

Retelling Stories: Setting Learner Narratives in Resource Ecologies

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Abstract: We explore the use of learner narratives and narrative methods in the design of CSCL. Our data are accounts of self-initiated foreign language learning. These stories describe the learning of new vocabulary from the learner's perspective, revealing key interactions with language, people and various other resources in linked episodes that take place across various settings. Such narratives provide valuable insights into processes that are difficult to observe. We introduce a new technique to document interactions described in these learner narratives within ecologies of resources (Luckin, 2010) and provide detailed analysis of a single story in order to illustrate the use of this technique and show how it informs design.

Introduction: Taking Learners' Stories Seriously

Kukulka-Hulme (2007) notes, "ethical and practical issues get in the way of analysing" the "fragmented conversations" (p. 30) learners have across distributed media, settings and times using different tools. This is partly because of the difficulties associated with observing such practices. Yet, learners themselves are often able to construct informative, compelling narratives describing this learning. In education research, while concerns about validity and generalisability remain, the value of learner narratives and narrative methods is accepted (Clandinin & Connelly, 2000). However, learners' narratives are not often used to inform CSCL design. Yukawa (2006) used narrative analysis to reveal and describe co-reflection in the learning experiences of two students in an online action research course. Kupperman and Weisserman (2000) also used narratives in analysis; they asked participants to construct narratives describing their experiences of playing online simulations and aimed to merge these accounts with their own observations and log data in a single polyvocal, descriptive and reflective narrative. Mor and Noss (2008) use narrative methods both in their analysis of learner activity and to guide CSCL design, emphasising the need to understand and design support for learners' own narrative construction. Even in the field of Narrative Interactive Learning Environments, systems that explicitly use narrative to support learning, Brna (2008) notes a lack of methods that incorporate narrative approaches. Brna goes on to suggest there is room for new methods that "take the stories of participants very seriously" (p.36). In this paper we aim to demonstrate one way we can take learners' stories seriously and make systematic use of them in the design of CSCL systems that aim to prompt and guide learners' narrative constructions.

Narrative Construction, Narrative Guidance & Learner Context

Previously, we have described narrative construction as the active process of meaning making through which learners discern and impose a structure on their learning experiences, making links and connections in a personally meaningful way (Underwood et al, 2006). In contrast, narrative guidance is provided by the "design elements that teachers and/or software need to provide in order to help learners interpret the resources and experiences they are offered" (Underwood et al, 2006, p.3). More recently, Luckin (2010) links learner context, narrative construction and narrative guidance; "Context is dynamic and associated with connections between people, things, locations and events in a narrative that is driven by people's intentionality and motivations. Technology can help to make these connections in an operational sense. People can help to make these connections have meaning for a learner" (p.18). Our aim is to design guidance for adult language learners in constructing narratives that lead to learning new vocabulary. We are interested in understanding how successful language learners acquire new vocabulary in order to design prompts for others to adopt similar practices. It is difficult to observe such learning, not least because it takes place at unpredictable times across various settings. Hence, one way we are informing our design is through analysis of the stories told by successful learners.

Method & Analysis: Setting Language Learners' Stories in Resource Ecologies

We interviewed fifteen long-term learners of various European languages. All participants had advanced competency in at least one foreign language, equivalent to level C1/C2 of the CEFR (1). Most had spent some months living in a culture speaking the foreign language. Participants' ages ranged between 25 and 60 with mean and median ages being late 30s. In semi-structured interviews participants talked about things they use to support their language learning and the constraints they encounter. Conversation then often turned naturally to descriptions of specific experiences. If this was not the case we prompted participants to recall and describe in some detail a recent vocabulary learning experience. Due to space restrictions, we present here a single story extracted from these interviews. Ines' (2) mother tongue is Spanish. We selected her story because it is representative and illustrates in a single account features we found across several other stories. Also, we

ourselves learnt something about the expression that is the object of Ines' inquiry (3). As with other stories, we first drafted our own summary of the story from interview transcripts and then asked Ines to comment on our telling of her story, to suggest any changes and to fill in some missing details.

