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Theorising the everyday work of cycle mechanics

Jonathan Tummons 

School of Education, Durham University, Durham, UK

ABSTRACT

Drawing on interim findings from an ethnography of a cycle mechanics' workshop, this article demonstrates how the work of the mechanics rests on not only specific and contextualised craft expertise but also on distributed networks of both people and things, within which highly specialist instances of expertise or competence manifest alongside more generic, even mundane, instances of subjectivised, experiential knowledge or habit. Through an analysis of ethnographic data using a composite theoretical framework, designed as a mosaic consisting of three different but equal components, the article provides descriptions and theorisations of everyday work that reconcile contextualised situated accounts of craft expertise with the wider sociotechnological and cultural networks within which such contextualised spaces are located.

KEYWORDS

Actor-Network Theory;
Communities of Practice;
craft expertise; ethnography;
Modes of Existence; New
Literacy Studies

“Are we charging this lass, or are we being nice?”

If you walk into a newsagent and look through the magazine racks, you will find titles dedicated to cycling. Most are aimed at keen recreational cyclists, containing ideas for routes to follow or exercises to try alongside product reviews and features about manufacturers or professional riders. In the back pages you will find advertisements for equipment – spare components, wheels, even frames – that can be ordered directly from a retailer and delivered to your home. The assumption is that if you order something, you either know how to install it, you have a friend who can do it for you, or that you live near a workshop. If you walk past the cycle racks outside a busy railway station, a rather different kind of cycling is evident. Here you will see bikes of all shapes and sizes, some new and others old, some with baskets and pannier racks, others with mismatched wheels and flaking paintwork. But whatever the function, cycling is worth thinking about.

In 2020, the UK cycling industry was worth £2.3 bn., boosted by the take-up of cycling during periods of pandemic lockdown and

CONTACT Jonathan Tummons,  jonathan.tummons@durham.ac.uk

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a concurrent rise in sales of electric bikes (e-bikes) in particular. As an industry, it supports over 64,000 jobs, and there are over 2,700 cycle shops in the UK. The history, habits and technologies of cycling have been a focus for sociological and cultural inquiry (Horton, Rosen, and Cox 2007), historically-situated sociotechnological critique (Bijker 1995), social history (Oosterhuis 2016), and as a way of knowing in craftwork contexts (Martin 2016). But what about the mechanics who get the bicycles onto the roads in the first place, who assemble them so that they are roadworthy, who service the gears and brakes, and who replace broken spokes?

“I’m not doing 31 bikes on my own!” Welcome to the bike shop

The Bike Shop (a pseudonym, as are all of the names used here) is a large independent retailer based in the North of England. It operates three different sites, although only the largest is the focus for the present study. Established thirty years ago, it is run by two directors (one of whom founded the business as a sole trader). They employ eighteen members of staff, full-time and part-time. The Bike Shop sells town bikes, sports bikes, e-bikes and folding bikes, and also offers servicing and repairs. Some left school aged 16, others at 18, and some have university degrees in subjects ranging from fine art to engineering. Some are employed as mechanics and others as retailers but the majority of the retail staff are also capable of doing some workshop tasks, and the workshop staff in turn will help with customer enquiries. The majority of staff have *Cytech* (Cycle Technician) qualifications. Cytech was launched thirty years ago by the Association of Cycle Traders (ACT), the largest cycle trade body in the UK, and in its current form consists of an initial theory module followed by three practical components of increasing complexity. In a manner akin to National Vocational Qualifications (NVQ) in the UK, these were originally designed as competence-based programmes for people already working in the cycle trade, although more recently a small number of training providers have started to offer Cytech training courses.

As an ethnographer of education with a background in technical and vocational education, my initial interest in *The Bike Shop* pertained to the Cytech scheme, and specifically the validity and reliability of the assessment of the Cytech curriculum and the tension in its relationship to the broader knowledge and expertise of the workshop (Avis 2014). However, this specific topic was quickly absorbed into a broader project, informed by my ethnographic and theoretical work drawing on social practice theories of learning and literacy, and socio-material frameworks for ethnographic research (Tummons 2021a), that seeks to illuminate the practices and

cultures of The Bike Shop as a nexus of both emergent and established practices.

