Dear Diary: Recommendations for Researching Knowledge Transfer of the Complex

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Abstract: A rich-picture can unfold itself to the researcher who engages management practitioners as research participants in the task of qualitative, open-ended diary-writing while also 'feeding' the participant with reading material to consider and reflect on in the diary itself. The particular work referred to in this paper is the result of a three year long research project, from 2002-2005, where 13 research participants were, in such a vein, asked to write a weekly work-based diary over the course of a year – a goal which some met and others did not. The three year study sought to find out how individual managers demonstrated making sense and learning using complexity science principles in work-focussed diaries. A key insight derived offers a way forward for future research on the topic of knowledge transfer of the complex by means of diaries as a qualitative research data collection tool in conjunction with ongoing, qualitatively rich interactions between researcher and research participant.

The use of diaries by researchers shows their versatility as a research tool. Diaries have been used by researchers in the evaluation and interpretation of the practice of teaching, training and learning, in the study of meaning and emotions over time, in investigations into workers' and management's responses to change and uncertainty, to conduct research into personal relationships, in addition to the subject of personal identity and life transition, health, and the study of diaries themselves. The domain of complexity science provides thought-provoking material that both challenges and complements perspectives of day-to-day work, thinking, and life. The ways in which people contextualise complexity science principles and other complexity science material in their work differs from case to case. While the extant literature conveyed value in making sense of experiences in working life with complexity science, there was a lack of grass-roots practical evidence from the field provided in the literature. The use of the diary as a research tool was considered invaluable in the study undertaken and insights suggest the value of the diary in researching knowledge transfer of the complex in general. The underpinning literature, the method followed, highlights of the findings, and an overview of conclusions and implications for practice and future research are provided.

Keywords: qualitative diaries; knowledge transfer; complexity; research.

1. Background

The research underpinning this paper was concerned with the ways in which people integrate complexity science principles into the rubric of their work-related reflection, learning and sensemaking and how that was brought to the foreground by the means of qualitative diaries. The domain of complexity science provides thought-provoking material that both challenges and complements perspectives of day-to-day work, thinking, and life. Complexity science principles such as self-organisation and emergence, for instance, question fundamental issues such as leadership, organisational behaviour, and hierarchical structures, while unpredictability, history and time set the scene for debates concerning certainty, strategy, and task management. Principles such as the edge of chaos, diversity, and pattern recognition also provide additional perspectives from which to consider and understand problems, in addition to providing stimulus for creative activities and opportunity recognition. The ways in which people contextualise these principles and other complexity science material in their work differs from case to case. Yet similarities between cases indicate that overall, as suggested by the literature, there is intrinsic value in the process in varying modes of application.

The literature conveys value in making sense of experiences in working life with complexity science, as found for example in the work of Lissack (1999; 1997), and Stacey (2000; 2001; 2003a; 2003b). In light of this work, the research study embarked on a consideration of data collected around a method of research that facilitated individuals to reflect on complexity science to greater and lesser degrees in the context of their own working lives, by means of a work-focussed diary. The need for this research to be carried out in this manner, while being inspired through many early discussions with practitioners and academics alike in the context of seminars and workshops, was identified through a review of the literature. Literature reviewed encompassed the domains of complexity science, sense-making and learning (including organisational learning, the learning organisation, and individual learning), and, diaries.

A critical consideration of this literature identified highly relevant issues that needed to be addressed, including a lack of: Research conducted over a longer period of time, for example, approximating a year or more; Data collection methods aiming to capture the personal reflections, narrative musings or theoretical

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abstractions on such issues as lived experiences in local situations which pay attention to the diversity of relationships in an ongoing way; Depth beyond the first person anecdotal level in presentation of research; Research that supports the data collection of many first person accounts, where the many research participants involved can be seen to be using complexity science (or not) in order to make sense of their day-to-day working lives; Data collection enabling multiple research participants to tell stories from their own perspective, in order to explore the extent to which complexity science can be integrated in the way these participants make sense and learn in the context of their working experiences; A more detailed research path which would link the data collection methods with the current state of the art in sense-making and learning relevant to working-life; Research that adds empirical value to the current domain, in order to broaden our understanding further and both question and support the theories propounded, and to suggest points of integration with sense-making and learning activities.

