Vishwanath Gali. Over the years, my status has evolved from an intruder into an invisible spectator, and today to a benefactor as I have gained trust and acceptance in the CoP.

In each of the 6 Karkhanas, a pair of master-apprentice were selected for this study, making a total of 12 participants. However, it must be noted that the Karkhanas include a family as well as a floating population of visitors consisting of peers, shopkeepers, or direct clients. Therefore, at any given point, interactions not only included the selected pair of master-apprentice, but also the impromptu interactions between family members and outsiders. An apprentice was not beholden to imbibe knowledge from the master alone, but was encouraged to gather and synthesise knowledge informally through an environment. Thus, studying a social learning system differs from experimental studies where subjects are not only known explicitly, but even their learning interactions are limited to explicit one to one communication, and not one to many associations.

The informal interviews were triggered and shaped by the personal, interpersonal, and community processes of interaction visible and accessible to me as a participant of the community activities. The conversation snowballed into topics as well as actions digging deeper into the relationships between master and apprentice, as they lived, learned, and earned their livelihood under the same roof. With the consent of the participants, some interactions were video recorded (8 sessions of about 2 hours each), while the rest were audio recorded (10 sessions of about approximately 1.15 hours each). Codes emerged from the examination of the content analysis of the transcriptions. I treated my data as a cross-dimensional comparison of verbal utterances, with observed actions and processes, and recorded still photographs or videos of in-situ action during the time period 2008-2012. First, I focused on the text-keywords, phrases and idioms, the "smallest, and as far as reliability is concerned, the safest recording unit for written documents" (Krippendorff 2004, p. 104). Secondly, I inferred open codes of the interactions, actions, activity, content, gestures, space, and time from the data. The selective codes were inclusive of the Master-learner verbal interactions (instructions, rebuke, advice, and encouragement), demonstration of actions (as evident in the images, videos and observation notes), and kind of learning, occurrence of learning in time and space, and bodily gestures (acknowledgement, disapproval, anticipation, and seeking approval). Here, is an instance of the same. (Identity of all craftspeople and community members has been removed in the paper.)

| **Sample Transcription** |
| --- |
| Older craftspeople did not make eyebrows. But my teacher made it, so I also make it. Looks beautiful! |
| **Coding of Sample Transcription** |
| *Date*: 24th May 2011<br><br>*Space*: Karkhana cum home of the XYZ craftsperson, Khojwa, Varanasi<br><br>*Members present*: Craftsperson himself, a colleague from another Karkhana was present. The apprentices (2 sons) had left for a marriage. Women members were in the inside room.<br><br>(M1) Older craftspeople (Ac1) did not make eyebrows. But my (M2) teacher made it, so (A1, Ac2) I also make it. (E-Ac2) Looks beautiful!<br><br>Where (M) is Master, (Ac) is Action, (A) is Apprentice, and (E-Ac) is Effect of Action. |

*Table 1*: Coding of a Sample transcription

Axial patterns were inferred by connecting such selective codes to arrive at a basic model of who teaches what to whom, by which means and with what effect.

Besides the above, this study also draws inferences from my previous publications on the conventions, canons, and beliefs held by toymakers, linguistic categorisation of the toys, and division of skills in the CoP. Together, they also inform the findings of this study on how craftspeople transfer tacit knowledge. Due to paucity of space, a brief summary of these publications as well as their methodology is shared in the footnotes wherever applicable.

## Practice makes a Community: Banarasi toymakers

According to Lave and Wenger (1991), it is more essential to examine the kinds of social engagements that provide a context for learning, rather than delve into the kinds of cognitive processes and conceptual structures involved in the transfer of knowledge. This changes the role of learning from the acquisition of propositional knowledge, to learning situated in the community specific form of co-participation. Consequently, the mode of participation which varies between communities and situations can throw light on the pedagogy of the community to pass knowledge of the practice, often tacit in nature, from a master to the apprentice.

Likewise, co-participation amongst the members of the Banarasi CoP is an interesting organisational model of learning and production. Here, every craftsperson specializes in a single skill set- Carving, lathe turning, cutting in patterns and assembling, and painting the toy. Almost all toys require multiple skill sets, compelling the craftspeople to be mutually dependent on each other for completing a product. Community members very often do not follow a hierarchy where a few lead the others. For any given order by the client, they associate with each other according to the skills required for the order. An earlier publication[1] shares details of this model of informal participation within the community membership which is adapted and reorganised for every toy consignment (Patil, 2015). Every member of the group completes a part and hands it over to the next craftsperson. In case, any changes are made to the toy, the next craftsperson is expected to coherently compliment the same with his skill even in the absence or lack of explicit instructions regarding the method of doing so. These groups of different skill sets stem from the same level of technology, material and design and form for every new order. For a detailed workflow, please refer to Figure 1.

[1] My recent papers (XYZ, 2015, 2017) both discuss the cumulative changes inscribed/superimposed by a group of toymakers sequentially while making a single toy in Banaras. Ethnographic data collected during the interactions within the Karkhanas with craftspeople as well as shopkeepers of the Vishwanath Gali formed a rich source of data to develop a flow of interaction between the clients and the craftspeople with varying skill-sets for developing any consignment.

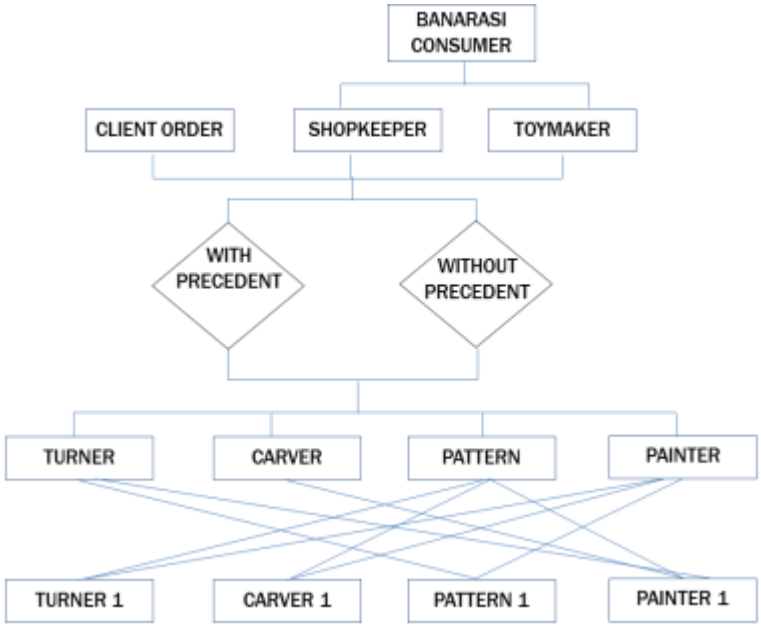


*Figure 1*: Work flow of all community stakeholders involved in designing a toy.

Such hierarchy-less participation in the Banarasi CoP emerges from the pedagogical means employed for imparting and imbibing knowledge within the Karkhana (homes-cum-workshops of master craftspeople). This requires access to in-situ production activities to engage with local technologies of practice, participate in culturally acceptable modes of interaction with the toys, co-create the social representation and value of toys, gain the opportunity to watch and listen to senior members, and engage with sufficient time and space to familiarise oneself with resources and the know-how of their application and use. Karkhanas take the labor of the apprentice, either from within or outside the family in exchange of the opportunity to learn the craftsmanship (Lave & Wenger, 1991). They triple up into an institution of learning, factory floor for designing and production, as well as a living space for social interaction. Therefore, under a single roof, multiple kinships- Master-apprentice, Employer-employee, and Head of the family- family members (Patil, 2017) are commonly observed.