“I’ve got a mountain of paperwork to do.” Thinking about practices, objects, and multimodal texts

The practices of becoming and then being a mechanic and/or retailer in The Bike Shop are multifaceted. They involve, *inter alia*: learning the routines, systems and shortcuts of the workshop and/or retail spaces; learning how to be a cycle mechanic and/or learning new practices in response to technical innovations, new products, and so forth; and using specialist tools, practices, and discourses. These are framed within a critical reading of *Communities of Practice* theory (Barton and Tusting 2005; Hughes and Unwin 2007; Lave and Wenger 1991; Tummons 2022; Wenger 1998). In thinking about The Bike Shop as a Community of Practice (CoP) it becomes possible to explore the ways in which people learn how to become a technician/retailer, including not only more recognisable practices such as the correct procedural use of specialist workshop equipment but also more idiosyncratic practices that are part of the repertoire of The Bike Shop specifically. The paradigmatic elements of any CoP – joint enterprise, shared repertoire, mutual engagement – provide conceptual tools for an ethnography of a specific site of work that encompasses people, routines, artefacts, discourses, and so forth (Wenger 1998). At the same time, limitations in terms of the boundaries and borders that frame CoPs are resolved through recourse to Latourian anthropology, and limitations in terms of discourse and language are resolved through recourse to New Literacy Studies.

In order to unpack the relationships between the people who work in The Bike Shop and the different technologies that are found in The Bike Shop, I draw on the philosophical anthropology of Bruno Latour in *An Inquiry into Modes of Existence: AIME* (Latour 2013). Through the AIME project, Latour brings together the different strands of work that represent his intellectual career (Delchambre and Marquis 2013). For Latour a mode of existence is a feature of the world, brought into view by empirical inquiry, and derived from experience. He proposes fifteen such modes, labelled through the use of a series of notations: for example politics is [POL], and religion is [REL]. Of particular relevance to this paper is the technological mode – [TEC] – which encompasses Latour’s earlier work in science and technology studies (Latour 1987, 1996) and the network mode – [NET] – which supersedes the earlier, and more familiar, actor-network theory (Tummons 2021b). Through [TEC], Latour offers a nuanced framework for exploring the social relations that enfold people and objects. Through [NET], Latour offers ways of thinking about the borders or boundaries of

socio-technological configurations that go beyond the more simplistic notions of boundary crossing that are found in CoP theory.

Finally, the everyday ways in which staff at The Bike Shop use, read or inscribe different texts, forms, documents, web pages, or manuals during their work, are framed by social practice accounts of literacy, also known as *New Literacy Studies* (Barton 1994; Barton and Hamilton 1998). A social practice account of literacy foregrounds the mediating work of written texts, the heterogeneity of literacies across social domains, the power relations between different kinds of literacy, the cultural practices within which literacy events are embedded, and the mutability of literacy practices that in turn require informal learning. The different genres of literacy practice that are found within The Bike Shop are made sense of through a consideration of *multimodality of digital literacies* (Gillen 2014; Kress 2003), specific frameworks for exploring literacy practices that are characterised by image as well as text, and by exploring the choices that people make when they choose to access web-based resources for specific purposes.

Through this composite framework The Bike Shop, as a socio-technological configuration of people, routines, discourses, tools, texts, resources, habits, and so forth, comes into view as a site for ethnographic inquiry, the exploration of which encompasses heterogeneous phenomena ranging from learning how to use a specific mechanical tool to the completion of online forms and documents, from acquiring specific ways of talking to making meaning from images and texts that are placed on walls or found on boxes.

“What’s he writing in there?” Method and methodology: a framework for an ethnography of everyday work

The data on which this discussion rests comes from the fieldwork phase of an ethnography that, at the time of writing, was approaching the half-way stage (Atkinson 2017; Banks 2007; Crang and Cook 2007; Spradley 1980). For four months, I had been observing the work of the staff at The Bike Shop, going to the shop two or three times each week, on different days (including Saturdays) and at different times (when opening up, during the middle of the day, at closing time), moving around the building, writing field notes and taking photographs, and collecting documents. Each visit lasted three hours. I transcribed all of the field notes after each observation. At present, the data set consists of transcribed notes from observations [$n = 26$], photographs of tools, components, equipment, shop fixtures, signage and paperwork [$n = 178$], and documents, including worksheets, webpages, and technical manuals [$n = 24$]. All of the data is managed and coded using Atlas-Ti (Friese 2014; Tummons 2014). The fieldwork lasted for a further five months.

