Rethinking Affordances:

Three Stories about the (Non-)Adoption of Digital Technologies

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Introduction

The challenge of theorising the use of newer forms of digital technology provides opportunities to examine specific conceptualisations to explore whether they can be developed. One such is the notion of 'affordances', which Treem & Leonardi (2012) used to characterise five forms of social media. This concept is examined here to explain the manner of use of similar technologies within a small voluntary-based organisation. These types of organisations are unlike other forms of organisations (e.g. private sector) in that technology users are volunteers and as such, need not be compliant to the desires to those managing these organisations. A quasi-ethnographic approach has been adopted to provide a rich qualitative insight into users of ICTs within a swimming club that has voluntary status. The evaluation of the limited manner of ICT usage using the concept of affordances reveals the need to consider the broader context of usage to appreciate the possibilities offered and why certain practices make sense to the user contrary to what might be expected.

This paper organised as follows. It commences with an overview of the concepts being considered. A brief outline of the approach to the study is then presented. Following a brief introduction to the organisation, there are three micro-cases detailing practices are described. The paper finishes with a discussion and conclusion.

Sociomateriality as Emerging Paradigm

The manners in which such technologies transform organisational life have attracted much interest. Whilst there has been much 'to-ing-and-fro-ing' between under-socialising and over-socialising conceptions of technologies one of the central questions is whether technological artefacts matter. Recent developments within sociology of organisations appear to welcome

the matter-ness of technical properties of technological artefacts while not being trapped in deterministic accounts of technology. The underpinning concept, 'Sociomateriality' (Orlikowski, 2007; Leonardi and Barely 2008) accepts socio-economic grounds of technology (re-)construction and use while highlighting the (relatively-ignored) material flavours of day-to-day practices. While the concept is new, it recalls and puts together some other past efforts to build its core argument. In this sense, the concept of 'affordances', initially introduced by ecological physiologist James Gibson (1979), has been gained growing attractions from researchers to theorise material grounds of either work or daily activities associated with a specific kind or set of technological artefacts (e.g. Leonardi 2011; Zammuto et al. 2007; Pipek et al. 2011).

Rethinking Affordances: Broadening its Relational Nature

By nominalising the term from verb 'to afford', Gibson was seeking to describe and conceptualise action possibilities which are provided by a given environment (including artificial ones) to an animal (including human ones). 'Affordances' here therefore refers to the co-existence of subjectivity and objectivity of dynamics in the ecology of the observer and the environment.

Within sociology of technology, this notion has been developed by Hutchby (2001) to deal with social deterministic view of 'technology as text'. He argues that materiality does "set some limits on what is possible to do with, around, or via the artefact" (p. 453).

Huychby's use of Gibsonian affordances enables us to understand action possibilities which an object offers to an individual by going beyond insufficient studies on representation and negotiation. When it comes to understand the interplays between 'the social' and 'the technical' in the course of using an artefact by a person, we need to think about "the use-in-situated-social-interaction of technological devices: specifically, those used in the mediation of human interpersonal communication" (Hutchby 2003, p.582) to simultaneously take into account both technologies-and-users.

By discussing some 'material substratum' of why a user was not able to connect a printer to a new machine, his affordances-based perspective goes beyond of the limited conceptualisation of the computer 'as a text', which the observed user could not read that text just because of her previous interpretation of what a 'typical' computer is.

Despite warm-welcoming to the notion of affordances by organisational scholars, the original Gibsonian conceptualisation of the concept seems to be problematic in capturing the bricolage

essence (Ciborra 1992) of sociomaterial practices. “Today, the most nuanced writings on the relationship between technology and organizational change emphasize the *relational* character of affordances” (Treem and Leonardi 2012, p.146; emphasis added). There are some, mostly implicit, modifications to the original notion of affordances by organisational and technology researchers to make it a workable concept in order to explain on-going sociomaterial practices (re-)constructed by ‘human-actors-and-technological-artefacts’.

