Learning to administer an IM injection: Candidate descriptions of knowledge

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Abstract

Can non-indigenous concepts be introduced into the description of settings while observing the strong form of the unique adequacy requirements of methods? We suggest that this can be achieved by adopting and developing Garfinkel's practice of deliberately misreading texts. In doing so, we seek to lay some foundations for an EM hybrid discipline of nursing. This project orients to two emerging initiatives in EM: the various previous attempts to develop a hybrid discipline; and the recent suggestion that the corpus of EM studies should be reviewed in order to revitalise the discipline. Two candidate descriptions of the process of learning to administer an intramuscular (IM) injection are presented. The first represents a conventional detailed ethnography of work, conducted according to the unique adequacy requirements of methods. For the second, we borrow concepts from Norman, Ryle, Polanyi and Garfinkel himself. We argue that the resulting analysis conforms to the unique adequacy requirements of method, and has a generic context-free, context sensitive, character, but does not yet meet the full requirements for a hybrid study.

INTRODUCTION

Anderson and Sharrock (2017, 20) call for an overview of the 'topography and topology of the research space ethnomethodology (EM) inhabits', suggesting that '[o]nce we have a sense of the overall mapping of the space, we can ask about its topology, the logical principles which link studies and groups of studies together.' What follows is an attempt to begin mapping that space, not as Anderson and Sharrock suggest through a critical review of the existing body of EM work, but rather through yet another study. We suggest that the topographic outlines of the space can be characterised as 'knowledge', and it is the structure, use and transfer of knowledge, that we set out to explore.

Winch (1990) suggests that the central concern of philosophy, and thus of social studies, is epistemology. To be sure this is not epistemology in the traditional sense, but is

perhaps better understood as an anthropology of knowledge. Thus, Winch carries forward Wittgenstein's interest in the indexicality and reflexivity of linguistic expressions and their concomitants: facts, concepts, theories and rules. He addresses the use of language, paying a great deal of attention to rules and their application. Garfinkel (1992) begins from these same properties of indexicality and reflexivity, to focus on competence, the ability to apply a method. Thus, membership is a set of competences, and a setting can be regarded as an assembly of members.

Thus, we see a small, but discernible difference between the focus of Wittgensteinian and EM analysis, and suggest that this can be understood as having a respective primary interest in 'knowledge that' and 'knowledge how'. This is not to suggest that Wittgensteinian analysis in any way neglects the performative nature of language, merely that its topics of interest tend to be denotable by the metaphysical nouns favoured by philosophers: 'knowledge'; 'rules'; 'understanding'; 'certainty'; etc. Wittgenstein recognised that all knowledge is ultimately 'knowledge how', but his interest in this fact was in how it served us to dissolve the problems of conventional philosophy.

For Garfinkel, the dissolution of conventional problems is merely a starting point. He spent the last part of his career attempting to create a new sociology. Such a sociology might be in one sense equivalent to Winch's vision of epistemology: a description of the knowledge-how entailed in the membership of a social setting. However, such a description would itself constitute knowledge-that; in the act of describing, the competences would be rendered as facts. There is some evidence that Garfinkel was not satisfied with this solution, hence his concern with instructed actions and his distrust of 'docile' texts.

Our own epistemological investigation originates in the 1990s when one of the authors faced a methodological problem while conducting research on behalf of the UK Health and Safety Executive. The research concerned the safety of assembling and dis-assembling various form-work and false-work systems, used in the construction of a concrete frame. Form-work and false-work are temporary structures which are necessary to the shaping of poured concrete in construction work. Form-work provides a mould which gives shape to the finished concrete element. False-work refers to the additional structures necessary to support the form-work and hold it in place.

It was apparent that the safety of any procedure depends on the actions, and thus the competence of the members involved. Equally it is dependent on material properties of the objects being manipulated. The problem was, how to adequately describe those competences and properties. Insights into language use were of little help in a setting where the emphasis was on physical activity and language played only a small role. The difficulty was exacerbated by resistance to filming by members involved in the work, though this was mitigated to some extent by their willingness to allow the researcher to 'have a go'. It turned out that while some procedures could be reduced to a set of instructions, in practice others could not. In any event, a report was produced and the researcher moved on to other things, though not without a niggling feeling that the project and report were incomplete.

It was not until 2007 that another chance became available to research knowledge as it pertains to the performance of tasks dependant on the material properties of objects. This was provided in the form of a doctoral training programme funded by the EPSRC Grand Challenge Project on information and knowledge management, which happily coincided with a growing interest in visual management among the lean construction community of which the researcher was a member. Thus, the second researcher came aboard and we began to look for a fieldwork opportunity. Beginning with a rough tripartite distinction between encoded information, social practice, and knowledge bearing material properties of objects, we employed Sacks' gloss to identify a suitable opportunity to discover how these aspects of knowledge play out in practice. Information is equivalent to the object of Ryle's (2009) 'knowing that', social practice to Garfinkel's 'membership', and physical properties to the comprehensible properties of the objects manipulated in the course of the concrete frame construction.

An accessible perspicuous setting was located when representatives of a hospital trust, engaged in upgrading existing facilities, expressed frustration with failures in their way-finding system. The second researcher carried out an extensive participant observation and auto-ethnography as a wayfinder in the hospital facility. Findings from this project are published elsewhere (Rooke 2012).