While preparing the historical accounts of the six Karkhanas that were a part of this study, I noted, often Karkhanas had one or two masters accompanied by 2-3 apprentices. Generally (but not necessarily in recent times), members shared a family relation which legitimised participation of the apprentice, besides his qualifying skill and will to work. Following abbreviations were employed to write the kinship chart of a Master-Apprentice relation: S- Son, D-Daughter, F- Father, R-Relative, O- Outsider, M- Master and A- Apprentice. Abbreviations were combined to form kinships across generations as recounted by the participants. For instance, F,s is Father's son while FR is Father's relative. Similarly, FR,s will be Father's Relative's, son. Drawing from anthropological legend scheme of Kinship maps, the F-Father was denoted as the Ego. All kinships were referred in relationship to F-Father. Also, chronologically this (F- Father) is the current generation of toymakers practicing toy making as a livelihood and teaching apprentices their skills, therefore F-Father is the current M-Master and his S-Son, R-Relative, or O- Outsider are the current A-Apprentices under observation in this study. Each kin is an apprentice, and as he matures, a master.

As seen in the Figure 2, 3 and 4, kinship between master-apprentices in some Karkhanas was strongly limited within the immediate blood-relations alone, while in others, it had loosened to include distant

relatives as well as outsiders. A traditional master-apprentice genealogy evolved in a linear fashion within the more conservative family in Karkhana-1. (Refer to Fig. 2) However, in two other Karkhanas, sons of close relatives were also adopted for passing down the skills. (Refer to Fig.3) The most common genealogies today are open to not only distant relations, but also apprentices from other communities like farming or the service sector. Three Karkhanas revealed such an open structure. (Refer to Fig. 4) Daughters and other female members from within the family have been included only in recent years for tangential skills alone. No member of the female gender from outside the family has been taken as an apprentice in any of the Karkhanas across Banaras.

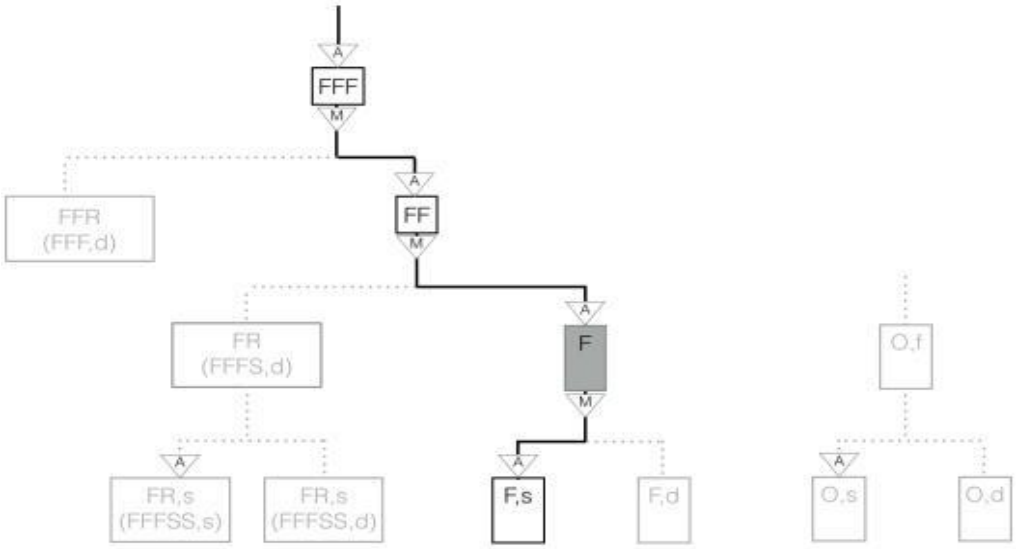


*Fig.2:* Traditional Master-Apprenice geneaology

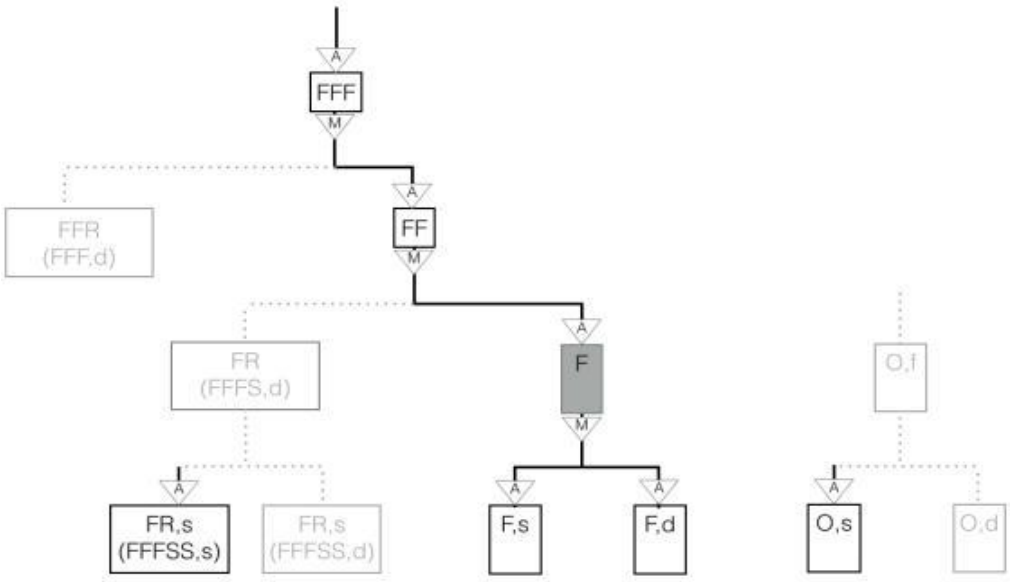


*Fig.3:* Contemporary Master-Apprentice genealogy including members from outside the family

The segregation of tasks in the workflow discussed earlier is possible into groups, skill sets, and also linguistic categories[2] (Patil, 2015) because each member executes tasks in an assembly line system, specialising in any one holistic and meaningful task and skill set. Each Karkhana specialises in only a particular skill set and imparts knowledge related to the same. But, in a toy making sequence members participate in multiple combinations of skills in differing sequences to take advantage of the capabilities of others, in addition to their own. These skill sets have been evolving and mastered in Karkhanas across generations as seen in the kinship maps. Therefore, in the workflow model discussed earlier (Fig.1), a 'Cutting & Assembling'- craftsperson can be easily substituted by a kin- F. Here, the F is a Father as well as a Master specialising in cutting and assembling wood for production as well as exchanging labor of the apprentice in exchange of his generational knowledge. In other words, the workflow diagram can be extended to include more relationships than those shared by the masters alone. It can also accommodate the apprentices whose labor is also used to a lesser or greater extent to complete the client order. This shifts the focus from the apprentice as a learner to apprentice as an active participant of the production as well as social processes. The apprentice is a craftsperson-in-becoming rather than a craftsperson-to-become. (Refer to Fig. 4)