Obtaining consent for the research involved a lengthy process of negotiation (in total, lasting six months) that culminated in a meeting with *all* of the employees at which I outlined my research interests and answered their questions. The directors at The Bike Shop were keen to foreground the interests and agency of all of the employees. As such they acted as the initial gatekeepers to the site, and then facilitated the meeting with all of the staff. Once everyone had agreed to take part (this was communicated to me approximately one week after the employee meeting) I then applied for institutional approval from my university, which I received in December 2021. The employees consented to being observed, but not to being audio recorded. I was also permitted to take photographs so long as people were not identifiable in them.

The three-part conceptual framework outlined above works in symbiosis with ethnography. New Literacy Studies is often framed in terms of ethnographic research, including photography (Hamilton 2000), and has been drawn on by ethnographers in exploring working contexts ranging from food manufacture and technical fabrication (Belfiore et al. 2004) to care for the elderly (Cuban 2008), or the multilingual practices of children at school (Schmidt 2020). Likewise, Communities of Practice theory and situated learning theory derive from critical ethnographies of apprenticeship learning in a range of workplace contexts (Bishop 2017; Fuller and Unwin 2003; Larrea et al. 2022). And whilst actor-network theory lacks an explicit methodological statement, it is anthropology that Latour most frequently identifies with and refers to (Berliner, LeGrain, and Van De Port 2013) and a consensus can be found regarding the empirical focus required for actor-network theory, which possesses an ‘insistence on painstaking ethnographic research’ (Kipnis 2015, 43).

The research questions that underpin the ethnography as a whole are:

- (1) Becoming a bike shop worker: how do people learn how to become cycle mechanics and/or retailers?
- (2) Tools, paperwork, and workarounds: what are the cultures, and materialities of the workshop?
- (3) From local to global: what can the workshop tell us about technical and vocational education and training?

These questions reflect the shifting emphases of the theoretical mosaic that I have outlined: the first primarily rests on a critical use of CoP theory as a way of exploring learning as a social practice within The Bike Shop; the second draws extensively on Latour in exploring the technological objects – or, more specifically, beings of the [TEC] mode - that run through The Bike Shop, and on New Literacy Studies in order to account for the literacy practices and artefacts found there. The third question draws on all

three elements of the theoretical mosaic. In this paper, I offer initial responses to the second question through interim analysis of data gathered during the first four months of the project.

“I knew you’d get your notebook out for this.” The everyday work of the bike shop

A cycle workshop is suffused with tools, spare parts, and mechanical and technical objects. It is in the specific arrangements of these, the ways in which they are employed, talked or joked about, or worked around, that they can be contextualised, rendered as elements of the shared repertoire of the community that are both of that community – localised through habituation and practice – whilst also being imported into it, mindful that the practice of any community is never wholly indigenous but always partially imported and localised (Wenger 1998). Some of the tools and equipment on display and in use pertain generally to mechanical work: spanners, screwdrivers, allen keys, hacksaws, and wire cutters (for example) might be found in other workshops that have nothing to do with cycles and cycling. Other equipment, or artefacts, are specific to the cycle industry. Some are straightforward for the visitor to make sense of: chain-link tools, wheel-truing stands, and tyre levers are almost autological, containing within their nomenclature indications of what the tools in question do. Others reflect the specialist discourse of the community, sometimes through recontextualising everyday words, and at other times through specialist indigenous (to cycling) terms: fourth-hand tool (used for setting correct tension on brake cables), derailleur (the mechanism operated by the rider which moves the chain up and down the gears on the rear wheel), or cassette (one of several terms used to describe the ‘block’ of cogs on a rear wheel of a derailleur bike).