Building on that research, we present an auto-ethnography of the process involved in administering an IM injection, and utilise various misreadings to offer candidate descriptions of learning processes involved in the transfer of manual skills. We gloss our first description as a 'Manchester School study of work', in that it provides a uniquely adequate description, couched in terms easily accessible to a general audience. Although such studies have made contributions to other disciplines, thus arguably fulfilling Garfinkel's demand for hybrid studies, several leading practitioners express dissatisfaction with the approach and demand a more 'radical' one. A favoured direction is to develop the cumulativity of the discipline through critical reflection on the body of completed studies (Anderson & Sharrock 2017).

There is much to be said for this proposal, if only because a critical reading of published studies might reveal a fair smattering of errors and loose reasoning. Furthermore, it may be these characteristics, rather than the natural culmination of EM's initial programme, that have contributed most to EM's 'assimilation into the body of conventional sociology' (Anderson & Sharrock 2017, 2). That being said, there is every reason to suppose that the solid work that has been done will prove a basis for inductive insights. Nonetheless, we do not (or only very partially) take that approach here, preferring one which facilitates a continued engagement in the project of hybrid disciplinarity, and encompasses a wider literature. In order to do so, we offer various misreadings, of Ryle, of Polanyi, of the design studies thinker Norman, and of Garfinkel himself.

Beginning with a misreading of Garfinkel & Weider (1992) we extract the concept of unique adequacy (UA) from Garfinkel's project. This project appears to have been ultimately frustrated by an inability to interest an audience in its findings (Garfinkel 2002) and UA itself remains somewhat controversial. Some feel that the strong form of the

requirements lacks clarity (Lynch 2007, Greifenhagen & Sharrock 2019). We argue none-theless that UA not only provides a vital set of criteria for the description of social pro-cesses, but differs little from the policies outlined in *Studies*. Indeed, the strong require-ment differs only in that EM indifference to social theory has been extended to all theo-retical constructs not indigenous to the setting, while, rather than being merely a policy recommendation, its viability has now been established as a discovered fact.

Ironically, it is what Garfinkel terms the weak form of the requirements that often proves most difficult for ethnomethodologists and other sociologists. It is often taken to be unduly restrictive of the settings that a researcher can investigate (Atkinson & Morriss 2017, Jenkings 2018) though as Jenkings points out, this does not have to be the case. Our first description, then, is offered as a uniquely adequate report on the process of learning to administer an intramuscular (IM) injection.

From there, we proceed to our misreadings of Polanyi, Ryle and Norman, in search of additional conceptual apparatus with which to reanalyse and re-describe the process.

MISREADING GARFINKEL

Garfinkel deliberately 'misreads' phenomenological texts for resources that can be used in his own projects (Garfinkel 1992, Lynch 2015). This allows him to borrow concepts without making the theoretical or programmatic commitments that they might otherwise require. While we broadly characterise the work presented here as ethnomethodological, we are not attempting to pursue Garfinkel's own research agenda, but borrowing his concept of 'misreading' for another purpose. In what follows, we misread the texts of a series of philosophers, but also of a design thinker. Whether this qualifies as 'a reflexive application to Garfinkel's own writings of his advice' (Lynch 2015, 605) is a moot point. We are not seeking to respecify 'fundamental themes in philosophy and social science methodology' (606), merely to garner resources for better description. Programmatically, our ultimate ambition is to 'create "hybrid" forms of investigation that [will] be recog-nised and credited within the relevant practices' (606), but we do not claim to have achieved that here.

Both Garfinkel and Sacks were deeply concerned with the problem of sociological description. In their joint paper (Garfinkel and Sacks 1986) they point out that any can-didate description must necessarily be a gloss on the events described and identify several ways in which such glosses can be utilised in the production of ongoing social settings. Each has a different approach to handling this insight. Sacks' interest is to produce an analytic framework that remains at once context free and context sensitive (Sacks 1972; Sacks, Schegloff and Jefferson 1974). Garfinkel's is to capture the haecceity of a particular setting. He proposes the unique adequacy requirements of method, among others, as criteria for ethnomethodological reporting (Garfinkel 2002; Garfinkel and Wieder 1992).

The weak requirement stipulates that 'the analyst must be *vulgarly* competent in the local production and reflexively natural accountability' of the event. In other words, the analyst must 'be, with others, in a concerted competence of methods' (Garfinkel 2002,

175-6; Garfinkel and Weider 1992, 182; emphasis in original) in order to learn that compe-
tence. The analyst must have learned, as knowledge-how, the methods which they seek
to describe. They must be competent to apply these methods in setting to which they
belong.

The strong requirement is presented as a finding, to be read as an instruction:

> *Just in any actual case* a phenomenon of order* already possesses whatever as methods meth-
> ods could be of [finding it] if [methods for finding it] are at issue. Comparably, a phenom-
> enon of order* already possesses whatever as methods methods could be of [observing], of
> [recognizing], or [counting], of [collecting], of [topicalizing], of [describing] it, and so on,
> if, and as of the in vivo lived local production and natural accountability of the phenome-
> non, [observing], [recognizing], [counting], [collecting], [topicalizing], or [describing] it
> is at issue (Garfinkel 2002, 176; Garfinkel and Weider 1992, 182; emphasis in original).

The term 'order*', spelt with an asterisk, represents whatever conception of order
might be at issue. Similarly, square brackets denote that the term they contain may be
substituted with alternative terms, representing whatever alternative tasks may be at is-
sue.