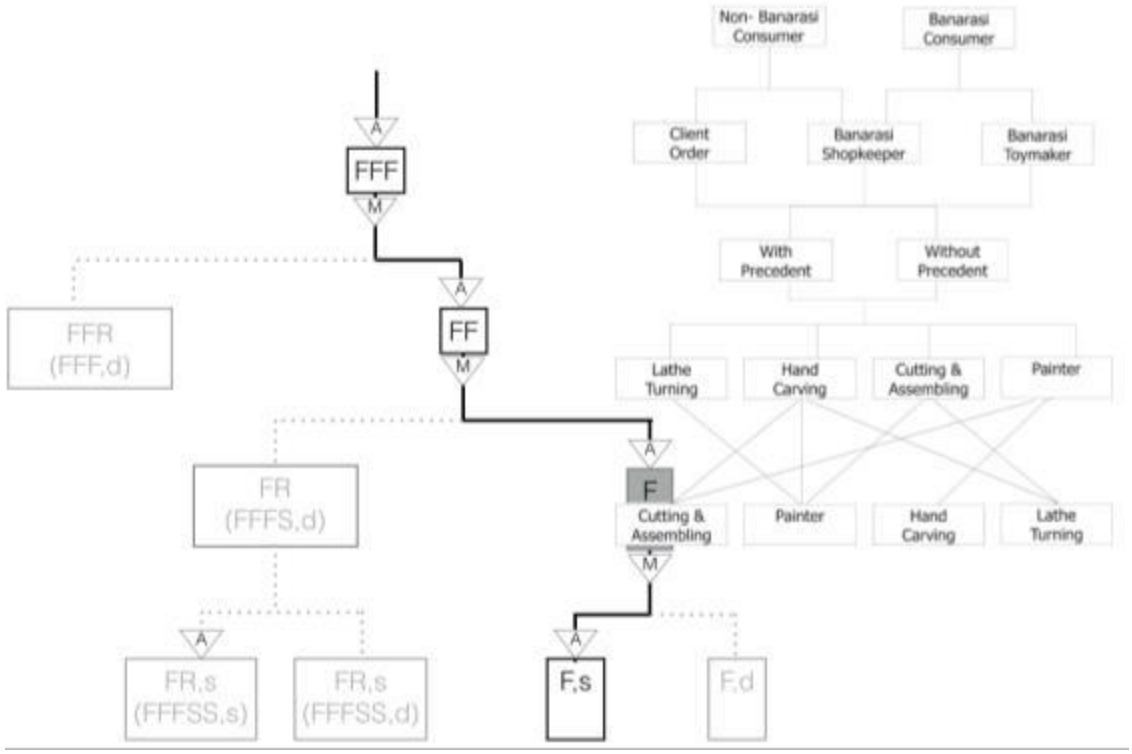


*Fig.4:* Substituting the kinship model with a workflow model of the Banarasi toymakers.

[2] My paper on linguistic categories observed in the Banarasi language (Patil, 2014) presents a category-based approach to elucidate how craft-based artefacts are designed for acceptability and novelty. For this purpose, the study traces the community perceptions of Banarasi Khilona (Khilona is the local Banarasi expression for Toy) by examining the expression of linguistic categories that both shape and are shaped by the Khilona. Proper nouns and collective nouns frequently used to denote *Khilonas* are analysed in the formal and informal interviews with craftspersons, consumers and shopkeepers (ten each, n=30). The characteristics describing the nouns are captured through attributive adjectives or propositions. This vocabulary reflects how Banarasi people structure their world, and continues to imply a system of categorization in which objects have multiple ways of being categorized. Khilonas are categorised on the basis of their meaning (Moorti, Khelne Ka Khilona and Decoration ka Khilona), representation (Local, Fancy, Plain and Chalu) and production (carved, lathe turned, and pattern-cut).

Functional specialisation and segregation narrows down the scope of knowledge to be transferred between a master and apprentice to what is available to be seen, emulated, practiced, and modified or innovated within the walls of the Karkhana. Therefore, walls of the Karkhana shape the scope of the curriculum- who is involved in what; how masters talk, walk, practice, and generally conduct their lives; how community members interact with each other and are implicated in the activities of each other; and what learners need to learn to fully participate in the CoP. It includes an increasing understanding of how, when, and about what masters collaborate, collude, and collide, and what they enjoy, dislike, respect, and admire (Lave & Wenger 1991, p. 95). In particular, the Karkhana propounds role models- masters and advanced apprentices, as well as finished products.

## Visual Learning

Children's ongoing presence and integration in adult activities is coupled with the society's mode of production. If adults are engaged in work that is organised at the level of the home or CoP rather than at the level of an institutionalised workplace outside the home, than children are more likely to be around, helping out and learning through observation (Gaskins & Paradise, 2010). According to Bandura (1971), all learning phenomena can be a result of vicarious observation that enables the observer to acquire large, integrated units of behaviour by example, without having to build up the patterns gradually through tedious trial and error. Polyani (1958) concurs that by watching the master and emulating his efforts in the presence of his example, the apprentice unconsciously picks up the rules of the art, including those which are not explicitly known to the master himself. Tacit discourses of such kind entail a set of strategies which are local, segmentally organised, context specific and dependent on maximising encounters with experts and in-situ activities. Such knowledge is not acquired by learning 'procedures of investigation and instruments of observation and understanding of the theory', but by acquiring a 'gaze'- a particular mode or style of recognizing and realizing what counts as reality (Bernstein, 1999).

Despite the wide use of observational learning in craft and craft like practices, Reitan (2006) believes that learning-by-watching is undervalued in learning theories. She describes its significance through several instances in which young and adult seamstresses in Kaktovik watch each other. It is even expected of a debutant seamstress to be able to design and make the whole garment alone, satisfactorily, by simply watching the adult skilled seamstresses without any form of explicit instruction. But certainly, it would be an exaggeration to conclude that watching alone can help in mastering the complete know-how of every craft. Then, what aspects of the tacit craft knowledge can an apprentice imbibe when given the opportunity to watch the master, in the absence or lack of any corresponding know-how of hand-skills?

Master toymakers emphasise that they learn to watch in childhood itself. Children start watching at a very young age as they are born and brought up in the Karkhana *that* also serves as their family home. (Refer to Extract 1, 2, and 3)

> I watched my father and learned. Nobody can learn in a hurry. In the first one or two months, the master will allow you only to watch. Then he might give you a saw. Later, he will show you how to use a chisel.
>
> Extract 1: XYZ- Karkhana 2, Khojwa
>
> I learned to shape wood in Banaras. I used to work in the house of a neighboring craftsperson. Watching the craftsperson shape wood, I also slowly learned how to copy the same.
>
> Extract 2: XYZ- Karkhana 3, Kashmiriganj
>
> Children learn by themselves. They just come, sit, and watch.
>
> Extract 3: XYZ- Karkhana 6, Laksha

Watching or observing actions of each other is so common a pedagogical tool that it is even explicitly referred to in the local dialect- Banarasi. Interestingly, in the local Banarasi dialect, this intelligence of the eye is also quantified as '*Andaz*'- an approximate sense of knowing. Visual comprehension of experiential knowledge like weight, force, or temperature can only be approximate, but enough to achieve a sense of knowing. However, accurate or precise information about the action and sequence of activities can also be easily ascertained by seeing alone.