A critical reflection on the literature pertaining to *sense-making and learning* and *diaries* was also undertaken. While the literature as a whole asserted value in making sense of day-to-day working experiences by means of complexity science, little empirical, qualitative research had been carried out to explore the different ways in which individuals may do this and how. It was judged that, in spite of the inherent limitations of the tool used in a research context, a work-focussed diary would be a good way to investigate this. It was from this starting point that the precise aim and objectives of the research, along with the chief research question, were derived. The overall aim of the research was thus defined to explore the ways in which individuals made sense of their working lives and activities by means of complexity science, as evidenced in work-focussed diaries.

2. Method followed

Having defined the aim of the research, a pilot study was initiated with two research participants to trial the use of a diary in the context described above. Following this, eleven further research participants were recruited to take part in the full study. The arch research objectives being: To initiate and maintain a process by which to conduct research that would facilitate data collection on the ways people make sense of their working lives by means of complexity science; To explore how people relate complexity science to their working lives in order to articulate more fully the value perceived in this area; From the data collected, and in the context of the study, to conceptualise the way people make sense of their working lives by means of complexity science. The overarching research question the study focussed on therefore became: *How do individuals make sense of their working lives and activities by means of complexity science, as evidenced in work-focussed diaries**?***

In order to meet the research aim, objectives, and answer the research question, the research strategy followed was exploratory. A qualitative, hybrid approach was adopted that suited the research situation in terms of its participants, the researcher, the topic in question, and the grounded theory and constructivist grounded theory approaches aspired to. The interpretive paradigm guiding the action undertaken within the context of this research assumed epistemological premises of subjective, postmodern, humanist perspectives, and an ontological position of relativist, constructivist co-creation. A path of inductive, qualitative research was undertaken in this study, which was predominantly exploratory in nature, with an element of description.

In the first instance, the pilot study was embarked upon to trial the diary method, and initial ideas concerning research methods were tested and refined. This stage of the research focused on the use of diaries by research participants as a tool by which to record and capture relevant data pertaining to their making sense of their working lives and in tandem considering and integrating comments on complexity science. This then led to the roll-out of the research method and recruitment of eleven more research participants. Throughout these stages of the research, the emerging findings helped to refine subsequent stages and iterations of the literature review. The exploratory nature of the research enabled the derivation of themes grounded in the emerging data.

The research was loosely inspired by the survey approach and utilised data collection methods commonly associated with surveys, i.e. interviews and diaries. A hybrid interview style was adopted in which elements of the different styles of semi-structured, unstructured, ethnographic, depth, intensive, and creative interviews were applied. Diaries were utilised in an open-ended format and an interactive style of ongoing research. Thirteen individuals volunteered to write weekly, work-focussed diaries, with the intention of continuing for one year: a goal which some met, but some did not. In this period, participants were also

emailed text-based extracts on management theory relating to the use of diaries and on the subject of complexity science (see table below) and were asked to make comments relating to these in their diary.

Table 1: List of reading materials sent to diarists

Item	General Theme	Source
1	Qualitative research diaries, style and format	Symon, G. (1998), pp. 94-117.
2	Introductory notes on complexity science	Lewin, R. (1999).
3a	Notes on a professional diary journey	Page, T. (1996).
3b	The termite mound; complex adaptive systems theory and key principles	Pascale, R. T., Millemann, M., and Gioja, L. (2000).
4	Further detail on complex adaptive systems (CAS) theory and how CAS are studied	Stacey, R. D. (2003), pp237-240
5	An image of a man looking into his own reflection in a glass ball	Escher
6	Self-organisation and emergence	Webb, C., Wohlfart, L., Wunram, M., and Ziv, A. (Eds.) (2004),
7	The edge of chaos	
8	Diversity	
9	Historicity and time	
10	Unpredictability and the future	
11	Pattern recognition	

Prior to embarking on the diary-writing exercise, participants were asked to take part in an interview, to establish the context of their own personal background in addition to their interests and motivations for taking part. Interviews were mostly face-to-face and mainly included the use of general, broad, and open-ended questions, in addition to closed-ended question probes in order to seek clarification. These interviews were held on different occasions, at the convenience of the research participant, in the period between Sept03 and Jul04.