Among these modifications, Bloomfield and his colleagues (2010) brings into question narrowed-conceptualisation of affordances with regard to sociological accounts. Broadening Hutchby’s conceptualisation, they used the notion of “counterfactual structures” to highlight what others called ‘relational nature’ of affordances. Their main contribution is the incorporating of the time element in conceptualising ‘affordances’. They argue that we “need to better acknowledge what lies beyond the here-and-now timeframe adopted by most analyses conducted in terms of affordances” (p. 428).

Taking another research focus, Jarrahi and Sawyer (2013) develop this notion through considering the role of other alternative technologies. The affordances of a specific technology could be transformed with its “competitors”.

Such efforts call for a departure from immediate concept of affordances to the one which emphasize its relationality to capture the dynamics of other social and material entities around ‘actor-artefact’ interplays.

Methodology and the Case

A quasi-ethnographic approach is adopted, whereby a mix of interviews, observation and secondary-data were used to understand practices. Data was collected using a variety of techniques including the recording of interviews and filming of practices. This provided a rich appreciation of ICT-related practices within-and-around the swimming-club. Data-analysis includes the coding of interviews.

A leading swimming-club which operates on a non-profit basis has been examined to analyse ‘ICT practices within smaller voluntary organisations’. The club is managed by a Management Committee and several professional coaching-staff. Also, its operations are widely supported by various volunteering-resources, mostly swimmers' parents. Volunteers may take some occasional-jobs such as timekeeping or marshalling-swimmers or they can get involved in more formal positions like pool-hiring and fund-raising activities. Those

volunteer in more long-term jobs have usually some kind of direct-and-constant communication with the staff.

The club is planning “IT Refreshment” as unlike the club's impressive successful in delivering swimming training services, it has experienced some difficulties to use ICT to minimise time-consuming manual works and thus human-errors. This was seemed similar story within many SMEs (e.g. Ritchie and Brindley 2005), however, what makes this case quite different is that its operation is widely associated with 'coming-and-going' volunteers. Therefore, at the early stages of the fieldwork, it has been confirmed there is no or less clear standard and strategy for current and future IT-related jobs. In an interview with the coach, the coach commented:

> *“I have a system I use for my documents ... Liza [a pool-hiring volunteer] has her own system which she uses, ... but we don't check to see if we have the same ... and Kayle has no system [laughing]”*

The Committee's vision to expand the club's operational area has brought to their attention that a mismatch between the club's activities and IT-supported solutions could bring their future success into the question. A former member of the Committee noted:

> *“... the current club's IT system was designed some years ago ... we go to improve the club's functional system ... things should go more on-line”*

However, it was noted that the digital technologies were used in different locations such as ‘beside-the-pool’, ‘volunteers’ home-offices’ and ‘the club’s less-used office’.

Three Stories

Three different stories describing different ICT-related experience are presented of the (non)use of technologies in order to advance the notion of affordances. These provide examples of users exploiting technologies in ways not necessarily anticipated or self-evident as ‘convenient’.

First Screen: Liza, Spreadsheets and Google-Docs

Liza is a swimmer's parent whose long-term volunteering job in the club is to manage pools which the club hires for either training or competition sessions. The club uses sixteen

different pools and at the beginning of each year, the Head Coach provides an annual 'Training Schedule' which is the main basis for pool-hiring. However, from time to time, there might be some cancellations of the weekly programme; from either pool side (e.g. technical problem) or the club side (e.g. coach decision). Liza is in contact with all pool managers, the Head Coach, a member of the Committee and the club's treasurer. Her main job is to hire the pools as well as to keep a detailed record of the cancellations for budgeting purposes. She has made a number of complicated spreadsheets in order to make sure that nothing is missing. However, she needs to pass information from a person to person until all necessary parts get filled and that task gets competed. As email is main communication medium to exchange related files and information, she realised that massive email exchanges not only have increased the time needed to complete a process, but also have resulted to many errors. So, she decided to set-up an Google-Docs project, which presumably gives people a chance to work with just one copy of the document which that itself is held on the server. The project, however, failed in a short period of time and people came back to email-dominated and paper-supported system to complete pool-hiring processes.