In the cluster, toymakers watch artefacts all the time from designs to other paraphernalia on the television, while they also watch each other. Toymakers watch each other when a young apprentice watches his master to learn, or when an experienced craftsperson watches the work of another craftsperson for up-grading his expertise. Depending on who is watching whom, the result of the act of seeing varies.

- When an apprentice watches his master, he learns to become a member of the CoP following its shared conventions, canons, and beliefs.
- When the master watches an apprentice, he corrects, rectifies or applauds to scaffold the apprentice in the process of becoming a member of his CoP.
- When a practiced master watches another, he learns in order to enhance, upgrade, or amplify knowledge in the CoP of which he is already a member.

When the apprentice is given an opportunity to watch, the offer is not limited to a single Karkhana, but is deemed legitimate across the CoP. The apprentice is allowed access to other Karkhanas which furthers the prospects of learning by watching a rich variety of visual stimulus. Therefore, learning is not limited to a particular skill, but to divergent skills mastered by other members of the community also. This introduces a holistic approach towards craftsmanship and the knowledge of interdependencies between various skills and skill holders evident in the following instances of in-situ learning observed in the Karkhana.

### *Watching canons, conventions, and beliefs*

Learning a technology of practice involves competency in the usage of tools, knowledge connected with the history of the practice, and aptitude to participate more directly in the culture of the CoP (Lave & Wenger, 1991). As participants in the CoP, apprentices are actively and responsibly part of the social organisation, manufacturing structure, economic system, ritual and the ideological framework. In craft, these implicitly form conventions, canons, and beliefs around which the CoP gathers and builds its knowledge of practice. Conventions of production, canons of representation, and beliefs held by the CoP with reference to a toy is tacit knowledge that resides either in the hand or in the mind of members. (The same is also referred as visceral, behavioural and reflective levels of a design object by Norman (2013). They were seldom made verbally explicit by the masters in the Karkhana, but were visible all the time in the making and use of the toys. (For a detailed analysis refer to Patil (in press)[3] In fact, on several occasions, watching alone was deemed sufficient to transfer knowledge.

[3] The quintessential property of Banarasi Play-things to gather, negotiate, and communicate a worldview as reflected in the canons, conventions, and beliefs observed tacitly in the CoP is discussed in a recent paper (Patil, 2017). The study employs rigorous artefact analysis on forty Banarasi toys at the visceral, behavioural, and reflective levels to deduce a pattern through an iterative process of comparison of similarities and differences between multiple dimensions of the toys. Consequently, the study revealed 23 conventions, 61 canons and 41 beliefs held by the community to make, use and discard a toy.

*(a) Watching contexts of representation*

In Banarasi toys, identity and meaning is represented through particular shapes, forms, and colours, designed either for purely ornamental reasons or to explicate a belief. This distributed knowledge of canons of typical representations or frequently repeated visible motifs, shapes, or patterns is visible on toys. This visual repository is implicitly known to all toymakers through shared preceding instances, experiences, or contexts.

It is fairly simple to learn the function of these canons and the particular time and space in which they are to be used by merely watching the master. However, the skill of making them is achieved only by emulation and practice later. For instance, '*bindi ka kaam*' or dot-pattern is hardly explicitly taught to anyone. In a 2012 visit, the daughter (Da-Daughter-apprentice) was given a task by the craftsperson (F-Father-Master). Here, is the excerpt of their conversation.

*Table 2*: Field data of a conversation between Master and Apprentice

| | |
|---|---|
| Date: 16th September 2012<br>Situation: Karkhana -5 of the XYZ craftsperson, Laksha, Varanasi<br>Members present: Craftsperson, a colleague from another Karkhana, women members in the inner room. | |
| Craftsperson-F (Father) | |
| Verbal | Paint it, the way he is doing it. |
| Action | He pointed to a Craftsperson-R (Relative) sitting beside him, painting a toy. Craftsperson-R used a match stick, the tip of which was covered with cotton in lieu of a brush. He dipped the tip in the paint and pressed it to apply uniform motifs of dots on the wood. |
| Apprentice-D (daughter) | |
| Action | Apprentice-D (daughter) shifted closer to the Craftsperson-R to watch this process for about 5-6 minutes. There was no conversation between Craftsperson-R and Apprentice-D. |
| Verbal | Apprentice-D (daughter) - Yes, I will do it. |
| Action | Apprentice-D (daughter) - She took the toys inside, and by evening 13 of them were painted. |
| Transfer of Learning from the Craftsperson-R to Apprentice-D | |

- Use of the matchstick-tool. Apprentice-D reasoned by herself that the matchstick tip was covered with cotton. She was neither told about it nor was she present when the cotton was wrapped around the matchstick.
- Pattern of the motif: The composition and shape of the three-dot motif was observed.
- Space: The area or body part in which the 3-dot motifs are used on the toy was noted.
- Quantity: An approximate idea of the amount of paint in which the match stick is dipped and the required pressure on the matchstick while painting the motif on the wood was gained and heuristically applied while emulating the same in practice.
- Observation and hands-on-application of learning was sequenced consecutively, with no time gap.

*(b) Watching methods of production*

As discussed earlier, a toy evolves through the skills of multiple toymakers who build upon the modifications made by the predecessor. It is possible to understand the sequential occurrence of tasks and sub-tasks for designing and manufacturing a toy by watching the master. Often, an apprentice is able to approximately judge the method and sequence of tracing drawings, cutting samples, operating machines, using tools, measurements or application of colours by observation. Some gross tasks are easily observed such as the way tools are held and operated for different tasks and its effect on wood. Such tacit know-how is drawn from community held conventions that shape decisions of making a toy based on preceding instances, experiences, or conditions.

Notably, the apprentice is exposed to the sequence of tasks and methods arbitrarily and not according to a pre-set fixed design of a standardised curriculum. Therefore, the apprentice is exposed to multiple processes according to the client orders irrespective of the complexity of the process or its content. On several occasions, an apprentice was exposed to more than one sequence demonstrated by two masters in the Karkhana. Sometimes, the observation process also had gaps if the apprentice was assigned other duties in between by the master. This missing information along with the disparate sequences of making a toy had to be fit into a coherent sequence with other chunks of information accessed in different time and space by the apprentice himself.

Some tasks are subtle and small. Careful observation can aid the apprentice in performing them later on wood. For instance, the distance between two holes that determines the oscillation of the head and tail in a pecking toy can be learned only by doing. However, by watching the apprentice achieves a heuristic understanding of the measurement between the two holes, process of iterations for refining the mechanism, and the acceptable accuracy of functioning.

*(c) Watching beliefs of production and consumption*

Communities are threaded together by intricate, socially constructed webs of belief, which are essential to understand what they do. Rites and rituals are generally community practices, visible and accessible in public spaces to a member-in-becoming. They also include festivals and ceremonies or in-house/Karkhana customs followed everyday by members such as prayers offered to Lord Vishwakarma before starting work.

> I was born in the family of a Vishwakarma. Craftsmanship was within the house that is how the child learns.
> Extract 4: Patil- Karkhana 5, Khojwa

> The Vishwakarmas pray to Lord Vishwakarma, but there are many others who pray to him too. We are the original craftspeople of the world. Vishwakarma is the architect of this world, so we, his progeny also create objects.
> Extract 5: Patil- Karkhana 6, Kashmiriganj

Beliefs consisting of values and notions govern the relationship between members of the CoP and their artefacts. These were expressed through social and religious values, taboos, or superstitions, in the practice as well as in actions of the members. Some beliefs were quoted from the scriptures and texts, while others were orally transferred or observed at home or in social events.