Once the diaries had been started they were sent and communicated about with participants, by email on a regular basis during the period May03 - Dec04. It was agreed that a diary reminder would be sent by email to participants on Fridays – if and when possible, and that written or graphic material would be sent by email on an irregular basis, giving the possibility for writers to reflect and comment on this material in their diary somehow, or not. The material chosen to send to diarists was selected based on my own learning ‘journey’ into complexity science and while some were extracts from books and papers I considered for early stages of the literature review, 6 pieces of writing were also written and used as introductory material to complexity science in the context of the European project I was working on at the time. This material has since been incorporated into the development and delivery of an EPSRC funded PhD research student short course on complexity science for beginners in addition to a further set of training materials on another EU funded project. Although participants were asked to send their diary on a weekly basis, they were given the freedom to choose the length, style and content of their diary, and the frequency at which they made entries in it over the course of any given week. The scope they were given to write about was 'anything they felt significant about their daily working lives and activities, the people and processes they interacted with'. The table below provides an overview of the background of the diary study research participants

Table 2: Overview of diary study research participants' backgrounds

Diarist	Age	M/F	Nationality	Occupation	Location	Native Language	Edu. Level Attained
A	33	F	Irish	Artist	London UK	English	Masters Degree
B	36	F	British	Civil Servant	London UK	English	Postgrad' Qual.
C	45	M	Irish	Consultant	UK (North)	English	Masters Degree
D	28	F	British	Artist	Bristol UK	English	Undergrad' Degree
E	38	M	Dutch	Consultant	UK (SEast)	Dutch	Masters Degree
F	22	F	British	Artist	Glasgow UK	English	Undergrad' Degree
G	34	M	Swiss	Network Manager	Switzerland	French	Masters Degree
H	26	F	Portuguese	Innovation Consultant	Barcelona Spain	Portuguese	Masters Degree
I	24	F	British	Artist	E Yorkshire UK	English	Undergrad' Degree
J	32	F	British	Artist	Sheffield UK	English	Masters Degree
K	21	M	British	Artist	Warwick UK	English	Undergrad' Degree
L	43	M	American	MD (software company)	Hong Kong	English	Doctorate
M	36	M	Austrian	Network Facilitator	Vienna Austria	German	Doctorate

Data generated by the pre-diary interviews as well as the diary study were handled in the same way. Guidelines for carrying out research based on a grounded theory and constructivist grounded theory approach were adopted. For interview data analysis units of text were not assigned a code because of their relevance to pre-identified themes from pre-existing literature or models. Coding was instead done in an inductive way, where the data was used to generate themes. Emergent themes of analysis were derived from the diary data generally and in relation to themes pertinent to complexity science.

3. Highlights of the findings

Findings pertain to the pre-diary interviews and extracts from diaries relating to sense-making, learning and reflecting, complexity science themes and work topics.

The pre-diary interviews showed that participants each had their own reservations and assumptions about how they were personally going to approach their involvement in the process. This, as desired from these interviews, established a sufficient context for communicating with the diarists and created mutual expectations about how the process would ensue. This also meant that the content of the diaries came as no big surprise. The key finding here, however, related to the use of open-ended diaries, and that upon embarking on such a diary study, research participants have their own ideas regarding the style and content of the forthcoming diary, which is then largely beyond the control of the researcher and sets the scene for the embedded-ness and rich context specificity of the ensuing knowledge transfer.