More surprising is the extent to which so many of the practices of the mechanics are mediated by texts. Texts proliferate – on screen, printed, computer-generated, hand-written, using forms. The richness and complexity of the practices of the mechanics that pertain to the cycles – building them for test-rides (they do not arrive in a ‘roadworthy’ condition from the factory and always require more work before being ridden), repairing and servicing them (after a few months, all new bikes are brought in for a service check), adding on or upgrading components (a customer might want to have more expensive parts fitted in order to enhance mechanical performance), and so forth – is mirrored by the richness and complexity of the literacy practices that the mechanics are required to acquire, and the different, multimodal, literacy artefacts that are necessitated by their mechanical work.

Vignette one: the literacy practices of the workshop. Thursday 13 January 2022.

A customer has brought a bike in for servicing. The workshop is busy, and there is often not much spare capacity: the schedule is managed using bespoke software that divides the day into units of time to which tasks can be allocated – a simple job such as replacing brake cables needs fewer units of time than a more complex task such as servicing a hub gear. This customer has pre-booked the repair so when dropping off their bike, it's a quick task for one of the mechanics to confirm the booking, ask follow-up questions as to whether there are particular things to look for in addition to the replacement of worn parts, and agree when the customer can return to collect the bike. After a few minutes of cheerful conversation during which the customer reiterates how pleased they are with their bike, the mechanic walks around to the front of the check-in desk, wheels the bike into the workshop area and puts it into the work stand.

Already, several literacy events have taken place, each drawing on different literacy practices and generating different artefacts. The initial phone call necessitated the use of the e-booking software, where the mechanic had to look up both the customer's service record and also read the workshop capacity reports, drawing on their professional and technical experience and expertise in order to estimate the amount of workshop time that would be required, before completing the required text boxes on the screen. Now that the bike has been dropped off, a different mechanic has to call up the prebooked job, confirm the arrival of the bike, and then complete and print a workshop jobsheet which includes a number of details: job number, customer details, item, schedule, time booked in, cost estimate and specific job instructions. An empty box at the bottom of the sheet allows for further handwritten notes to be made once the job is underway. A sticker is also printed off with the customer name, bike details, and drop-off and collection dates: this is stuck onto a cardboard tag which is then tied to the saddle. When the barcode at the top of the sticker is read by a handheld scanner, the customer record will open automatically. After the job has been completed, the work is priced up and another document, an invoice, is printed. The jobsheet and invoice are filed away together, ready for when the customer returns.

A bike repair is a practice that is inscribed in texts of different modalities. From the moment that the customer first telephones or emails the workshop to the moment that they wheel their bike out of the door, the trajectory of the bike, as an object travelling into and then out of the workshop, is accompanied by texts. Some of these are for information, so that the mechanics can match the bike to the owner to the jobsheet to the invoice. Others provoke specific practices: the examination of a specific part of the bike; the selection and use of a particular tool; or the installation of a specific replacement part or accessory. Sometimes, reading the jobsheet will invoke or require the use of more texts in turn: technical drawings showing the arrangement of a hub gear that is listed as faulty; or a video showing how to reassemble a specific unit; or handwriting some notes for the customer to record additional required work. On some occasions, the mechanical work will necessitate the use or

inscription of more texts: reading the packaging that a spare part was boxed in, that includes technical notes to indicate compatibility, often with a QR code to allow for further information to be accessed online; or the running of a diagnostic from an e-bike control unit in order to generate a diagnostic report that will in turn be printed off and given to the customer. These mediate the work of the workshop in a textual hierarchy (Barton 1994), some relying on others, some informing others, some requiring additional inscriptions from the mechanics, others acting as depositories of information, recording information that the mechanics, and perhaps customers as well, will need. They are paper-based and screen-based, image-rich and text-heavy, printed and handwritten, drawing on specialist terminology. They form a rich symbolic landscape, likewise reified within the other practices of The Bike Shop, whether in the textual practices required for selling a bike through the UK government Cycle To Work scheme, or in reading manufacturers' bike descriptions and specifications (either on manufacturers' websites or in hard-copy manuals produced for retailers) in order to find and adapt phrases that can be used for the product descriptions that appear on the labels hanging on bikes in the showrooms.

Vignette two: mending e-bikes. Wednesday 9 March and Friday 11 March 2022.