Many rituals and rites are performed by adults or particular castes alone; watching is the only method of internalising such customs - who performs which rituals, at what time, in which space, and with whom. For instance, a craftsperson himself is prohibited from applying the same *Tilak* on his forehead as that of a Brahmin. However, craftspeople can recognise, differentiate, and later with skill also reproduce the *Tilak* that a Brahmin wears by watching alone.

It is interesting to note, that which is not watched, is also not represented in the toys. For instance, an owl is not seen often in a populated town like Varanasi, therefore, also seldom represented. Moreover, this rarely seen bird is also unfavourably received in the community beliefs. (Refer to Extract 6).

> I have never made an owl because owl is the vehicle of Lakshmi. No one keeps it in the house. It is considered inauspicious for business.
>
> Extract 6: Patil- Karkhana 3, Laksha

Designing and manufacturing of such toys is not taught to an apprentice, nor are they purchased within the community. According to Bandura (1971), learning may rarely be activated into overt performance, if it is negatively sanctioned. If at all, an order is commissioned by a non-Banarasi customer for an owl-toy, visual motifs are borrowed from another cultural practice to make the design. This is also true for a penguin, kangaroo, butler or any other character that does not belong to the Banarasi visual culture in particular, and its practice and environment in general. The visual representations for the same are borrowed, and do not adhere to the Banarasi identity of the toys.

Knowledge of beliefs significantly contributed to the trajectory of a member from the periphery to the centre. For instance, in Karkhana-4, two aspiring apprentices did not traditionally belong to the CoP. They had laterally shifted from as diverse a field as agriculture and rickshaw pulling. They were gradually imbibing the canons of representations and the conventions of making, but were unable to gather all the beliefs practiced by the masters, as they did not have direct access to many rituals and practices followed inside the family or community. This lack of opportunity was visible in the quality of their craftsmanship, as well as the limited diversity in the artefacts designed by them. Their work was often referred as '*challu kaam*' by the masters. '*Challu kaam*' describes a standard of crafting that is barely acceptable in the community, and therefore sold cheaply. These apprentices lack the knowledge of community held beliefs and the motivation to strive for perfection, therefore, they almost never, become central members of the CoP.

*Watching to kindle an aspiration for the complex or the valuable*

By watching the master struggle to make a particular, toy or the effortlessness with which he completes another, the apprentice realises the complexity involved in an endeavour. The value of a toy and its worth can be known by not only its market price, but also by watching the care with which it is made by the master and used by the consumer. If this value is not implicitly imbibed, later when the apprentice practices making a toy, the *watchful* eye of the master corrects him.

> I stop my children when I see them making too many local toys (low-skilled-low-paying). I want them to make fancy work (high skilled-high paying).
>
> Extract 7: Patil- Karkhana 3, Laksha

Here, the apprentice realises the benchmarks on which his work will be evaluated in future, while the master constantly tries to stretch these boundaries through his own practice.

*Watching responsible participation in the community*

As discussed earlier, multiple experts are required to design a single toy. This requires every craftsperson to negotiate with another to complete a consignment. Skillful negotiations are open for observation to the apprentice as he watches the master holding conversations, bargaining payments, as well as modifying his practice to satisfy the other stakeholders or clients. Apprentices can quickly draw an implicit sense from the ambient culture of what is suitable diction, what makes a relevant question, what is legitimate or illegitimate behavior in a particular activity (Brown et al., 1989). Apart from the power equations visible in such negotiations, the dynamics of control, shifting social boundaries, and terms of negotiation are also interpreted while learning to make sense of the communication between master-master, master-client, master-apprentice, master-community, and master-kin. According to Lave and Wenger (1991) such observation by an apprentice increases his understanding of how, when, and about what masters collaborate, collude, and collide in a negotiation to strengthen their own membership, or challenge another's.

Observant watching is peripheral learning practiced consciously or unconsciously, as soon as a novice is given the opportunity to 'absorb and being absorbed in the culture of the practice' (Lave and Wenger, 1991). Alternately, observant watching is also used by members who have gained central membership of the CoP to legitimise their ownership on all community based knowledge, skill, and resources. Such learning trajectories are long and demand a very keen and patient eye from the apprentice as well as the master. The onus of filtering the relevant information from the irrelevant ones, self-assessing how much has been learned and what yet remains to be learned in the absence of any knowledge on the quantum of the syllabus lies completely on the learner, and not the master. The learner dominates the learning situation, either peripherally or centrally.

## Doing by Emulation

However, watching only permits approximate comprehension of the activity. Therefore, Lave and Wenger (1991) propose that in relation to a single craft that is taught through "hands-on" legitimate peripheral participation, the ability to learn would develop in close relation to the ability to perform tasks. They further argue that a training program that consists of instructional settings separated from actual performance would tend to split the learner's ability to manage the learning situation from his ability to perform the skill. Consequently, a student may manage the learning situation, but may never actually perform a skill. However, in an apprentice relationship, where the learner is routinely performing to learn, such a situation is easily averted.

The sequentiality of the observational and emulation learning levels was established by Kitsantas, Zimmerman, and Cleary (1999). They argued that learners who acquire a high level of emulation accuracy with the support of a model form a motorically detailed representational standard to guide and self monitor their practice efforts, and experience a heightened sense of self efficacy. This enables them to practice more effectively on their own, than learners who have acquired only an observational level of skill.

Similarly, Sennett (2009) elucidates that about ten thousand hours of experience are required to produce a master carpenter or musician. As the skill of the apprentice progresses over the hours, it becomes more problem-attuned, whereas novices struggle more exclusively on getting the mechanism to work. This skill of problem solving is based on how apprentices and masters learn to practice, and to learn from practice, that is reflect-on and in-action.

But, reflection-on and in-action is difficult to achieve for a novice who is attempting to observe actions of a master that are not easily observed, or to identify the corrective adjustments required to achieve a close match of symbolic model and overt performance. In most everyday learning, people often achieve rough approximation of new patterns of behaviour by modelling, and refine them through self-corrective adjustments on the basis of informative feedback from performance (Bandura, 1971). Thus, before problem solving, apprentices practice to emulate the master correctly. Reflection-on and during emulation confirms and validates the approximate knowledge gathered while observing, into a habit of the hand. Doing-by-Emulation is the process of imitating the explicit experience of the master (expertise of the master accessible for imitation) into the explicit skills of making an artefact by the apprentice (learning of the apprentice accessible for evaluation).

In the Banarasi CoP, emulation is a way of learning, iterating, transferring and retaining knowledge. In the local lexicon, copying is referred as '*Nakal karna'* or '*Nakal utarana'*. This process helps the craftsperson to repeat traditional designs made even over a century ago in the absence of oral or written records. Members of the CoP watch the actions of each other and memorise patterns of toys over incessant repetitions, thus tacitly transferring designs and know-how to the whole community. Design evolution depends on repositories of such genetic codes (Jones, 1970). As a consequence, community known knowledge is collectively practiced, and therefore collectively owned amongst the Banarasi toymakers.