Interviews revealed four main routes in which research participants had been introduced to the subject of complexity science. These included: education, learning and academia; the natural sciences; emotional triggers; and, via social interconnectivity – i.e. other people. In reference to emotional triggers, the findings support the view that the opportunity to engage in debate and conversation with a view to making a personal and emotional connection with learning material on the subject is valuable and can serve to stimulate the attention of would-be learners further. The aspect of social interconnectivity, or, the 'people route', acknowledges the importance of belonging to networks of people and engaging in communication with them by a variety of means in order to learn and discuss new ideas, i.e. in a knowledge sharing style. Of relevance

here is work from the knowledge management domain and the learning tools and learning modes such as those facilitated by means of technology or in social contexts.

Interviews revealed that potential areas of application of complexity science of relevance to focus on include: communication; learning and growth; seeing and understanding; and, more practical application. These findings could be used as 'selling points' of learning about complexity science, or in terms of what 'added value' it brings. This builds on the work of Lissack (1997), which suggests that complexity science metaphors fit well in organisational activities where investment in knowledge is required. Investment in knowledge, he said, referred to the ability of an organisation to effectively deal with new knowledge which could give rise to the potential for increasing returns. This would take place through improved ability to absorb and leverage new information. This knowledge represented the 'ephemeral world, the world of ideas, of processes and change' (Lissack 1997:297).

Data collected by means of the diary study was presented according to three broad topics of relevance: 1) sense-making, learning, and reflecting; 2) complexity science themes; and 3) work topics.

Sense-making, learning, and reflecting generated the *common themes*, i.e. where one or more diarist wrote on the theme in their diary, of: emotion; experience; intuition and instinct; the intangible, mysterious, and unexplainable; identifying paradox; sense-making and reflection; learning; conversation; debating theory; thinking; metaphors, analogies, perspective; and, observations.

Unique themes, i.e. where only one diarist wrote on the theme, included: ideas and intellectual beliefs; developing a vision; finding resonance; simplification; finding meaning; obsessing; confusion; personal awareness; encountering turning points; and, visualisation.

In relation to sense-making, learning and reflecting, this research revealed, by means of unearthing the themes presented above, that making sense and learning articulated in a diary is not just a one dimensional matter of analogising. It is a much more thickly, descriptive and colourful affair, deploying subtleties and nuances of thought and articulation. It is interesting to 'hear the voices' on non-experts speaking authoritatively from their very own experiences and points of view, often quite strongly. Individual research participants were very much in charge of their own interpretations, not following a specific formula. These interpretations and ways of articulating themselves were often vivid, imbued with personal meaning. Participants most definitely 'did what they wanted' in the diaries and with complexity science ideas. For example, Diarist E often articulated a very specific set of ideas that he had in mind, speaking to a potential audience he seemed to want to show his support of key ideas to.

Diarists found interesting ways to discuss and mention aspects of a broad range of complexity science ideas, not just those prescribed through interaction with me as a researcher and also not fitting a specific theoretical perspective as prescribed for example by Stacey. The key point which seems to shout out here is that this perspective sees the diarist very much as an 'artist', where the diary is a tool for creating a 'collage' – a metaphor which fits Hatch's (1997) description of the postmodern view, and at the same time therefore resonates with the relativist and multiple voice enabling mode of research this study followed. Diaries often communicated the essence of cathartic ranting in this context, coupled with personal messages – sometimes playful and humorous, tongue in cheek – to me as the researcher and audience, by turns reminding me that research participants wouldn't be writing or trying to write in this way if it were not for me and this research. Diarists 'talked to' me through the diaries as if in conversation with me, or another non-existent audience. In this way the making of sense, learning and reflecting articulated upon in the diaries resonated with Stacey's (2001) view of continual social interaction described by conversations between people, where time in the present has a circular structure, and with Weick's position that action is tempered by reflection.

Complexity science generated the *common themes*: understanding and reporting complexity; use, application and relevance; systems, processes and evolution; interconnectivity; ants and termites; self-organisation; emergence; chaos, and the edge of chaos; diversity; patterns; history and time; unpredictability; and, rules.

Unique themes included: machines and humans; attractors; prominent figures and authors; complex responsive processes of relating; and, conversations.