There's an e-bike frame in one of the workstands when I arrive on Friday, fixed at a 90 degree angle to the floor to allow access to the underside of the frame. The wheels have been removed, and so has the motor, axle, crank and pedal assembly. Alex the mechanic has carefully applied a coat of black paint to a small section of the otherwise dark blue frame. The customer, a 'very heavy user' (Alex's words), has again brought the bike in for service: it's 'always in a state'. In addition to the routine elements of the service, Alex quickly found that both the frame and the motor unit needed repairing: however, in order to keep costs down ('but it's a four thousand pound bike!') the customer did not want to pay for the frame to be returned to the manufacturer for repair. Fortunately, John – another mechanic – knows a motorcycle frame builder who was able to repair it. It was this part of the frame that Alex was painting when I arrived – the customer did not want to pay for a respray either.

As the paint dries, Jenny (retail) comes into the workshop with a small box and a workshop job special order jobsheet. It is a replacement motor unit for another e-bike that Alex had told me about on Wednesday. The motor unit on that e-bike had been damaged but Alex could not quite work out how: 'the customer swears he doesn't know – [either] he tried to mend something himself or got someone else to do something.' He's enthused by the arrival of the replacement motor unit, as is John. Alex unboxes the motor unit and starts to take out the components.

John: 'are you going to do that today? I'd like to see that.'

Alex: 'no, not enough time. I'm slightly excited about it though!'

“So what’s all this then?” asks Rob, the third mechanic at work today, as he comes over to watch Alex sorting through the different parts, slotting them together, moving them around, turning them around in his hands, generally getting to know them. Alex and Rob spend a few more minutes looking over the components before Alex gently boxes them back up, slotting them together into the packaging: “it’s exciting” he repeats, before turning back to the repaired e-bike frame and his tin of black paint. He applies another coat as Rob looks over the frame, appreciatively: “it’s just great”, he says. “Is this from new? Did we do this?” (The answers to these questions are ‘yes’ and ‘no’ respectively).

Alex: ‘I’m going to leave it now while it [the paint] hardens off.’

Rob: ‘All that work, and he won’t appreciate it. Any other bike shop . . . ’ and Rob leaves the rest of the sentiment unsaid, but the meaning is clear.

Alex puts his tools down, and he and Rob lean against the workbench, gazing at the e-bike frame in the way that you would gaze at a painting in a museum.

The workshop, as a Community of Practice (CoP), has three equal and inter-related dimensions of practice (Wenger 1998). There is the *shared repertoire* of tools, materials, discourses and so forth that the mechanics variously employ in their work. There is also the *mutual engagement* of the social relations of the mechanics – the members of the community – as they talk about their work and establish the ways in which their competence, experience and expertise are complementary or overlapping. And there is the *joint enterprise* of mutual accountability or responsibility, of activity that can be sometimes instrumental, sometimes fulfilling, and of work that is sometimes self-contained within the CoP and sometimes reliant on larger contexts. These elements of practice merge with each other. Sometimes an aspect of one can be unambiguously picked out – for example, a tool such as the allen key that Rob uses to tighten the bolts surrounding the newly-repaired part of the e-bike frame. But as he performs this task, he is also invariably involved in a conversation with one of the other mechanics, talking about this job, or the job that the other is engaged in, or where they might go cycling at the weekend, or how their children are doing at school. Alternatively, he might be remembering the previous work that he has done on this or a similar bike in the past and what he learned from that experience, or anticipating whether or not he will need some help with the next stage of the repair. The conversation might turn to the customer whose refusal to pay for the frame to be sent back to the manufacturer has led to the casting around for ideas about how the bike might be made roadworthy once again, a dilemma that was only resolved when another member of the community remembered that he knew somebody who worked in a different trade but who might be able to help. The workshop culture is generated not only through the explicit tasks, tools, bodies of expertise and materials involved in mending and servicing bikes, but also through the shared

understanding of and commitment to the work being done, the capacity to help each other out, drawing on competences and ways of knowing that fall both within and without The Bike Shop. The practice of the workshop community flows from handling of precision tools to experiential knowledge of workarounds to sharing expertise, from phoning the manufacturer to examining and interpreting an online schematic diagram, from sharing frustrations – with customers, with the directors, with suppliers whose deliveries are running late – to sharing an appreciative, aesthetic, perspective in relation to the work that they can do.