> We have to copy each other. If one craftsperson has learned to make an artefact, by copying him everyone else also learns.
>
> Extract 8: XYZ- Karkhana 2, Khojwa

Apprentices and masters, emulate the prototype assigned to them from either an old sample preserved for reference, a prototype made by the master, or a design given by a client, largely to meet the production demands of the market. Toymakers emulate designs of each other, either to transfer know-how from a master to an apprentice for learning, or between master toymakers for up-gradation. Besides each other, toymakers also emulate designs from client orders for livelihood. Emulation of a client order restricts dissemination of knowledge between toymakers, because clients closely guard designs from their competitors. These three kinds of emulation viz. from masters to apprentices, between two or more masters, and from a client order to toymakers are discussed below.

### *Emulation of Masters by Apprentices*

'Doing-by-Emulation' confirms and validates the sense of practice acquired through watching into concrete knowledge by the apprentice. Banarasi toymakers not only emulate to learn, but also teach to emulate. Producing to learn or to replicate makes 'Doing-by-Emulation' a method of learning as well as teaching where an apprentice not only tries to replicate the actions of the master, but the master himself, in the lack of any overt instructions makes his actions available to be emulated. Therefore, skills are learned by emulating the master's hand movements, errors are caught early and corrected by disapproval or rebuke while emulating.

For teaching skills related to *Kharad* (turning), a spinning top was often used by the masters. It is one of the oldest toys made in the community and played by the children in every nook and corner. The spinning top is replaced by a nested doll as the apprentice gains skill. On the other hand, *Pattern* toymakers, often asked an apprentice to cut simple shapes of birds to make a pecking toy. It is by emulating a particular Banarasi toy- pecking toy that an apprentice learned the skill of cutting, assembling and making the rotatory mechanism; whereas the *Gadhwa* craftspeople (carvers) introduced small body parts like the torso or the leg of an animal figurine to a novice. Details of the eyes or the lips of a human figurine were handled only by adept apprentices or masters.

Notably, in these instances, the apprentice was not taught to emulate a principle, paradigm, or a general practice of making, but instead the hands-on skill of making a particular toy. It was by emulating a particular pecking toy, spinning top, or figurine that the apprentice learned the conventions and canons of making and representing a body part, and the beliefs that render them acceptable in the community. Even when the apprentice watches or emulates the master using a machine, he watches the use of the machine for producing a particular toy. On the other hand, in formal education, students are often introduced to all commonly used thumb rules, principles, techniques and materials which are later practiced on new artefacts.

Then, what is common between a spinning top, pecking toy, and an animal figurine? Why have they been selected as learning-objects to be observed, practiced, and evaluated upon? There are several features common to this triad. They are ideal members of the community held categories not only in terms of typicality, but also in terms of their perceived or actual benefits and value to the community (Patil, 2014). All three artefacts represent *Banarasipan* (local dialect) or Banarasi-ness, therefore exemplify the identity of the Banarasi toys as well as the community. From the point of view of situated learning, this indicates that the learning of the apprentice is geared towards not only attainment of skill but also towards obtaining membership in the CoP by sharing the skill of making those artefacts that form the identity of the practice (Lave & Wenger, 1991). They are small in size and have large plain surfaces that do not require very fine and controlled motor skills. This facilitates experimentation as the pieces require less raw material, further reducing the expenditure on trial and error. Moreover, these pieces enjoy a high market demand; therefore, the apprentice supports the income of the family or Karkhana as soon as he becomes adept at making them. These objects, then, are a part of the 'authentic' culture (Brown et al., 1989). Their meaning and purpose are socially constructed through negotiations among present and past members. Authentic activities enable practitioners to act meaningfully and purposefully, and shape or hone their tools.

Within a Karkhana when a particular toy is produced, community held conventions, canons and beliefs are largely preserved because they are emulated with little or no change at all in toys designated for religious purposes (*Moorti*), in most toys designed for ludic purposes (*Khelne ka Khilona*), and some toys reserved for clients from outside the CoP (*Decoration ka Khilona*) (Patil, 2014). It is in the absence

or lack of any other method of change that *Banarasipan* or Banarasi-ness is emulated and passed on from generation to generation from masters to apprentices, despite changes in technology and consumer behaviour. For instance, the convention of drawing *Kamalnayani* (lotus-like) eyes on all human and animal figures has been emulated since early 1900s in the Banarasi toys. The community is unable to give a reason for its existence, but emulates the feature nevertheless. This should not be misunderstood as mindless copying because emulation does allow change and improvisation from the source to the copy. Therefore, though *Kamalnayani* eyes are conventionally emulated, the canon of making them can be improvised over time. (Refer to Extract 7)

> Older craftspeople did not make eyebrows of the *Kamalanayan*.. But my teacher made it, and I followed him. It looks beautiful.
>
> Extract 9: Patil- Karkhana 5, Khojwa

*Emulation between Masters*

A local entrepreneur recounted that the idea of converting small wooden birds into earrings commonly seen in the community today was first given to him by a foreign client. Based on his oral instruction, toymakers taught themselves the skill of making earrings, hitherto unknown. They learned to craft very small birds on the fret saw, colour them and pierce the same with a thin wire. About 8 years back, only a few toymakers could supply these designs. But, today the whole community is employed in fabricating a diverse range of designs representing birds and animals in myriad hues to meet the rising client demand. In this instance, the other community members learned by emulating the toymakers who had completed the production order for the local entrepreneur. Toymaker openly emulated the design due to absence of copyrights in the community. Thus, emulation is an accepted form of 'producing' a toy amongst the toymakers. Here, the CoP refers to production in two ways: production as a method of assembling a single toy by a group of functional specialists, as well as production as a method of scaling up the fabrication of a toy to meet the client demand by employing several groups of functional specialists. (Refer to Extract 10, 11)

> Traditional designs are often copied. Copying is permitted because a new toy is learned by only one person. When others copy, everyone has a sample, and that is how everyone learns.
>
> Extract 10: Patil- Karkhana 6, Laksha
>
> I have crafted all these toys on display. This toy (pointed out to a nested doll with a Gandhi′s three monkeys on it) was also made first in our Karkhana. But, now it is made by others, too. After all they (client) want production. Even if they give the order to me, I will not be able to complete it. A single piece or a small order can be completed easily. However, if you have to make a thousand pieces, no one can make it alone.
>
> Extract 11: Patil- Karkhana 6, Laksha

Some forms of emulation, such as the one required for production discussed above demand exactitude or imitation without change; while others demand the master or more adept apprentices to modify the object of emulation. These modifications are sometimes willfully made either for the sake of novelty, introduction of new or cheaper material substitutes (industrial enamel colours replaced the natural colours as seen in Fig.5), or to cater to changing consumer preferences. For instance, carved animals traditionally purchased to decorate the *Jhanki* (decorative tableau displaying stories of Lord Krishna) are today, also given to children as play-things

*Figure 5*: Use of Lacquer and Enamel paint on wooden animal

Some emulated modifications can also be mistakes. Modifications are errors if they affect the defining feature of the toy, but if they are continuously emulated in subsequent designs by other members, they may also gain acceptability. For instance, the three petal flower motif emulated on almost all toys has loosened into three individual circles over time, thus changing the design. (Refer to Fig.6) Interestingly, this change is noticeable in not one, but all Banarasi toys, implying that it has been emulated within the CoP, further shaping the Banarasi identity of toys in general.