The point of this is that whatever ethnomethodological procedure we may wish to
carry out, it must be carried out under the instruction to use only the resources we find
in the setting with which we are concerned. This is effectively an extension of the prin-
ciple of EM indifference, which demands an agnosticism towards sociological theory.
The strong requirement demands indifference to *any* theoretical construct which is not
native to the setting.

These requirements tend to meet different objections from different sections of the
academic community. For most mainstream sociologists they are of course anathema,
proposing that they sacrifice their theoretical privilege, and dedicate themselves to learn-
ing more about the events that they are to analyse. For other disciplines with which the
present authors have been involved (construction and project management, and nursing)
the weak requirement is, in contrast, often attractive, validating the experiential
knowledge of practice with which these academics and their students are more or less
familiar. However, like mainstream sociologists, they may be reluctant to disavow their
own privilege to theorise. For ethnomethodologists, the reverse tends to be the case;
while they endorse the ethnomethodological indifference to theory contained in the
strong form of the requirement, they are sometimes suspicious of the demand for vulgar
competence contained in the weak form, which presents particular difficulties for those,
like sociologists, who wish to study practices with which they are not familiar.

In what follows, we attempt to fulfil both forms of the requirements while retaining
Sacks' aim of conducting an analysis which transcends the local circumstances of its pro-
duction. In this sense, we are misreading Garfinkel in order to borrow his concept of
unique adequacy for our own purposes.

AUTO-ETHNOGRAPHY: LEARNING HOW TO
ADMINISTER AN INTRAMUSCULAR (IM) INJECTION

In this section, we present an initial report on a learning process undergone by one of the authors. The report was constructed using the method of self-reflection, recommended by Francis and Hester (2004) in order to bring into focus the taken for granted aspects of the social phenomenon being studied. Francis and Hester argue that reflecting on our own understanding should lead to an appreciation of the methods in and through which ordinary life is done, and suggest a three step approach:

1. Notice something that is observably-the-case about some talk, activity or setting.
2. Pose the question 'How it is that this observable feature has been produced such that it is recognizable for what it is?'
3. Consider, analyse and describe the methods used in the production and recognition of the observable feature.

This technique of 'armchair research' (Francis and Hester 2004, 35) was adopted for the purposes of recalling the learning experience described below. As will become apparent a close following of the three steps listed above enabled the production of an account meeting both forms of the UA requirements. This account was produced collaboratively in a series of conversations between the two authors.

Intramuscular (IM) injection to the upper outer quadrant (the dorsogluteal muscle) of the buttock is a common medical procedure and the ability to administer such an injection is a standard expectation of nurses in the UK. The procedure entails some risk, including injury to the sciatic nerve, tissue scarring, inflammation or other lesion. Thus, in order for a nurse to gain the required competence, a degree of specialist training must be undertaken. Here we describe this training, as experienced by one of the authors as part of her training to be a nurse. It will be seen that the training involves learning in a classroom situation and on placement in hospital wards.

The author's first introduction to the administration of IM injection occurred during a two-hour classroom lecture entitled 'Theory and Practice'. The lecture was delivered to a group of 20 students who were halfway through their three-year nurse training, a few weeks prior to their first placement on a hospital ward. The first part of the lecture covered the physiology and anatomy of the dorsogluteal muscle, the correct location for an IM injection, the risks associated with such an injection and the injection technique required to minimise those risks. The students were then given an opportunity to practice under supervision.

The lecturer used three methods to instruct her students how to find the dorsogluteal muscle and how to locate the correct injection site: she pointed to the relevant part of a diagram of the buttock divided into four parts while saying that the safe site for the injection is in the upper outer quadrant of the buttock; she indicated the correct location

on a rubber dummy; finally, she indicated the correct location on her own buttock whilst half facing away from her students.

She went on to explain that the dorsogluteal muscle is associated with sciatic nerve injury and that the 'upper outer quadrant' technique of locating the precise part of the buttock to be injected is commonly used to reduce risk of injury. She also explained that drugs administered via the IM route should be deposited deep into the muscle tissue in order to reduce damage to sensory nerve endings.

The correct injection technique was explained first with the aid of diagrams and then demonstrated physically whilst the students watched. The demonstration was accompanied by a running commentary. In the first instance the lecturer pointed to a diagram of a hand holding a syringe and needle positioned at 90 degrees to the buttock and another one of a needle inserted to three quarters of its length into the upper outer quadrant of a buttock. She told the students that the syringe should be held like a pen and inserted with a dart-like motion, to reduce accidental depression of the plunger and inadvertent deposition of injectate as the needle is being inserted. The lecturer also communicated the need to check for 'flashback' of blood into the syringe to ensure that the drug is not been not injected into a blood vessel.