More so than the themes relating to sense-making, learning and reflecting, the themes that were discovered in the diary data relating to complexity science were more specifically of a context specific nature. For

instance, in commenting in their diary on complexity science, diarists A and E in particular worked hard to either apply complexity science to talk about their own work, or in order to develop their own ideas further as to what they could do with it. Diarists expressed individually unique ways of 'using' complexity science ideas, for example diarist L articulated a family tragedy. There was some difficulty expressed by some diarists in relating to and communicating complexity science at some level though (e.g. diarist F, G, H, I, and D). Some diarists referred to and brought previous learning into their diary (e.g. diarist M and F).

With regard to ants, termites, birds and bees, analogies and ideas associated with these by diarists were used in diaries as inspirational stepping stones of thought, showing that analogies relating to ants, termites, bees and birds are of value in the early stages of learning about complexity science and can be highly stimulating, generating much interest in the subject, but that further along the learning curve more direct analogies relating more specifically to humans are needed.

Diarists could make leaps of application from principles such as self-organisation and emergence themselves to their own working lives or other experiences (e.g. diarist A, C, E, H, L, and M).

In relation to the theme of 'patterns', diarist A applied it directly to her work, while diarist C discussed patterns in terms of the psychodynamics in his own working groups. Diarist E related patterns to Stacey's ideas that resonated with the diarist personally, and again diarist H related the theme to problems in her own company and then proceeded to develop her own ideas and theories in a conceptualising way that resonated with Kolb's learning cycle. Diarist I explored patterns in reference to how she would like to understand and apply such ideas and diarist L treated the idea like a problem by doing something with it and developing his own ideas further, almost creating a formula for himself by which to understand it. Diarist H, again, related the theme to problems at work and developed her own theory from this to understand it. And, diarist L used the principle in his own way of developing a formulaic type theory.

In reference to unpredictability, there was a sense that where diarists mentioned or referred to it, either directly or indirectly, unpredictability was seen as a positive thing and that the diarists liked it (e.g. diarist C, G and H), and that it was seen as a more humanistic way of interpreting and accepting the world than that assumed by planning and control type management approaches (diarist L).

Work topics generated the *common themes*: emotion, well-being and stress; time management, planning and flexibility; collaboration and psychodynamics; hierarchy, power, politics and management; work events, activities and meaning; change and transformation; creativity, play, innovation and novelty; managing complexity; tools and methods; and, organisations, humans and machines.

Unique themes include: remuneration value; research and exploration; conventionality; art; identity; sustainability; and, linearity.

The context specificity of the background of the diarists came through in the area of work topic themes more strongly than either of the previous themes relating to sensemaking, learning and reflecting, or complexity science. This was obviously due to the unique relationship held between each research participant and their working lives in addition to what that work constituted. However, over and above this context specificity, the domains of application implied can be generalised and therefore substantive application made.

Diarist A saw work as an emotional experience and related trying to improve her time management skills, while diarist D reported encountering little stress due to her ability to plan and structure. Diarist H reported her then current ambitions to manage her life/work balance better and articulated the problems with this in the context of unpredictability and having to react to change. Diarist I also commented on her time management and planning abilities and related her experiences to edge of chaos situations that had to be negotiated around the working styles and demands of others and their differing degrees of flexibility and rigidity, dependent she said on the type of job held and the need to manage being 'put upon' by others. Diarist M's view was of the balance between planning, and planning not to plan, in order to enjoy an experience more, such as, for example, a holiday.

Collaboration, psychodynamics and human nature were related to in order to comment on how a diarist made decisions in that context (diarist A), in articulating their understanding of the interactions of others in the working context (diarist C), and also in postulating personal ideas contrary to mainstream ideas that might work to better describe reality (diarist L).

Issues to do with hierarchy, power, politics, management and leadership were discussed in a speculative, 'what if' way inspired by complexity science by diarist A, and in a descriptive mode of articulating the events in his working environments by diarist C. Diarist E discussed his views on this topic in terms of the difference between old fashioned ways of thinking and ways of thinking based on self-organising leadership with enabling constraints. Diarist H made reference to problems in her own company and spoke of the difficulty of the role of manager. Diarist L related the entire issue to the manager's paradox, and diarist M to political movements and regimes.