Ines is in the pub with friends. The football is on the TV. She hears the commentator say something like "... he's at sixes and sevens". She's been living in Ireland for years now and her English is very good but she's never heard that expression before. Her interest is piqued. She more or less gets the meaning in this context but she wants to check and improve her understanding, so she makes a mental note to do so. A little later she asks a friend about the expression. He says it's not an expression he would use. Ines is not very confident with the explanation he gives. She moves her ring from her right hand to her left hand, a habit she has developed to help remind her to look things up. Later at home, she notices her ring and looks up the expression. At first she can't remember exactly what it was, something to do with six and seven. Eventually, she finds it in her dictionary: "at sixes and sevens - in a state of total confusion or disarray". She is now more confident she understands. However, Ines's story doesn't end there. She isn't sure whether she has used 'at sixes and sevens' in conversation. She feels doing so might require conscious effort or perhaps she just hasn't had the opportunity.

This story is derived from Ines's account, as told by her in interview (see Table 1) and later elaborated in email exchanges. Ines confirmed that this account is, for her, a good retelling of her story. However, the story told here includes information that was only inferred in the original telling and combines information that was distributed across interview and emails. Also we have transposed the story to the third person (she) and the present tense, positioning the reader as observer, reflecting the traditional research perspective. The story was told in the first person (I) and resonated with our own experiences of learning vocabulary, prompting us to think about how we have acted in similar situations, our own strategies for remembering and investigating such language, and the many times we have heard interesting 'new' words or expressions only to lose them in the hustle of other activity and passing time. Such resonance is one criteria for validity in narrative approaches and the way stories act to prompt us to reflect on our own experience is an illustration of the value of stories. We offer this story here in the hope that for some readers the story will have similar validity and value. Notwithstanding our belief in the value of individual readers' unmediated interpretations of such narratives, we now offer our own approach to interpreting these learner narratives and show how this can inform design.

Connelly and Clandinin (2000) suggest three dimensions of narrative should be explored simultaneously: *temporality*, *sociality* and *space*. *Temporality* guides us to look at a story as a process and consider it in the context of past, present and future. *Sociality* requires us to consider the impact of personal feelings, hopes desires and other aspects both of participants' and our own (researcher's) agency. *Sociality* also means to draw our attention to "the environment, surrounding factors and forces, people and otherwise, that form each individual's context" (Clandinin, Pushor & Murray Or, 2007, p.23). *Space* guides us to think through the impact of each physical setting on experience. To facilitate this kind of analysis we plot events and interactions with people, the environment and other resources from Ines's narrative in a chronologically ordered chart (see Figure 1). This builds on representations (e.g. CORDFU) successfully employed previously to represent dialogue and feature use within CSCL environments (Luckin, 2003). For mapping experiences in ubiquitous technology-rich environments, we need to look beyond interactions with traditional computing resources. Consequently, we expand the elements included on the y-axis to include all resources that may contribute to learner context. We organise these using the general categories suggested by Luckin (2010):

Context is a learner's dynamic lived experience of the world that is constructed through their interactions with multiple *concepts*, *people*, *artefacts* and *environments*. These interactions are *spatially and historically contingent* and are *driven by the goals and feelings* of those who participate. (Luckin, 2010, p.34 – *italics added*)

The learner's actions and the goals, feelings and other resources the learner brings to an interaction are critically important; we group references to these in a layer labelled *learner agency & resources* (see Figure 1). We organise other resources in layers labelled *knowledge & skills*, *environment*, *people* and *tools*. Between the learner and these resources we introduce a layer labelled *filters*; filters influence access to resources (Luckin, 2010). Vertical lines break the narrative into discrete episodes. Key events or actions within episodes are numbered sequentially; we describe the significance of connecting arrows later. Representing interactions with resources in this way helps us focus on the connections between episodes and on changes over time, e.g. where is this happening now, how has access to resources changed, what filters constrain interactions and how do these change, how has the learner changed? Our next step is to identify and label transitions in the story. Benford, Giannachi, Koleva and Rodden (2009) identify six kinds of transition in mixed reality experiences (Beginnings, Endings, Role transitions, Interface transitions, Traversals between physical and virtual worlds, Temporal transitions) and note that these require careful design and management; it is in transitions that there is greatest risk to coherence and continuity. By providing stronger narrative guidance at such points, we may hope to remediate this risk and support learners' narrative construction. Hence in analysing Ines's successful learning