Second Screen: Nanda, eMail and Doodle

Nanda is another swimmer's parent whose job tends to be occasional and less-engaging with the club's staff. She is a Squad Administrator and her responsibilities are to facilitate the communications between parents and the squad's coach. One of her main jobs is to record swimmer's availabilities for competition sessions and send the final list to the squad coach. Usually volunteers use an email or phone to generate that list, but Nanda has set up a Doodle project. This cloud-based service gives parents a chance to directly select their child available slots for a specific competition. For each round, it reduces around 25 'confusing' emails which Nanda used to receive beforehand: when she makes Doodle page, send the link through one email to parents and when the results come back, she lets the coach know which slots is the best and who would attend.

Third Screen: Flora and MeetMnR

Flora is one of the Committee member as well as Swimming Convenor of the club which works there as a full time staff. When the squad admins (like Nanda) send swimmer's availabilities to the coaches, they allocate each swimmers to a specific group based on the swimmers' capability. When they produce their own list, it is supposed that they log-in to the club's main packaged software (MeetMnR) and allocate their own squad available

swimmers to the upcoming competition event. However, the current practice is that all coaches send their own list via an email to Flora and then Flora's husband, on behalf of her, enters those data to the MeetMnR (Image1). The coaches say that as MeetMnR doesn't let them to be logged-in anytime, we cannot wait and randomly try when it becomes free. MeetMnR uses a server-based database, but when an individual loges into the system, it works just as 'read-only' which others cannot change anything until that person complete his or her task. While there might be other implicit reasons for not using the system by the coaches, it seems this 'Single Log-In' feature has a major effect on Flora's failure story of using the system to reduce her email-based activities.

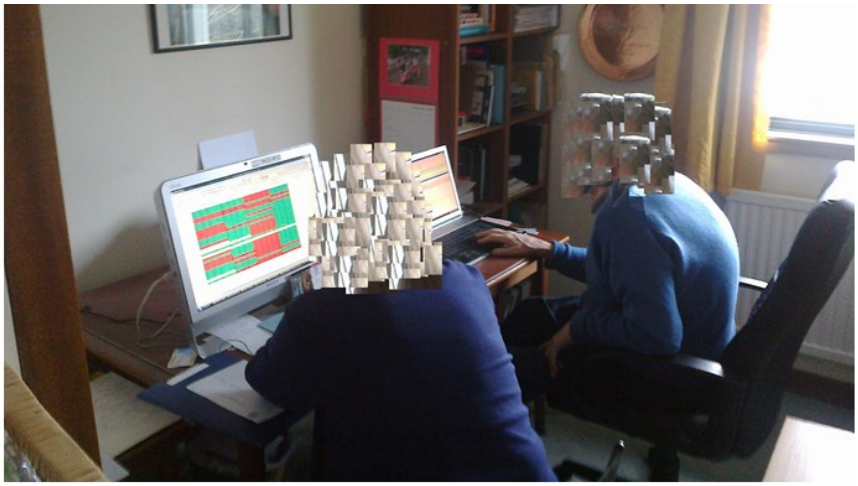

Image1: Flora and her Husband: Entering the Received Information to MeetMnR

Making Sense of the Stories

Within these three IT adoption stories, the notion of affordances provides an interesting unpacking of the actions relating to Google-Docs and Doodle initiatives as well as the MeetMnR system. These three IT applications all have some level of collaborative characteristics. By transforming social interactions within organisational behaviour (Hath et al. 2000), digital technologies can facilitate information flows and collaborative communications among organisational actors within and around the organisation. Two characteristics ("Log-In Feature" and "Network Type") are revealed to explain why the IT-enabled projects have had unanticipated consequences in both first and last stories.