*Figure 6:* Changing 3-dot motif over the years

On the other hand, all features of emulation are not borrowed from precedents within the toy-making practice. Some emulation retains and transforms the borrowed features from lateral sources also. For

instance, visual motifs of the *Mehendi* designs draw on the feet of Banarasi men and women by the *Sharma* community (community of barbers and not toymakers) are emulated by toymakers. (Refer to Extract 12)

> The ritual of coloring the feet with *Bhukni* is performed by women of the Sharma family before any auspicious occasion such as a marriage or *paath* (reading of a holy book). The *Payal* (anklet worn in the feet by women) like decoration on the wooden toy-elephants is borrowed from these *mehendi* designs.
>
> Extract 12- Patil - Karkhana 6, Kashmiriganj

Apart from visual features, the community also emulates written and oral narrative from the *Puranas* (ancient holy texts) and epics like *Mahabharat* into 3-D wooden toys. This challenges the toymaker to interpret and transform words into images. Some stories have been traditionally emulated such as *Putna vadh* or *Nag-nathiya*, but others have also been recently added such as *Krishna* stealing clothes of the *Gopis*. Emulation of stories that are already a part of the worldview and their subsequent adaptation into 3D toys further perpetuates *Banarasipan*. (Refer to Fig.7)

*Figure 7*: Depiction of the *Kaliya Mardan* story in wood

*Emulation of Client designs by Masters*

Besides preserving the *Banarasipan* of artefacts, emulation also assists master toymakers to earn their livelihood by producing novel designs given either by the client or through interventions of NGOs or the government. Toymakers are appreciated by Non-Banarasi clients for the exactitude with which they can emulate a given sample design; thus they are paid essentially for imitation and not innovation. However, client orders often do not conform to the Banarasi worldview, therefore, even though the toymakers excel in copying the client designs, they consciously do not emulate the non-*Banarasi* features of such designs into their own toy-practice.

Often, the client commissions a 2D image to be manufactured in wood (3-D). Though, the client insists in mimicking the 2-D image, the toymaker still needs to interpret the 2D surface on a 3-dimensional

curve, which requires significant skill and judgment. Sometimes dimensions, back profile and the mechanism may be specified, but there are also instances in which incomplete information is left to the imagination of the toymaker. In the latter case, toymakers are expected to reconstruct the missing information through their own judgement. For instance, a client in his first set of instructions asked XYZ toymakers to emulate the paper design given in Fig.4 without any changes in wood. Only the height of the design was provided (Height= 10cms). The toymaker was expected to calculate rest of the dimensions. Despite lack of design information, the toymaker made the toy as seen in Figure 8.


*Figure 8*: Emulating a 2D client design into a 3D toy

Emulating 2D instructions into 3D toys involves not only challenges of visualization, but also that of reverse engineering, in case of a mechanism. For instance, the original design of the pecking toy introduced in the Banarasi market from East Europe in the early 1930s required substantial cognitive

effort to reconstruct the rotary mechanism of movement and synchronization of all body parts for not a single, but multiple birds on a single plate. Such mechanical movements are rarely seen in Banarasi toys, and yet the toymakers were able to emulate it.

Interestingly, irrespective of the authorship of the original toymaker, who reverse-engineered the mechanism of the pecking toy, it is important to note that the knowledge and skill once acquired was freely left open for all others to emulate. This led to up-gradation of all toymakers in terms of skill and knowledge. Up-gradation of other toymakers was important not only because multiple members are required to meet the production demands, but also, because a new toy needs community approval. In a community without any records of origin or trajectories, a feature that is not emulated dies. Therefore, in the absence of any copyright laws, wilful emulation of a feature is the sanction of the CoP for making it.

A sanctioned design is emulated for dissemination in the CoP, but every member also claims the design as his own not in an attempt to hide its origin, but to unselfconsciously claim the collective knowledge and skill that produced and preserved the toy. Therefore, emulation is a sign of community acceptance of a borrowed attribute resulting into its preservation, improvisation and dissemination.

## Discussion

This paper delves upon two lesser discussed aspects of learning in a CoP, viz. learning through observation and emulation. Tacit knowledge embodied in the practice of a master is internalised by the apprentice not through explicitly externalised principles, but by observing and emulating the inexplicit situated workmanship. In-situ observation and emulation fosters situations for facilitating co-production of knowledge as inferred in this study, and summarised briefly below.

1- Observational learning is an active mode of knowledge acquisition (Bandura, 1986; Gaskins & Paradise, 2010) . Apprentices in the Banarasi CoP were learning to learn in the absence or lack of any external explicit input or feedback. This process calls for active learners and improvisatory in-practice based teaching. The master performs an action not to demonstrate, but to produce an artefact for his livelihood. Teaching, then is incidental and not central to the relationship between master and learner. Hence, learning to observe is a tool for transferring knowledge required to learn content, and not the content itself. Therefore, the initial condition to participate in the community of practice is not an existing skill or qualifying grade, but the capability to acquire the primary technology for learning itself, that is observation.

In the absence of an explicit standardised curriculum, apprentices were often exposed to all skill levels- low to high, as they carried out their daily routines in the Karkhanas. These skill sets of the masters as well as their application were not always observed in the sequential order of their occurrence during design and manufacturing. Often, they were experienced as isolated disparate phases of a long causal sequence made of interconnected smaller episodes. This imposed an additional responsibility on the apprentice to observe disconnected sequences in different contexts and time, recall and assimilate this non-sequential data into a meaningful sequence, and then decide upon its appropriate application to the problem at hand. Here, observation implies an inherited learning tool to identify, filter, mentally record, as well as retrieve information during appropriate situations by organising categories of reality and structuring ways of applying the same onto situations (Rogoff 1994, p. 70).

2- The notion of 'authentic' activities elucidated by Brown et al. (1989) presumes that knowledge is both situated and progressively acquired in practice. This requires knowledge to be contextually specific to not only the CoP, but also to the learning potential and methods of the apprentice. Accordingly, in

Banaras, learning did not have marked milestones, instead, it was self-paced to the individual's specific learning trajectory. Often, the learning curriculum stemmed from production orders itself, which contributed to the flexibility and customisability of the curriculum. Therefore, curriculum was not constituted or preconceived but was shaped by the market, thus acknowledging the apprentice as a craftsperson-in-becoming rather than a craftsperson-to-become. Moreover, masters and apprentices participated in the same culture, but in varying degrees, such that an uncensored version of the adult worldview and practice was accessible to apprentices.

In the absence of any formal examination or graduation ceremony, the master, through continuous evaluation based on his experience and judgement decided when an apprentice was capable of practicing on his own. If the apprentice (S-son) was an immediate family relation, trajectory from periphery to the centre was even more gradual, lacking any perceptible identifiers of change from the role of an apprentice to a master. The apprentice (S-son) continued to work, become a full participant of the community, and in time inherited the Karkhana- that is his alma mater and site of living and livelihood.

3- Situated in the community system of transfer of knowledge were also the local standards of intelligence and creativity as valued by the community. From the minimal requirement of making the traditionally practiced toys, to the mutual admiration of highly finished skills of carving, and thereon aspirations of some members to make an automata are implicitly shared standards of work imbibed by the apprentice. Members also rebuked a low standard and checks and balances in the community practice despite its informal and inexplicit nature of transferring denoted the same into a linguistic expression - '*challu kaam*'. Such introspection has maintained knowledge. Besides, the standards include not only the practice, but also the conduct of the practitioner. For instance, a Banarasi toymaker is required to know, not only how to make a toy, but also how to responsibly participate in family and social life. Thus, gaining membership in a CoP is not merely a matter of gaining a professional degree, but a slow process of enculturation facilitated by the pedagogy of learning itself.