She demonstrated the injection technique twice: first using the syringe and her hands and then the syringe and an orange. The steps in this demonstration are specified below:

1. She held the syringed needle up to her eye level, informing the students that she was demonstrating the correct way to hold it.
2. She positioned the syringe at a 90 degree angle to the palm of her other hand, stating that this was the correct angle.
3. She moved the index finger of her free hand along the needle, starting from its tip to approximate the three-quarter mark, stating that this was the desired depth for IM injections.
4. She then simulated giving an injection by pushing the needle between the fingers of her free hand, pointing out that she was demonstrating the correct dart-like motion. She again called attention to the correct depth of entry.
5. She demonstrated how to partially withdraw the syringe piston to check for 'flashback' of blood into the syringe to ensure that the drug has not been not injected into a blood vessel. She achieved this by holding the end of the piston between her thumb and index finger and pulling it slightly outwards. She explained that should blood be indicated at this stage withdrawal of the needle must follow to allow a fresh preparation of the drug followed by insertion at another location, to avoid accidental intra-vascular administration.
6. She then pushed the syringe piston all the way to the base of the syringe in order to allow complete deposition of the drug into the muscles, again pointing out that this is what she was doing.
7. She demonstrated how to smoothly and quickly withdraw the needle at an angle of 90 degrees, pulling it outwards. She explained that the practitioner should

watch for bleeding and apply pressure and a dressing on the punctured site if required.

The simulation of the injection technique on an orange amounted to a repetition of the steps articulated above.

Following the demonstrations, the students were asked to form groups of four or five, in order to practice the technique. Each group was given two oranges and two syringes and instructed to repeat to each other what they had learned and to practice the injection technique. The lecturer moved from group to group examining each student individually on their ability to reproduce both the instructions and the technique. Each student was thus required to verbally articulate the steps involved in administering an IM injection, before demonstrating the injection technique on an orange. Each student spent about five minutes with the tutor. Finally, the students were told that the acquisition of the technique cannot be considered to be complete until they had administered an injection to a real patient.

The opportunity to complete this part of the training is provided when the student nurses are sent on placement to a working medical setting. During this time, each student is assigned to an experienced practitioner (a qualified nurse) whom they shadow over a period of at least four weeks. Learning in this context takes the form of individual tutoring in a busy environment where the practitioner must complete their normal workload while assuming the additional tutoring responsibility. Close supervision is considered necessary and the practitioner is accountable for any mistakes the student makes.

The IM injection training received by the author on placement began with a five-minute test in which the student was required to verbally articulate the knowledge gained from her classroom experience regarding anatomy, injection technique and the risks associated with poor administration. This occurred in the drug room while the practitioner was preparing the drug to be administered. The student then watched as the practitioner performed an IM injection on a patient.

As the weeks progressed, the student was able to observe several more IM injections performed on different patients. Only when she expressed a readiness to proceed and consent had been given by a patient did she perform her first IM injection under close supervision. No amount of practising the IM injection on an orange could have prepared the student for this moment. The patient clearly felt anxiety at being injected by a learner. The anxiety was first communicated verbally when the patient asked for the practitioner's reassurance that no harm would come to them. It was also evident in the non-verbal behaviour of the patient when they tensed their muscles as the needle was introduced into their buttock. This caused them to shift their original position, thus affecting the angle of the needle. The student reassured the patient that she was going to be a quick as possible and asked them to relax. The patient responded by relaxing their muscles and this allowed the student to readjust the angle of the needle. Compounded by the learner's sweaty palms which had developed from the time the patient first communicated her anxiety, the procedure of partially withdrawing the syringe plunger to

check for blood and then depositing the drug slowly into the muscles took longer than would normally have been the case. However, the injection was completed successfully in that no blood appeared in the syringe or on the surface and no bruising of the muscles appeared at the puncture site. Subsequently, the student administered five more injections while on the placement, her confidence improving each time.

MISREADING POLANYI AND RYLE

Lynch (2015) points out that ethnomethodological investigations can be seen as 'efforts to delve into tacit knowledge' (607). But what is the nature of such knowledge? The conception we use here relies exclusively on Polanyi's (1966) essay 'Tacit Knowing'. In this late essay, Polanyi shows that all knowledge has the same structure. Whether we speak of 'knowing something', or demonstrate our knowledge-how through performance, there exists, in addition to the knowledge that we indicate, a substratum of unattended knowledge without which our acts of knowing would have no sense. Thus, 'knowing':

> always involves two things. We may call them the two terms of tacit knowing. [...] *we know the first term only by relying on our awareness of it for attending to the second.* [...] we *attend from* something for attending *to* something else; namely, *from* the first term *to* the second term of the tacit relation. In many ways the first term of this relation will prove to be nearer to us, the second further away from us. [...] we may call the first term *proximal*, and the second term *distal*. It is the proximal term then, of which we have a knowledge that we may not be able to tell (Polanyi 1966, 9-10, emphasis in original).

Thus, [1] all knowledge has a tacit dimension, which [2] consists in a continuum between proximal and distal knowledge, and [3] proximal knowledge *may* be inexpressible. It is proximal knowledge that is usually referred to as tacit. Crucially, it is a form of knowledge that is present whenever anyone knows anything. Distal knowledge, is that to which we attend in an act of knowing.

Membership is a form of knowledge: the set of competences that constitute a member's belonging to and place within a setting. It is 'the "seen but unnoticed," expected, background features of everyday scenes' (Garfinkel 1992, 36) that constitute the proximal terms of membership, without which explicit facts about those scenes cannot be known at all. Yet these terms are hidden from us, not by illusions, repressions, ideological distortions, or any other device employed as an apology for constructive analysis but, to extend Polanyi's metaphor, by their very closeness to us; they are hidden right under our noses.

Garfinkel's disruptive procedures are one way in which these proximal terms can be brought into open view. Conversation analysis techniques are another. A third is participant observation in an unfamiliar setting. A fourth is for the researcher to bring materials to colleagues for discussion. The auto-ethnography presented above was produced using this last approach, plus one other. It relies on the fact that the researcher is

reporting on a learning process. This means that the events reported had a naturally occurring unfamiliar aspect. A drawback of auto-ethnography as a research approach is that, dealing as it does with the familiar, it is equipped with no obvious method for bringing proximal knowledge into view, focusing on a learning process obviates this difficulty.