narrative we aim to identify the events and resources that support her as she moves through such transitions. By doing so we hope to identify opportunities to prompt and support other learners' in creating similarly connected learning narratives. Further analysis aims to identify key features on which Ines' successful outcome depends.

Table 1: Extracts from interview transcripts and email exchanges indexed to events identified in Figure 1.

Interview		
1) Interviewer: "...how do you learn English..." 2) Ines: talking about using dictionaries "...so, I'll give you an example, so I heard..." This leads into the story as told below.		
Episode 1 1) "...the other day somebody saying something like, oh I was <i>at sixes and sevens</i> ..." 2) "...it was during a soccer match actually and we were in the pub and it came out of the commentators..." 3) "...I never heard this before..." 4) "So obviously because your in a conversation you have an idea of what is going on... from the context you can actually make out what the person is talking about..." 5) "I just said, oh my I haven't, I thought, wow... you know I wonder what it means" 6) "You know you kind of make a mental note, you say I must actually check this up as soon as I can"	Episode 2 1) "So the first thing I did, because it was bothering me so much, was I asked somebody, 2) and he said 'oh yeah, yeah I heard something like that but it is not an expression that I would use'..." 3) "I didn't understand exactly what he meant" 4) "what I do is... I wear my ring on my right hand so change it to my left hand, then I know there is something to check"	Episode 3 1) "I didn't remember exactly what it was, but I knew it had to do with the number six and the number seven" 2) "...at home I would actually physically get up and go into, you know my office where I have all the dictionaries and actually take the dictionary out and 3) check it up ..."