Vignette three: building a wheel. 15 April 2022.

In the workshop, Lloyd is in the midst of an extensive repair on a town bike – a full rewire, replacement axles, new chain guard, and – of particular interest to Lloyd and also to John who is also in the workshop today – a new rear wheel which Lloyd is going to build. In common with many Dutch-style town bikes, the rear wheel has internal hub gears, but the existing wheel has a now-obsolete hub gear and spare parts are unavailable. Building a wheel requires skill and care: the spokes have to be laced through the hub and into the rim following a particular pattern (there are several ways to do this depending on whether you are building for strength or for minimal wind resistance) and then brought up to tension in an even manner so that the tension of each spoke is consistent across the wheel as a whole. Otherwise, the wheel will not stay true. It is vital that the correct length of spoke is used (spoke sizes go up in one millimetre increments). Calculating spoke lengths requires knowing the different dimensions of the hub and the hub flanges, and the inner circumference of the rim. With these, Lloyd can use an online spoke length calculator (there are several) to do the required arithmetic. With the spoke length established, Lloyd starts to lace the first spokes through the holes in the hub flange, stopping momentarily to check that he is lacing them in the correct pattern and asking John to pass another wheel down to use as a reference point. He very quickly senses that something isn't quite right. The rim is a 36 hole rim, but the hub is a 32 hole hub. These are both common sizes for town bikes, and at first or even second look are hard to differentiate compared to a more specialist hub for a road racing bike. Lloyd goes to the workshop computer to see if there is a 32 hole rim that will match the rim on the front of the bike. I asked Lloyd why he didn't use a 36 hole hub instead. The answer was that because the 32 hole hub had been sent to The Bike Shop in error by the distributor, he could pass on the (not inconsiderable) saving to the customer. If he was to order in a 36 hole hub he would have to charge the full price: it's much cheaper for the customer to have the new rim instead. Lloyd, with an air of disappointment shared by John, puts the hub away for now and replaces the spokes in the correct boxes. The wheel build is going to have to wait: a new rim is going to have to be ordered.

An internal gear hub is an archetype of the technological being as described by Latour as [TEC]. It is an assemblage that in itself consists of a large number of smaller parts – pinions, clutches, gear rings, sprockets, drivers – that constitute 'the heterogeneous elements necessary for the maintenance of technological arrangements' (Latour 2013, 213). Conspicuously lower to maintain and also harder wearing in comparison to derailleur gears, the

complex internal workings are sealed inside the hub, entirely out of sight, and thereby literally embodying the notion that ‘technology, for its part, seeks to be forgotten [. . .] it likes to hide’ (ibid., 217). But it still needs to be maintained, and there are two parts to this. Firstly, there is the hub gear, which needs to be maintained. For example, the cable that connects the gear selector at the handlebars to the hub must be kept at the correct tension in order for the gears to shift correctly: if the cable is too slack, the gear shifting will be affected and the hub internals might be damaged. Secondly, there is the entire wheel that the hub has been built into. The maintenance of the hub relies on other components of the [TEC] mode – the gear selector, the cable, the cable assembly – as well as on people (the mechanics and/or the owner of the bike) to adjust the cable tension and observe the workings of the hub. The hub, notwithstanding its status as a [TEC] being, can only actually do anything once it has been built into a wheel [TEC] which is then built into a bike [TEC]. It exists as an assemblage of smaller elements but in turn can only function – indeed is only imagined and then evolved to function – as a smaller element itself within a more complex object.

“That will make a huge difference to how the bike feels.” Tools, paperwork, and workarounds: what are the cultures and materialities of the workshop?

The Bike Shop is a sociotechnological and cultural location within which a heterogeneous range of practices are followed, learned/acquired, discussed, demonstrated, and embodied. These all gravitate around a core of activities that we might define in terms of the craftwork of cycle mechanics (Martin 2016): the repairs, the workarounds, the discussions and mutual problem-solving, sometimes expressed in words and at other times through actions. The mechanics embody as well as articulate their craft within a specific social context (Winch 2010). Throughout the working day, an order of sorts to the flow of work is established through texts of different kinds: job sheets, invoices, emails, and handwritten notes (Defoe 2004). Themes such as these are well-established in ethnographic and/or anthropological studies of workplaces ranging from building conservation (Brett, Thomson, and Dainty 2022) to woodworking (Marchand 2010). Such accounts provide insights into the craft and expertise that is enfolded or reified within the work of the social actors in question, but seldom look beyond the boundaries – whether institutional, geographical, and/or discursive – of the social contexts in question. By contrast, and mindful of the fact that no Community of Practice rests on a purely indigenous culture (Wenger 1998) we have to account for those things that the practices of the workshop rely on but that are not internal to it, in order to make sense of the workshop as a CoP.