As Garfinkel demonstrates, proximal knowledge poses a problem of description for sociology in that it begs the question: what constitutes an adequate description? He shows that there is no obvious limit to the task of describing tacit knowledge. Asking his students to analyse the meaning of a simple conversation, and requiring from them a progressively greater degree of 'accuracy, clarity and distinctness', he demonstrates that:

> *if,* for whatever a student wrote, I was able to persuade him that it was not yet accurate, distinct, or clear enough, and *if* he remained willing to repair the ambiguity, then he returned to the task with the complaint that the writing itself developed the conversation as a branching texture of relevant matters. The very way of accomplishing the task multiplied its features (1992, 26, emphasis in original).

This inevitable multiplication makes the task of capturing the tacit knowledge in a setting demonstrably impossible. Crucially, it is this multiplication of relevant matters in an endless spiral of questions, rather than the practical difficulty in translating proximal into distal terms, that in this case renders the tacit dimension ineffable. In Polanyi's conception then, 'tacit knowledge' is not an ineffable *type* of knowledge, but an ineffable characteristic of *all* knowledge. Put in terms more familiar to ethnomethodologists, all explicit knowledge is reflexive to the setting in which it is explicated.

EM solves this problem by treating accounts of settings as constitutive of settings. The effort of analysis thus shifts from an attempt to complete the description by comparing it to the thing it describes. It becomes instead an investigation of the methods used to produce accounts (whether intentionally descriptive, or otherwise) in the first place. This gives a definitive focus to the analysis, supplying clear parameters of analytic interest. Together with an application of the strong form of the UA requirements (effectively insisting on the strict observance of EM indifference, broadly interpreted) excludes much that would otherwise qualify as legitimate description, this closes the loop.

This is not, of course, the only solution to the problem. The disciplines which Garfinkel characterises as Formal Analytic prefer to systematically exclude the details of actual settings (though this still leaves them with the problem of endless theoretical speculation). Keane and Mason (2006) offer a pragmatic solution for knowledge management practitioners which is to capture and preserve explicit informational knowledge, including sufficient detail of its context to facilitate its intended use. CA provides a set of descriptive techniques which can be used to generate a reportable framework around which a description can be woven in a more or less ethnomethodological manner, though there is always a danger that the framework takes on a theoretical character.

While Polanyi's proximal/distal distinction offers some guidance as to candidate elements of a description, it provides only a minimal framework for the provision of that

description. Further resources are found in Ryle's typology of 'knowing how' and 'knowing that'. Ryle (2009) observes two distinct ways in which we talk about knowledge: we may refer to a person's cognitive repertoire of facts and theories (their knowing *that*); or we may discuss their abilities and performance (their knowing *how*). Unlike Polanyi's tacit and explicit continuum, these are distinct types of knowledge. Indeed, with his focus on language use, Ryle does not share Polanyi's interest in the structure of knowledge, being concerned rather with the meaning that the concept has in the practical activities of everyday life.

The tacit knowing and knowing-how conceptions have strong similarities and are often confused. In particular, Polanyi's insistence that all knowledge has a tacit dimension finds an echo in Ryle's assertion that knowing-that is always dependent on knowing-how. But the terms are not equivalent. Ryle aims 'to show that there are many activities which directly display qualities of mind, yet are neither themselves intellectual operations nor yet effects of intellectual operations' (2009, 15-16).

He is focused on aspects of knowledge which cannot be reduced to knowledge-that, offering the example of learning to play a musical instrument. However much instruction one receives in guitar playing, along the lines of '*that* is how to make chord shapes', '*that* is how to strum', and not withstanding that these instructions are accompanied by accurate demonstrations of performance, once one picks up an instrument, one will be faced with the difficult task of training one's fingers to make and unmake those shapes, while strumming the strings without missing or tripping over them. Furthermore, knowledge-how extends beyond the ability to perform physical 'hands on' activities to qualities such as 'shrewdness' and 'prudence', for instance.

Polanyi (1966) recognises Ryle's distinction, but has no interest in distinguishing between these two types of knowledge. It is sufficient to consider the former's analysis of a psychological experiment to demonstrate that there is no equivalence between the proximal, dis-attended term and knowing-how. The experiment consists of the administration of electric shocks together with certain nonsense syllables. The subject of the experiment soon learns to associate the shock with the syllables in question and shows signs of anticipating the shock, though they are unable to identify the relevant syllables when asked. Clearly, the subject has learned *how* to predict the coming electric shock. Yet the proximal dis-attended term in this knowledge, the tacit dimension, is the knowledge *that* a certain syllable predicts an electric shock. Here, the assumed relationship between the how/that and tacit/explicit distinctions is reversed, a knowledge-how is shown to be dependent on a tacit knowledge-that.

It would seem that sociology and philosophy have peculiar problems when it comes to communicating knowledge-how and distinguishing it from knowledge-that. Garfinkel attempts to do it by describing tutorial problems that he sets for his students (Garfinkel & Wieder 1992); or indicating the role of printed instructions in the assembly of flat-pack furniture (Garfinkel 2002). However, the point is that a set of instructions for assembling a piece of furniture is not the same thing as assembling that piece of furniture. This would be the case, even if it were possible to document the process in infinite detail. It is this

which people usually have in mind when they refer to the ineffability of tacit knowledge. As we have shown above, it is only one type of case.