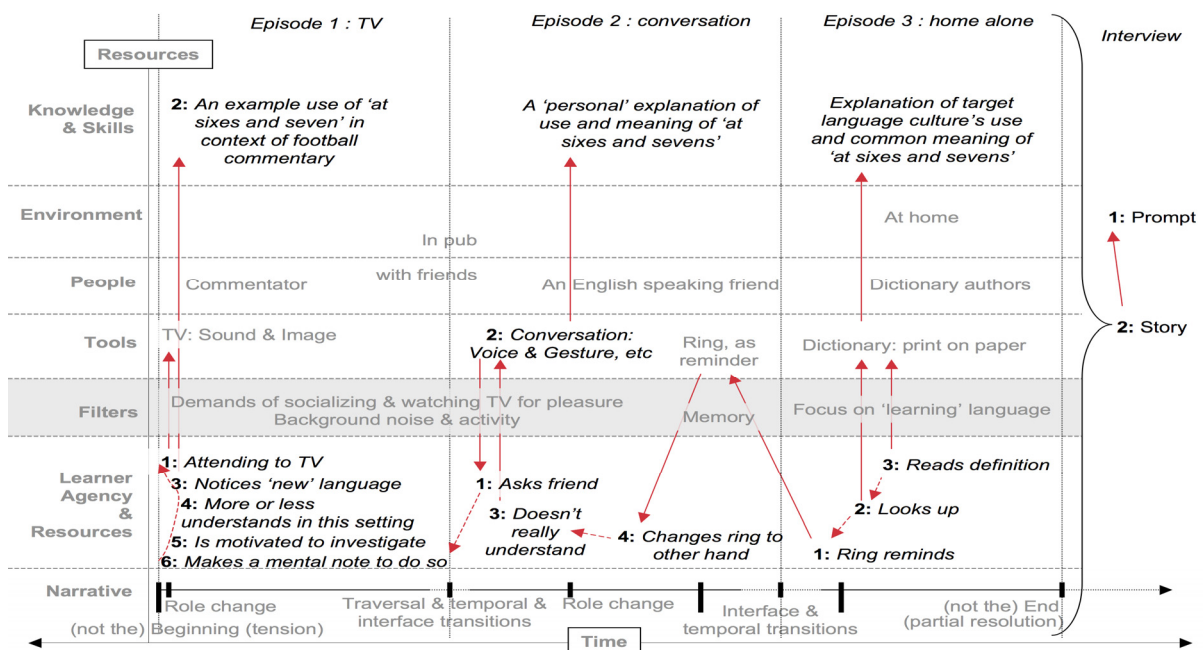


Figure 1. Chronologically Ordered Interactions with Resource Ecologies in Narratives (COIREN) Chart.

To help us identify and make explicit our interpretation of key features we adapt contingency graphs (Suthers, Dwyer, Medina, & Vatrapu, 2010); contingencies are ideally "manifest relationships between events" and events are "observed changes in the environment" (p.12). Contingency graphs express relationships between events. Given the nature of our data, we identify events described or implied by the narrative. Evidence for contingencies between these is implied by the narrative or self-evident. For example, Ines noticing the expression 'sixes and sevens' is dependent on the commentator using it; we represent this relationship with an arrow. So, how does Ines learn 'at sixes and sevens'? Our interpretation of events contributing to this learning is overlaid in Figure 1. Solid arrows connect contingencies between resources, including other people, and Ines; dotted arrows indicate contingencies between her own acts. We read the graph as follows, Ines's understanding of 'at sixes and sevens' is informed by her reading of the dictionary definition, her friend's explanation, and her recall and interpretation of the setting in which she heard it. These events are contingent on each other and other events, the filters and resources that create her context. Looking up the expression is contingent on availability

of a dictionary, her ability to use a dictionary and to relate the spoken form to its written form, and is filtered by the lack of other distracting activity. Remembering to look the word up is facilitated by her reminder strategy and the presence of her ring. The ring travels with her and helps bridge the temporal transition between episodes. Switching her ring is motivated by the realisation she doesn't really understand 'at sixes and sevens'. In part, this is caused by her conversation, which in turn is contingent on the presence of an English speaking friend, her decision to ask about 'sixes and sevens', her ability to communicate the expression, and her having noticed it in the first place. Of course any account of this type is incomplete; there will be critical events outside the story, e.g. developing the competence to notice the expression. Nevertheless, we find the identification of contingencies and transitions in this story useful in moving towards designing support for this kind of learning.

Discussion: Deriving Design Challenges, Limitations & Future Work

Our analysis describes a sequence of events and actions that we assert contribute significantly to the learning described by Ines' story. In designing from Ines' story, it is important to note that we do not seek to enhance the interactions in her story but rather to guide other learners' narrative construction of similar learning. In similar stories, similar events may or may not happen. If they don't happen they will affect the outcome of the story. For example, if learners do not notice new language they cannot decide to investigate it, if learners cannot remember the language they decide to investigate and/or don't have access to appropriate resources they can't look it up later. These represent opportunities for computer support for personal and collaborative learning and challenges for design: What can we do to prompt learners to notice new language? How can we support memory across episodes? How can we provide access to and make learners aware of appropriate resources at the right time and in the right place? We can look at each contingency identified in figure 1 and interpret it as a design challenge, asking ourselves how can we increase the chances of this happening. There is no space to work through each of these design challenges here but readers may wish to think these through for themselves.