'Log-In Feature' and 'Network Type'

Both Google-Docs and Doodle offer users to simultaneously 'log-in' and make any change they want. However, for MeetMnR, while the system uses 'server-based database', if person X

get 'logged-in', this limits others' possibilities for use to 'read-only'. Thus, to make their changes they need wait to person X saved their changes and log-out. The 'multiple log-in' feature pushes the boundaries of 'action possibilities'' for the users. This 'material ground' is a reason for the on-going adoption of Doodle while 'single log-in' technical disadvantage of MeetMnR has massively contributed to the non-adoption of the system which supposed to generate a 'collaborative' final competition-list by the coaches.

Similarly to Doodle, Google-Docs application also offers multiple log-in possibilities which encourage its users to not care when they can get logged-in and use the system. Considering the Liza's story of Google-Docs, we flesh out how advanced functionality of Google-Docs had less effect to transform organising practices. Using ideas of task-oriented groups within classic organisational communication theories (Bavelas 1950; Leavitt 1951), we argue that the pattern of the social interactions influences how a task gets completed.

Liza's experience reveals a 'Circle' type characterised by a one-way work-related information flow within her group of associates. In the cases of Nanda and Flora, while information flows in one direction (from associates to her), the 'network type' tends to be as 'Star'. Both Nanda's and Liza's ICT-enabled solutions were using a 'multiple log-in' service. However, the 'Circle-Type' of Liza's group-work and its associated processual task contributed to discontinued use. Both Liza and Nanda had one or more people who were not happy with the 'new way'. The 'Star-Type' of Nanda's job offers her the possibility of on-going use even if a person exits from the network, the others' information will be received without any interruption. However, the processual nature of the Liza's job (and its associated Circle-Type group) will bring into the question the capability of Google-Docs if one person in the chain rejects to adopt the initiative. Figure1 summarises these three stories.

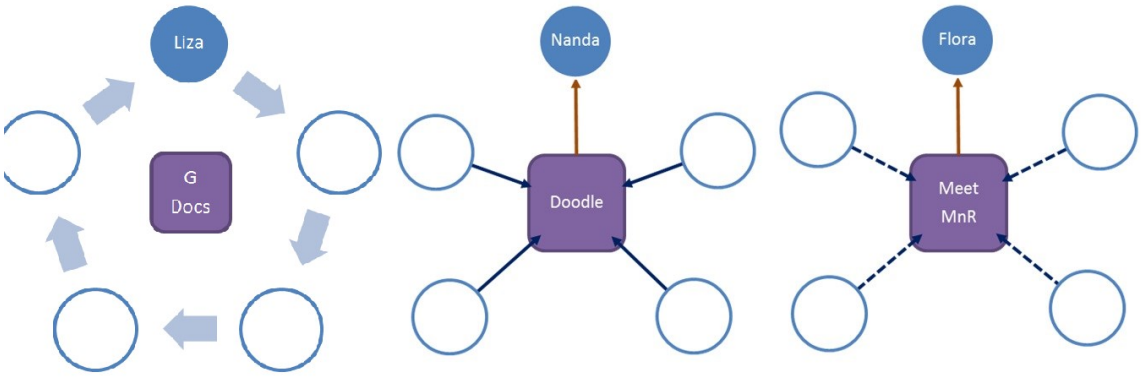

Figure1: Network Types

The computer supported initiatives which the club's members-- Liza, Nanda and Flora-- have undergone ended up with different results. The concept of Sociomateriality, supported by the notion of affordances, generates valuable insights into unpacking sociomaterial grounds of such diverse outcomes. This case indicates that the successful adoption of a digital technology is not neither a mere social issue nor material issue: The *Network Type* as (social) work-related element and *Log-In Feature* as technical property have been illustrated in this research as examples of complex sociomaterial assemblage around a specific practice.

Table1 shows that while Google-Docs offers simultaneous work on a document for Liza's network, however, the processual nature of the job which should be done, mediates the materiality of such cloud-based service. On the other hand, while the each unit of information which should be collected by Nanda and Flora to finish the task are independent from each others, the MeetMnR dysfunctionality of single log-in capabilities narrow the possible actions for Flora's group member. Doodle, in contrast, provides a space to let all independent piece of information are collected from Star Type group.