My argument here is that there is no straightforwardly identifiable border between the workshop CoP and any other communities that might impact on it: here, the limitations of Wenger's framework come to the fore. Instead, I draw on Latour's notion that 'a border indicates less a dividing line between two homogeneous sets than an intensification of crossborder traffic' (2013, 30). In this way, the cultures and materialities of the workshop necessarily rely on the status of the workshop, and of The Bike Shop as a whole, as a sociotechnological and cultural space that is located within a heterogeneous network of other analogous spaces and configurations. Or, to put it another way, the workshop can *simultaneously* be constructed as both a Community of Practice (Wenger 1998) – that is, as a specific situated environment within which particular kinds of learning happen through practice (including textual practices, exemplified by the New Literacy Studies (Barton 1994)) – and *also* as a socio-technological network which following Latour's method of notation for the AIME project is designated as [TEC-NET] (Latour 2013) – that is, as a dynamic network of human and non-human actors that is in a constant process of ordering.

With this theoretical mosaic in place, the practices of the workshop can begin to be explicated in all of their complexity, reconciling the specificities of the local or indigenous with the impulses of the global or external. Thus, the literacy events and practices outlined in vignette one range from the local to the global. The local includes the specific literacy texts generated within the workshop using the forms and procedures that the directors of The Bike Shop have installed and modified over time such as the jobsheets used to book in each bike that comes in for repair, a process that reifies the translation of a customer's bike as a vehicle for transport and/or leisure into an object for inquiry, repair, and evaluation. The global is exemplified by the paperwork that accompanies bike orders made through the UK government Cycle To Work scheme, or the text and images related to correct bike assembly and sizing that appear on bike boxes for bikes that were manufactured in Asia for a US-based company, and have been delivered to The Bike Shop on the back of a lorry.

The e-bike repairs outlined in vignette two illustrate the craft expertise of the mechanics in the workshop, but also the ethos and philosophy of The Bike Shop, exemplified in not only the work needed in order to find a way for the required repairs to be made (which required external expertise) but also the aesthetic appreciation of the bike being repaired. The local craft expertise of the mechanics could only be activated or brought into action after the enrolment of an external body of craft expertise (that of the frame builder who did the frame repair) and after the delivery of the replacement motor unit – a specific technological object [TEC] – that, alongside the e-bike as a whole, was appraised by the mechanics from not only a mechanical or craft perspective (as a well-designed component for a well-

designed bike) but also from an aesthetic perspective (as an elegantly-designed bike that marries form and function), with the mechanics pointing out to each other those features or design aspects that they found to be the most pleasing (Latour 2005; Sabeti 2018).

The wheel building discussed in vignette three illustrates a different aspect of the ethos of The Bike Shop at work, in this instance a consideration for keeping costs down for a customer, that nonetheless relies on not only the cultural practices of the workshop (the decision by the mechanic to go about the wheel build in such a way as to pass on savings to the customer) but also on an external factor (a distributor sending a hub gear in error, and then operating a policy of allowing The Bike Shop to keep the hub as it would be more costly for the distributor to retrieve it than to simply let The Bike Shop keep it). At the same time, wheel building is a paradigmatic example of the craft of being a cycle mechanic: it is not something that all mechanics can do, and this is reflected in the fact that wheel building forms a specialist component within the curriculum for the CyTech qualifications discussed above. Nor does wheel building rely solely on mechanical skills: it also requires highly contextualised or situated numeracy practices (Lave 1988; Yasukawa et al. 2018) that involve specific tools or artefacts. In this instance, the practices involve taking measurements from the hub as well as the rim so that the correct spoke length can be calculated, using both more universal artefacts (a calculator, pencil and paper, a vernier gauge) as well as highly specific artefacts found only in cycle workshops (a spoke calculator, a ‘Spoke-Calc’ wallchart, and a pair of Effective Rim Diameter (ERD) measuring tools). All of these are instantiated in order to bring a new technological object [TEC] into being – a bicycle wheel – which itself provides the milieu for another [TEC] being, namely the hub gear at the centre (Latour 2013).