4- Multiple studies have established the difference between copying as mindless imitation, and emulation as a discerning practice (Tomasello, 1990; Byrne & Russon, 1998; Nielsen, 2006; Guth, 2010) Further to the same, this study throws light on the richness of emulative practices in learning within a CoP, thus enhancing its relevance amongst the current pedagogical tools. Given the range of decision making involved in the emulation of familiar as well as novel toy-designs amongst the Banarasi toymakers, it is possible to infer that emulation unlike copying is not a skill governed activity alone. It requires decision making and is a cognitive habit that can be acquired only through intelligent practice.

5- This study has been implemented in the context of a particular Indian community of practice, however, its insights can further enrich the discourse of social learning theories in general, and craft and design education in particular. Instead of concentrating on pedagogy alone, formal learning environments may also benefit from imparting skills and tools for learning-to-learn itself. Both, obervation and emulation can scaffold the learning-to-learn capability of a student, transforming them into active learners seeking their own interests, and responsibly organising and managing their learning.The formal educational pedagogies may wish to re-evaluate the role and value of observation as well as emulation in the classrooms, in light of the findings of this, and other similar studies (Reitan, 2014; Rogoff, 1990; Gaskins & Paradise, 2010; Bandura, 1971; Gowlland, 2012).

6- In future, it may be also neccessary to conceptualise a more quantitative approach to the study of tools of social learning to further strengthen the insights obtained from qualitative studies or theoretical postulations in this area. Most studies in the discourse of tacit learning are context specific and qualitative in nature. Capturing tacit data, especially in a contextual living environment such as the

Karkhanas of Banarasi toymakers, has been a continuing methodological challenge. It is widely recognized that implicit knowledge-in-action is difficult to communicate, and therefore coordinate with (Valkenburg & Dorst, 1998; Gamble, 2001). Design and development of new methodological tools for eliciting as well as capturing tacit transfer of information from experts to novices will greatly aid in demystifying the creative process of problem solving in craft and design.

The data collected during this study contains further insights on the pedagogical processes subsequent to observation and emulation, however they are beyond the scope of this paper, and will be discussed in a forthcoming publication. This study demonstrates the role of observation and emulation in a community of practice to draw a member from the periphery to the centre of the practice, reemphasizing their inclusion in a more pivotal role in formal educational pedagogy. This would further enrich the research as well as practice of craft and design.

## References

Bandura, A. (1971). *Social learning theory.* New York: General Learning Press.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Bernstein, B. (1999). Vertical and horizontal discourse: An essay. *British Journal of Sociology of Education 20, no. 2*, 157-73.

Brown, J. S., Collins, A. & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational researcher, 18(1)*, 32-42.

Byrne, R. W. & Russon, A. E. (1998). Learning by imitation: A hierarchical approach. *Behavioral and brain sciences, 21(5)*, 667-684.

Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *British journal of educational psychology, 70(1)*, 113-136.

Gamble, J. (2001). Modelling the Invisible: The Pedagogy of Craft Apprenticeship. *Studies in Continuing Education, no. 2* , 185-200.

Gamble, J. (2004). *Tacit knowledge in craft pedagogy: a sociological analysis* . Doctoral dissertation, University of Cape Town.

Gaskins, S. & Paradise, R. (2010). Learning Through Observation in Daily Life. In D. Lancy, J. Bock, & S. Gaskins (Eds.) *The anthropology of learning in childhood* (pp. 85-118). Plymouth: Rowman & Littlefield.

Gowlland, G. (2012). Learning craft skills in China: Apprenticeship and social capital in an artisan community of practice. *Anthropology & Education Quarterly, 43(4)*, 358-371.

Guth.C. (2010). The Multiple Modalities of the Copy in Traditional Japanese Crafts. *The Journal of Modern craft. Vol.3. Issue-1*.

Jones, C. J. (1970). *Design methods: seeds of human futures.* New York: John Wiley & sons.

Kitsantas, A., Zimmerman, B. J. & Cleary, T. (1999). *Observation and imitation phases in the development of motoric self-regulation.* New York: Graduate School of the City University of New York.

Krippendorff, K. (2004). *Content analysis: An introduction to its methodology (2nd edn).* Beverly Hills, CA: Sage Publications.

Lave, J. & Wenger, E. (1991). *Situated Learning. Legitimate peripheral participation.* Cambridge: University of Cambridge Press.

Muller, J. (2012). *Reclaiming knowledge: Social theory, curriculum and education policy.* London & New York: Routledge.

Nielsen, K. (2002). The Concept of Tacit Knowledge–A Critique. Outlines. *Critical Practice Studies, 4(2)*, 3-17.

Nielsen, M. (2006). Copying actions and copying outcomes: social learning through the second year. *Developmental psychology, 42(3)*, 555-565.

Nonaka, I., & Hirotaka, T. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation.* New York: Oxford university press.

Patil, K. (2014). A Glimpse inside the Banarasi mind: What do lingustic categories reveal about the Banarasi mind? *Craft Research, Issue 5.2*, 175-197.

Patil, K. (2015). Designing without a Designer: A Case Study of Decision making in Banarasi toys. *The International Journal of Designed Objects, 9*(3), 1-17.

Patil, K. (2017). Dincs as Worldviews: Things that Communicate a Mind. In L. Magalhaes, & J. Goldstein (Eds.) *Toys as Communication.* Palgrave Macmillan.

Patil, K. (2017). Mutable Mobiles: Charting the Cartography of Banarasi Toymakers. *Design Issues, 33(2)*, 43-57.

Polanyi, M. (1958). *Personal knowledge: Towards a post-critical philosophy.* Chicago: University of Chicago Press.

Reitan, J. (2006). Inuit Vernacular Design as a Community of Practice for Learning. *CoDesign 2 (2)*, 71-80.

Reitan, J. B. (2014). Learning by watching Vernacular Iñupiaq-Inuit design learning as inspiration for design education. *Techne Series A, 21(2)*, 1-20.

Rogoff, B. (1990). *Apprenticeship in Thinking.* New York: Oxford University Press.

Rogoff, B. (1994). Developing understanding of the idea of communities of learners. *Mind, culture, and activity, 1(4)*, 209-229.

Sennett, R. (2009). *The Craftsman.* England: Penguin Books.

Tomasello, M. (1990). Cultural transmission in the tool use and communicatory signaling of chimpanzees? In S. Parker, & K. Gibson (Eds.) *'Language' and intelligence in monkeys and apes: Comparative developmental perspectives* (pp. 274-311). Cambridge, UK: Cambridge University Press.

Valkenburg, R. & Dorst, K. (1998). The reflective practice of design teams. *Design Studies* , 249-271.

Wolf, A. (2002). *Does education matter? Myths about education and economic growth.* London: Penguin Books.

Dr. *Koumudi Patil* is an Assistant Professor in the Department of Humanities and Social Sciences and the Design Programme in the Indian Institute of Technology Kanpur, India. Her work revolves around the study and development of appropriate, affordable, and accessible designs, pedagogy and technology for designers and craftspeople.