		Liza	**Nanda**	**Flora**
Dimension of Relational Affordances	Log-In Feature *(Possibility of Simultaneous Use)*	Multiple *(YES)*	Multiple *(YES)*	Single *(NO)*
	Network Type *(Flow of Information)*	Circle *(Processual)*	Star *(Modular)*	Star *(Modular)*

Table1: Two Observed Characteristics of Relational Affordances

Concluding Remarks: Type, Time, Technologies and more!

To advance the applicability of the notion of affordances for the sake of technology-mediated (organisational) interactions, we need to go beyond talking about of an actor encountering an artefact. "The affordances of technological objects are typically interfered with, and modulated by ... 'co-presence' ... of other social actors and other objects" (Bloomfield et al. 2010, p.420).

Highlighting its relational characteristic of technology affordances, recent developments within sociological studies on technological objects have made some modification to the immediate and static understanding of the notion by asking about "when" and "what other technologies". This research in particular flags on the issue of "which type" of group and its associated kind(s) of information flows within. It explains why certain practices make sense to the user contrary to what might be expected.

References

Bavelas, A., 1950. Communication patterns in task-oriented groups D. Lerner & H. D. Lasswell, eds. *Journal of the Acoustical Society of America*, 22(6), pp.725–730.

Bloomfield, B.P., Latham, Y. & Vurdubakis, T., 2010. Bodies, Technologies and Action Possibilities. *Sociology The Journal Of The British Sociological Association*, 44(3), pp.415–433.

Ciborra, C.U., 1992. From thinking to tinkering: The grassroots of strategic information systems. *The Information Society*, 8(4), pp.297–309.

Gibson, J.J., 1979. *The Ecological Approach to Visual Perception* C. University, ed., Houghton Mifflin.

Heath, C., Knoblauch, H. & Luff, P., 2004. Tools, technologies and organizational interaction: The emergence of "workplace studies". In D. Grant, ed. London ;;Thousand Oaks Calif.: SAGE Publications.

Hutchby, I., 2003. Affordances and the Analysis of Technologically Mediated Interaction: A Response to Brian Rappert. *Sociology*, 37(3), pp.581–589.

Hutchby, I., 2001. Technologies, Texts and Affordances. *Sociology*, 35(2), pp.441–456.

Jarrahi, M.H. & Sawyer, S., 2012. Social Technologies, Informal Knowledge Practices, and the Enterprise. *Journal of Organizational Computing and Electronic Commerce*, p.121115075642003.

Leavitt, H.J., 1951. Some effects of certain communication patterns on group performance. *Journal of Abnormal and Social Psychology*, 46(1), pp.38–50.

Leonardi, P. & Barley, S., 2008. Materiality and change: Challenges to building better theory about technology and organizing. *Information and Organization*, 18(3), pp.159–176.

Leonardi, P. M. 2011. When flexible routines meet flexible technologies: Affordance, constraint, and the imbrication of human and material agencies. *MIS Quarterly* 35(1), pp.147–167.

Orlikowski, W.J., 2007. Sociomaterial Practices: Exploring Technology at Work. *Organization Studies*, 28(9), pp.1435–1448.

Pipek, V., Wulf, V. & Johri, A., 2011. Bridging Artifacts and Actors: Expertise Sharing in Organizational Ecosystems. *Computer Supported Cooperative Work (CSCW)*, 21(2-3), pp.261–282.

Ritchie, B. & Brindley, C., 2005. ICT adoption by SMEs: implications for relationships and management. *New Technology, Work and Employment*, 20(3), pp.205–217.

Treem, J.W. & Leonardi, P.M., 2012. Social Media Use in Organizations: Exploring the Affordances of Visibility, Editability, Persistence, and Association. In *Communication Yearbook 36*. Routledge, pp. 143–189.

Zammuto, R.F. et al., 2007. Information Technology and the Changing Fabric of Organization. *Organization Science*, 18(5), pp.749–762.