“You can be nice if you like.” Networks, technologies, practice, and the entangled worlds of the bike shop

There is a rich tradition of ethnographic research in education, ranging from studies of secondary schooling to studies of workplace learning, based on periods of immersive research ranging from just several weeks to over several years. In recent years, it has become more difficult to attract funding for long-term ethnographies, and the research community has responded in several ways. Shorter-term ‘rapid’ ethnographies and ‘intermittent’ ethnographies allow for more flexibility in how ethnographers engage with their chosen sites and as such when considered alongside longer-term projects such as that discussed here (the fieldwork lasted nine months in total), the ongoing value of the ethnographic research paradigm based on participant observation as a vehicle for the in-depth exploration of the practices and

cultures of learning is self-evident, although obtaining consent can be a time-consuming process and the emergent nature of ethnography is not always straightforward for ethics panels to appreciate (Beach, Bagley, and Marques da Silva 2018; Russell, Barley, and Tummons 2022). Rapid and intermittent ethnographies are, arguably, perfectly positioned to allow for ethnographic research alongside the teaching and administrative workloads that have been characteristic of not only further education colleges since incorporation but also universities in a period of massification. Indeed, at the time of writing I have yet to complete the analysis of all of the data due to my own teaching and administrative as well as other writing and research commitments.

The Bike Shop is a rich, colourful environment, replete with signs, practices, objects, photographs, discourses, tools, habits, and people that reify its cultures and its practices. The workshop (the specific focus for this paper) is brought into being and then sustained by a complex network of technological objects (the bikes themselves, of course, but also tools, spare parts, components, computers, and so forth), of people (the mechanics, the retail staff who require mechanical work to be done, manufacturing company representatives, customers, and so forth), and of routines, habits, and dispositions (craft-based evaluations and problem-solving, aesthetic appraisals of technological objects, an ethic of customer care, and so forth). It is characterised by a heterogeneous array of practices centred around the work of being a cycle mechanic whilst also resting on other kinds of work that, at first look, are nothing to do with being a cycle mechanic in terms of craft technical expertise or know-how. Building a bicycle wheel or replacing an e-bike motor unit are both conspicuous elements of this body of craft knowledge, entangled within networks of tools, resources, websites, and so forth. And yet both of these can only be brought into being through other practices, invoking other resources, tools, habits and so forth, that are not straightforwardly about cycle mechanic craft expertise at all. Being nice to a customer (not charging for a quick and easy repair) reflects the culture of the shop rather than the culture of cycle mechanics *per se*. Finding a mechanic who can complete a frame repair at a price acceptable to the customer reflects the subjective experiential knowledge of one of the mechanics in The Bike Shop, not a more formalised relationship between shop and manufacturer.

In order to make sense of what goes in within a specific milieu such as a bike shop it is necessary to question the extent to which the milieu in question is indeed specific, or bounded, in any way other than having been designated as such (for example, within a proposal for a research project.) The theoretical mosaic employed here illustrates the ways in which different conceptual lenses can be simultaneously used to observe a sociotechnological cultural space that at first look is tightly bound but,

through inquiry, is revealed to be tied to other, ‘outside’ or global materialities, cultures and practices in such a way that the indigenous or local can only be made sense of through an exploration of the outside in a manner analogous to the ways in which the work of the mechanics – the human social actors – can only be made sense of in relation to the work of the tools, materials, and components around them – the non-human social actors. Through employing a theoretical mosaic of different conceptual tools that are not only epistemologically and ontologically sympathetic to each other but also methodologically aligned in terms of the construction of empirical data through ethnographic work, it is possible to keep in view both the local site that is characteristic of anthropological ethnography and also the wider networks of the social within which the local site is embedded.

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ORCID

Jonathan Tummons  <http://orcid.org/0000-0002-1372-3799>

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