Thus, we can say that there are two types of tacit (proximal) knowledge, and there are two types of explicit (distal) knowledge also. As we shall illustrate below, knowledge-how can be made distal in performance. Furthermore, although it cannot be reduced to knowledge-that, it can be communicated with the support of factual and theoretical instruction.

MISREADING NORMAN MISREADING GIBSON

The design literature on perceived affordances (Norman 1998, 1999) provides a useful perspective on the knowledge bearing capacities of physical properties. An affordance is an opportunity for action provided by a physical object or environment, whether natural or artificial. The perception of an affordance is generally crucial to its utility. For example, a door offers the affordance that it can be opened to provide a way through a wall; at the same time, it provides a clear indication that this affordance is available and as to how it should be accessed.

The concept of affordance is borrowed from Gibson (1986) and, like tacit knowledge, carries with it a certain amount of unnecessary philosophical baggage. Intended as an attempt to escape the Cartesian dichotomy of subjective mind and objective matter, it remains enmeshed in debate around that very dichotomy, due possibly to some infelicities in Gibson's style of expression (Ingold 2018). Viewing these disputes from a Wittgensteinian perspective, they can of course be seen to arise from grammatical misunderstandings. However, it is noticeable that this debate has done little to diminish the term's utility to designers.

Norman argues that the art of the designer is to ensure that the actions relevant to an artefact are readily perceivable. Well-designed objects, he contends, should be easy to interpret and understand, containing visible cues as to how they should be operated without the need for words or symbols. For example, the design of a door can provide not only for the visibility of its functional parts such as handles, but also communicate their correct use, informing the user as to whether the door opens inwards or outwards: a door with a vertical plate, rather than a handle communicates to the user that it should be pushed to open inwards. The utility of the term 'affordance' in this approach is that the affordances provided by the door exist independently of a users' perception of them.

For our purposes Norman's work has two important consequences both deriving from its emphasis on actionable properties. First, in emphasising action, it provides an explanation of the knowledge bearing properties of physical objects that focuses on knowledge-how rather than knowledge-that. Second, while recognising the importance of visual cues, it grounds its explanation of these communicative properties in the more substantial physical properties that facilitate action.

TACIT RELATIONSHIPS BETWEEN
EXPLICATION, SKILL AND AFFORDANCE

It is possible to identify at least nine distinct methods of teaching and learning in the IM injection study:

1. **Instructions**: as given verbally by the teacher in the first half of the lecture.
2. **The use of drawings and models** to (i) illustrate techniques such as holding a syringe and (ii) locating the correct part of the anatomy to injected.
3. **Observation of simulated demonstrations**, first by pushing the needle between the fingers and then into an orange, finally watching other students practice in the second half of the lecture.
4. **Repetition of instructions by the student**, first in class and then on the ward.
5. **Oral examination**, following/during group-work and again on placement.
6. **Practice in a simulated risk-free context** by injecting an orange.
7. **Examination of the student's skill** following group-work.
8. **Observation of real life injection**: when the student shadowed an experienced practitioner on placement.
9. **Supervised injection of a patient**, on placement.

In these methods, a complex relationship between explication, ability and affordance can be observed.

Four of these methods (1, 2, 4 and 5) consist in the communication of information. Two important distinctions can be observed here: first, information is communicated in either verbal or visual form, while the difference between these two modes of communication is clear, it would be a mistake to assume that the latter relies more on material properties than the former; second, a communication can be issued in either form, or alternatively, an interaction can be initiated in which the student displays their knowledge and the teacher assesses it as a basis for further action. In all four methods, material affordances support the transfer of information. All these methods rely on shared proximal knowledge to support the explicit distal knowledge that is conveyed; this proximal knowledge consists in both information and competence.

Method 3 consists in the explication of practice. Here, proximal competence is made distal in the form of a demonstration. This method depends equally on the skill of the demonstrator and the material affordance provided by the syringe, the fingers, or the orange.

Five of the methods (3, 6, 7, 8, and 9) consist of the demonstration of competence. These demonstrations, whether or not accompanied by a verbal commentary involve either the simulation or actual performance of the skill in question. These methods are primarily distinguished by the identity of the participants and their relationship, as follows:

- 3 and 8, teacher or qualified nurse demonstrates, students observe;
- 6, student perfects her technique relatively free from observation;
- 7 and 9, the student is engaged in both demonstrating and perfecting her ability. As Ryle (2009, 46) notes, '[i]t makes sense to ask at what moment someone became apprised of a truth, but not to ask at what moment someone acquired a skill'.