Clearly, there are issues in deriving designs from a single learner's story. Ines' story is representative in that it exemplifies many features of a pattern common across other stories we were told. We call this personal and collaborative language inquiry. A learner notices new language and is personally motivated to investigate it. The learner forms a provisional hypothesis about meaning, which is iteratively refined and tested through inquiry employing various resources including people. Often, the stimulus for inquiry is encountered in one setting but, because of availability of resources and/or other filters affecting interaction, active inquiry is delayed to later episodes. Critical factors for success are learner motivation and memory, the ability to link and sustain inquiry across episodes and relate spoken and written forms, and availability of appropriate resources. Our initial design solution is a mobile multimedia vocabulary notebook providing 'one-click' access to a customisable collection of resources, including social media, for personal and collaborative inquiry (Underwood, Luckin, Winters, 2011). The interface provides static narrative guidance by: supporting quick capture and revisiting of stimuli for inquiry, prompting users to reflect on understanding, keeping an inspectable history of changes, providing easy access to resources that support inquiry and options for sharing inquiries.

In future work we aim to scaffold learner activity by providing adaptive narrative guidance. Scaffolding 'involves the evaluation of learner need, the provision of assistance and the withdrawal of that assistance in order to engender learner development' (Luckin, 2010). Van Lier (2007) suggests scaffolding often focuses attention on support giving strategies and the agency of collaborators. He points out the need not to lose sight of the learner's agency. Ultimately, it is how the learner interprets situations and acts that is critical. Learner narratives are useful because they reveal such agency. In Ines's story it is her who takes the initiative, deciding what she wants to learn, it is Ines who identifies resources and collaborators that can help her and it is Ines who decides whether she needs more help and when and where to access this. To scaffold learners towards adopting similar successful self-directed vocabulary learning practices we need to design adaptive narrative guidance, prompting learner action only when this is not forthcoming and fading prompts in response to learners adopting appropriate practices. We might prompt learners to add new vocabulary items if they do not do so for some time and not prompt them if they do, or prompt them to revisit and revise unchanging vocabulary records but not records that they do change, or similarly prompt (or not) sharing and collaboration around inquiries. However, it is not the prompts we design but how learners interpret them and react that is critical. This is one motivation for a participatory approach. Learner narratives inform our initial design and we are now moving towards involving learners in refining this design. We have described and demonstrated versions of our design to some interview participants and several were enthusiastic about participating in formative evaluations. Through these evaluations of functional prototypes we aim to acquire new stories. Analysis of these stories, employing the approach described here, will reveal new practices and challenges leading to revised designs.

In this paper, we hope to have demonstrated value in using learners' narratives to inform design. For reasons of space, we told only one story. We believe that even a single story has value but the value of Ines' story for any individual reader will depend on what that reader brings to the story and how they interpret it. Similarly, its plausibility will likely depend on whether it resonates with readers' own experiences more than any claims that some number of others have validated our interpretation. However, our intended contribution

here is not the story itself but rather our approach to analysis of learners' narratives. We have demonstrated a way of charting Chronologically Ordered Interactions with Resource Ecologies in Narratives (COIREN). This approach highlights the knowledge to be learnt, the tools and people that can assist and the influence of physical and temporal environment on a learner's interactions with these resources. Our analysis of these interactions adapting contingency graphs (Suthers, Dwyer, Medina, Vatrpu, 2010) helps us identify design challenges.

In summary, we have demonstrated an approach that takes learner stories seriously and provided an example of how this informs the design of mobile software for language learning. The methods we employ, particularly the COIREN chart, may be of use to researchers using other kinds of temporal data, e.g. log files, observation records, video recordings. In future uses we intend to combine narrative and log data. We also see a role in fleshing out imaginary narratives envisaging future systems; here charts could help focus attention on resources, filters, transitions and contingencies across settings and episodes. One flaw in our approach is that while following some guidelines from narrative inquiry, we have failed to position ourselves in the narrative surrounding the story told here. Also, the focus on a single learner in our COIREN chart is a limitation. Ideally, charts would incorporate perspectives from all parties involved. Such charts would promote more careful consideration of each collaborators' individual context and how this affects personal and collaborative learning.

Endnotes

(1) See http://en.wikipedia.org/wiki/Common_European_Framework_of_Reference_for_Languages

(2) Ines is a pseudonym for the participant who told this story.

(3) For stories about the possible origin of at sixes and sevens see http://en.wikipedia.org/wiki/At_sixes_and_sevens

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