Change and transformation was important to diarist A in terms of 'changing the system' and the struggle to survive and make things better. Diarist E questioned his role as 'change manager' within one organisation and suggested in complexity science terms that change was messy and could not be managed, and instead was a matter of changing things informally through conversations and influence. Diarist H found it useful to talk of change in systemic terms where lots of things were always being influenced by other things. Diarist L went through some life changing experiences whilst being engaged in the study and reported these in his diary. Diarist D reported change as it was happening in her organisation and its wider network and articulated this by means of the butterfly effect.

Managing complexity and the tools and methods derived from complexity science was a topic of relevance to those with a more advanced understanding of complexity science (diarists E, L and M).

It can be seen that although backgrounds were different and unique, complexity science inspired debate on some general issues. The implications of this is that making sense of and learning about work in the context of complexity science conversations is likely to generate conversation on these issues, which could serve to form part of a knowledge transfer process, initiate knowledge transfer and be useful in certain contexts and domains of application, such as the development of bespoke training materials and understanding key issues of a specific knowledge transfer objective.

4. Conclusions, implications for practice and future research

This work provided multiple first person accounts and opened up new avenues of exploration and suggested some tangible ways in which learning and making sense in a work-focussed diary by means of complexity science can be improved and enhanced and utilised for other purposes – one of which it is proposed here could be the stimulation, initiation and development of knowledge transfer activities on particular themes. This applies at the level of self-directed endeavours, in the context of work, or as part of an organisational programme.

This work has shown that work-focussed, personal journal-like diaries, as a vehicle for knowledge transfer in conjunction within a wider research process, can be used to reflect on and integrate personal commentary on complexity science and other complex issues in context specific ways - sometimes in personal ways in which habits were formed (e.g. in applying an idea directly to work, relating it to problems in the company, or contesting and developing an idea further in a formulaic way).

The study showed that a diary can be used to make sense and learn about complexity science by: providing a space for descriptive articulation of thoughts in a richly nuanced way; allowing non-experts to firmly voice their opinion and develop their views; facilitating the exploration of new and familiar ideas from the complexity science domain in individual ways not necessarily conforming to academic theory; interpreting meaning in individual ways, not following someone else's formula; and, articulating thought in vivid ways, imbued with personal meaning – all of which provide the meat on the bones of an embedded knowledge transfer endeavour where context and complexity are acknowledged as important.

The use of a diary as a research tool has therefore been extended in the context of this study, which contributes to earlier work on the use of diaries for teaching, training, learning, the study of meaning and emotions, exploring worker/manager responses to change and uncertainty, personal relationship studies, observation of technological implementation programmes, time and measurement of daily events and experiences, personal identity studies, life transition, health, and the study of diaries (Foote, 1961; Jepsen, Mathianssen, et al, 1989; Symon, 1998; Stone, Kessler, et al, 1991; Verbrugge, 1980; Zimmerman & Wieder, 1977). The study revealed that diaries are one method which could be further developed and integrated in this context within current organisational knowledge transfer activities, or learning programmes, strategies and management systems.

In spite of differing completion and attrition rates among research participants, this research showed that the generally intended, year-long, diary method used was a suitable tool for facilitating person to person knowledge transfer through the stimulation of thinking, reflecting, learning and subsequently capturing the personal reflections, narrative musings and theoretical abstractions on the issues of lived experiences in local situations which pay attention to the diversity of relationships in an ongoing way.

Lissack (1997) said that complexity metaphors could add value in decision making and articulation of organisational processes and problems where investment in new knowledge was required, as investment in knowledge referred to the ability of an organisation to effectively deal with new knowledge which could give rise to the potential for increasing returns. This would take place through improved ability to absorb and leverage new information. This knowledge represented the 'ephemeral world, the world of ideas, of processes and change' (Lissack 1997:297). This research has added to Lissack's work and validated his assertions in this context, but has shown also that the use of complexity science metaphors can, while not always changing the way managers think about the problems they face, definitely provide a language for articulating them, and thus begin to provide the vehicles and processes for knowledge transfer of the complex.

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