The process of teaching and learning consists in a subtle interplay of information, competence and affordance, each supporting the other. For example, in telling the students that the syringe is held 'like a pen', the teacher communicates a fact about an affordance, in order to support the communication of a skilled exploitation of that affordance. The information *that* the syringe should be held like a pen helps the students to learn *how* to hold the syringe correctly. At the same time, the success of the communication depends on the student knowing *how* to hold a pen in the first place. Thus, the two types of knowledge form alternate layers in the structure of the communication, constituting the tacit dimension. In the relationship between the knowledge-*how*-to-hold-a-pen and the knowledge-*that*-a-syringe-is-held-like-a-pen, the knowledge-how forms the proximal background that allows the students to understand what the teacher says (the distal term). This distal term is used by the teacher to highlight her proximal knowledge-how-to-hold a syringe. She makes this knowledge distal by demonstrating: holding the syringe correctly for her students to see. For the students viewing this demonstration, the knowledge-that-a-syringe-is-held-like-a-pen now becomes a proximal aid to seeing what is significant about the way the syringe is being held. Thus, the knowledge-how-to-hold-a-pen is now the distal term of the tacit dimension, while the knowledge-that-a-syringe-is-held-like-a-pen is the proximal term. Ultimately, when the students have learned how to successfully administer an injection, the knowledge-how becomes for them a proximal term to, for instance, the knowledge-that-a-particular-patient-is-nervous-and-tense. In this way, knowledge-how and knowledge-that subtly intertwine, alternately changing their respective statuses between proximal and distal, along the tacit dimension, as the learning process evolves.

Thus, the problems of explicating competence are overcome through instruction and demonstration. However, a further ineffable characteristic of knowledge-how is manifest when the student is faced with the task of administering he first injection in real life (9). As in the case of learning how to play a guitar discussed earlier, it can be seen that however much instruction the student received in the technique of administering an IM injection, however many demonstrations she had seen, or simulations she had performed, there was an irreducible qualitative difference between these pedagogic exercises and the act which she must now perform. Furthermore, when confronted with a real life situation she had to contend with a new challenge: the patient's overt anxiety, and the tensing of their muscles; the need to control her own consequent anxiety, to project an outward calm and thus reassure the patient.

CONCLUSION: THE FUTURE OF EM'S PROGRAMME

In attempting to create a generic framework for the description of knowledge, our project is closer to Sacks' than Garfinkel's; our findings look more like the membership categorisation device, or the simplest systematics than they resemble anything that Garfinkel produced. The chief difference is that Sacks' analytic insights were entirely original, whereas we have merely borrowed and assembled a set of second-hand concepts through our various misreadings.

What we have done departs in another way from the direction taken by both these pioneers: rather than focus on members' methods, we have focused on members' knowledge. This is a slight shift in focus, but a noticeable one. We have suggested that a significant difference exists between the analytic focus of Wittgensteinian social science and Garfinkel's EM, in that the former is focused on 'knowledge that', and the latter on 'knowledge how'. While we claim that our analysis conforms to the UA requirements, it is not concerned directly with members' practice, but with the structure and typology of knowledge as it appears in that practice.

We did not set out to explore the consequences of Garfinkel's own project, nor to merely appropriate his ideas to the service of another discipline. Rather, we have performed our misreadings in order to generate a study that seeks to conform to the UA requirements, while pursuing a Sacksian endeavour to produce an analysis which is context free and context sensitive. Ultimately, the intention is to contribute towards a hybrid discipline that we hope can eventually be worthy to be called an EM discipline of nursing.

A strict observance of both forms of UA must be foundational to this discipline. In its full expression it will require: [1] a vulgar familiarity with the practices studied; [2] absolute indifference to non-indigenous concepts, including those from sociology, philosophy and even EM, unless and until they can be demonstrated to offer a practical contribution to nursing; [3] explication of the concepts and theories of nurses themselves, both as relevant features of studied settings, and as legitimate concerns of (some of) the readership of studies; [4] a demonstrably practical contribution to the discipline of nursing.

It could be argued that the strong requirement is not strictly observed in the current study, because the concepts which have been brought to bear have been imported from outside the setting. Our counter argument is that these concepts have been shown to be descriptive of members' methods. Furthermore, these concepts combine context sensitivity with context freedom: they are as applicable on a construction site as in a nurse education setting. If, in doing so, they go beyond what is acceptable in an EM study, then the same must be said of, for instance, the simplest systematics.

Nevertheless, the approach contains clear dangers, and to be successful requires careful observance of the four requirements outlined above. It is worthwhile repeating the point already made: we do not claim that this paper fulfils those requirements. Specifically, while the concepts have been demonstrated to have descriptive efficacy, it is yet to be shown that they have practical import.

Nor do we claim that this is the only possible approach to developing a hybrid discipline. As Anderson and Sharrock (2018) point out, early studies in EM can be read as hybrid studies in the work of doing sociology. Indeed, inasmuch as EM studies continue to orient towards specifically sociological concerns, they can still be read in this way. Although we broadly endorse such a reading, we would like to draw a distinction between mere studies of work and properly hybrid disciplines. Thus, while EM studies in sociology are properly hybrid, those in other disciplines rarely achieve that status. Garfinkel's attempts, by his own admission, did not succeed (see Garfinkel 2002, 278).

On the other hand, EM informed ethnographies have been very successful in the field of human-computer interaction, and attempts have been made to develop a hybrid discipline of software engineering (Button and Dourish 1996; Dourish and Button 1998; Crabtree 2004). Unfortunately, this initiative seems to have made little progress in recent years.

More recently, Ikeya's (2020) study of practice in an emergency control centre would appear to represent a major step forward in the development of a hybrid discipline in management studies, both for its close attention to the parameters of Garfinkel's own project, and for its innovative adoption of an action research approach. Both of these aspects are deserving of further study and discussion, but we will restrict ourselves here to a brief remark on the second. It has been previously suggested that action research studies can conform to the UA requirements, even when they employ non-indigenous theory, though this required abstracting the UA concepts from their EM origins (Rooke and Kagioglou 2007). Ikeya's achievement is to demonstrate that a thoroughgoing EM action research is possible.

REFERENCES

Anderson, R. J. & W. Sharrock 2017. 'Has Ethnomethodology Run Its Course?', Unpublished Manuscript, Draft 7.1 http://www.sharrockandanderson.co.uk/wp-content/uploads/2019/10/Run-its-Course-VII.pdf Visited 15/04/21.

Anderson, R. J., & W. W. Sharrock. 2018. *Action at a Distance: Studies in the practicalities of executive management*. Routledge: Abingdon.

Atkinson, Paul, & Lisa Morriss. 2016. 'On Ethnographic Knowledge'. *Qualitative Inquiry* http://dx.doi.org/10.1177%2F1077800416655825

Button, Graham, & Paul Dourish. 1996. 'Technomethodology: Paradoxes and Possibilities'. In *Proceedings of the ACM Conference on Human Factors in Computing Systems CHI'96, Vancouver, BC, 19-26 April*, edited by A. Miller. New York: ACM.

Crabtree, Andy. 2004. 'Taking Technomethodology Seriously: Hybrid change in the ethnomethodology-design relationship.' *European Journal of Information Systems*, vol. 13, 195-209.

Dourish, Paul, & Graham Button. 1998. 'On "Technomethodology": Foundational Relationships between Ethnomethodology and System Design'. *Human-Computer Interaction*, vol. 13, no. 4, 395-432.

Francis, David, & Stephen Hester. 2004. *An Invitation to Ethnomethodology: Language, Society and Interaction.* London: Sage.

Garfinkel, Harold. 1992. *Studies in Ethnomethodology*. Cambridge: Polity Press.

Garfinkel, H. (2002) *Ethnomethodology's Program: Working out Durkheim's Aphorism.* Edited and introduced by Anne Warfield Rawls. Lanham, MA: Rowman & Littleford Publishers, Inc.

Garfinkel, Harold, & Harvey Sacks. 1986. 'On Formal Structures of Practical Actions'. In *Ethnomethodological Studies of Work*, edited by H. Garfinkel, 160-193. , London: Routledge & Kegan Paul.

Garfinkel, Harold, & D. Lawrence Wieder. 1992. 'Two Incommensurable, Asymmetrically Alternate Technologies of Social Analysis'. In *Text in Context*, edited by G. Watson & R. M. Seiler, 175-206. London: Sage.

Gibson, James. J. 1986. *The Ecological Approach to Visual Perception*. Hove: Psychology Press.

Greiffenhagen, Christian, & Wes Sharrock. 2019. 'Tensions in Garfinkel's Ethnomethodological Studies of Work Programme Discussed through Livingston's Studies of Mathematics'. *Human Studies* vol. 42, 253-279.

Ikeya, Nozomi. 2020. 'Hybridity of hybrid studies of work: Examination of informing practitioners in practice.' *Ethnographic Studies* vol. **17,** 22-40.

Ingold, Tim. 2018. 'Back to the Future, with the Theory of Affordances'. *Hau: Journal of Ethnographic Theory* vol. 8, no. 1/2, 39-44.

Jenkings, K. Neil. 2018. '"Unique Adequacy" in Studies of the Military, Militarism and Militarisation.' *Ethnographic Studies* vol. 15, 38-57.

Keane, B. T. & R. M. Mason. 2006. 'On the Nature of Knowledge: Rethinking PopularAassumptions;. In *Proceedings of the 39th Hawaii International Conference on System Sciences,* Track 7, HICSS '06.

Lynch, Michael. 2007. 'The Origins of Ethnomethodology.' In *Handbook of Philosophy of Anthropology and Sociology*, edited by S. P. Turner & M. W. Risjord, 485-515. Amsterdam: Elsevier.

Lynch Michael. 2015. 'Garfinkel's Legacy: Bastards all the way down'. *Contemporary Sociology: A Journal of Reviews*, vol. 44, no. 5, 604-14. https://doi.org/10.1177%2F0094306115599356a

Norman, Donald. A. 1998. *The Design of Everyday Things.* New York: Basic Books.

Polanyi, Michael. 1966. *The Tacit Dimension*. London: Routledge & Kegan Paul.

Rooke, C. N. (2012) *Improving Wayfinding in Old and Complex Hospital Environments*. Doctoral Thesis, School of the Built Environment, The University of Salford. http://usir.salford.ac.uk/27358/ accessed 11/12/2020.

Rooke, John A., & Mike Kagioglou. 2007. 'Criteria for Evaluating Research: The Unique Adequacy Requirement of Methods.' *Construction Management and Economics,* vol. 25, no. 9, 979-987. http://usir.salford.ac.uk/2579/

Ryle, Gilbert. 2009. *The Concept of Mind* Abingdon: Routledge.

Sacks, Harvey. 1972. 'An Initial Investigation of the Usability of Conversational Data for Doing Sociology'. In *Studies in Social Interaction*, edited by D. Sudnow, 31-74. New York: Free Press.

Sacks, Harvey, Schegloff, Emanuel. A., & Gail Jefferson. 1974. 'A Simplest Systematics for the Organisation of Turn-Taking for Conversation'. *Language,* vol. 50, 696-735.

Winch, Peter. 1990. *The Idea of a Social Science and its Relation to Philosophy.* (second edition) London: Routledge and Kegan Paul.