Negotiating Academic Communities: Narratives of Life-long Learners

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Abstract: We bring together three case studies in computer science and engineering which were launched for the same purpose: to understand what participants – students, high-school teachers, and university teachers – considered themselves to be significant in their pursuit of professional growth and what empowered and disempowered them. All three studies use narrative methods, although in different ways. The studies share two findings: (a) participants were engaged in processes of becoming or being life-long learners, and (b) the importance of community in their narratives.

Keywords: computer science, narrative methods, community, life-long learning

Introduction

Computer Science (CS) and engineering face challenges due to rapid technological changes. Teachers need not only to keep up with these changes but must also be able to teach the changing material. Students have to develop the ability and propensity to constantly learn, adopt and adapt changes. In this symposium we bring together three case studies in computer science and engineering which were undertaken for the same purpose: to understand what participants – students, high-school teachers, and university teachers – considered to be significant in their pursuit of professional growth and what empowered and disempowered them.

All three studies used narrative methods. Specifically, in the first study, Dziallas interviewed American CS and engineering students in a learner-centered engineering program about their learning processes over the course of their life. In the second study, Fincher followed CS higher education faculty from various countries for a year, asking them to fill out a diary one day every month, capturing details of their daily work. In the third study, Ben-David Kolikant and Brandes asked CS teachers who participated in leading teachers courses to write their professional biographies. These methods differ. Fincher's diaries are written in present tense and tell the story of single days, reflecting what participants saw as being important at that time, while both Dziallas and Ben-David Kolikant and Brandes used retrospective biographical approaches, albeit differently.

Nevertheless, the findings of these studies are similar in two major aspects. First, participants were engaged in processes of becoming or being life-long learners. In all studies the desire to excel for self-realization was a prominent drive. Students and teachers alike developed their own rule systems and paved their own ways. In both Fincher's and Ben-David Kolikant's work, university and high-school teachers respectively reported dealing with time management and logistics, yet spending valuable time planning new projects, finding new learning opportunities – and moreover, they expressed positive emotions towards these challenges. In Dziallas' study the students had to adjust to an environment specifically designed to develop these lifelong learning skills.

Second, the importance of community permeates these narratives, albeit with a different expression in each. In Dziallas' study, students develop lifelong learning skills at a college where they live on-campus for all four years of their undergraduate education in an immersive community. Ben-David Kolikant and Brandes found that participants in the leading teacher program valued the sense of community the program gave, to be with "peculiar creatures" like themselves. And in Fincher's diary study, participants negotiated relationships within local and disciplinary communities.

This symposium, hence, sheds light on the processes of becoming and being life-long learners, and the difficulties they entail. It raises questions regarding the role of one's actual and designated identity in (life-long) learning. (Sfard and Prusak, 2005) In Dziallas' study, students' designated identities, the wish to become part of a community, brought about substantial learning. However, in the other two studies concerning professionals' learning, it was their actual identity, that of life-long learners, which brought about learning. The community surrounding them was not a designated one, it was an actual one. Indeed, the professionals experienced their community as an essential resource to sustain life-long learning; in all case studies, it is the community which is the basis of participants' sense of empowerment. This symposium also highlights the benefits of narrative approaches, their diversity and richness in exploring professional development and growth.

Students' positioning in life stories of learning experiences

Sebastian Dziallas

Introduction and context

The goal of this study was to explore how classroom and campus community influence student learning; how students position themselves in them; and how they make sense of their own experiences over time.

Phil Hammack argues that we construct narratives to make sense of our experiences by integrating stories of culture with our daily experiences. These stories of culture are scripts available to members of a particular group (such as students at a specific institution) – they are master narratives (Hammack, 2008). Students position themselves against these scripts. Of course, they are specific to institution and context – they can't simply be transferred. But the stories and positions we identified may provide opportunities for other institutions to draw upon as they look for ways to help their students develop lifelong learning skills.

In this work, then, we draw on interviews from a preliminary study with a dozen students at Olin College. Olin College is a small undergraduate institution in the United States that was founded in response to multiple calls for change in engineering education (National Academy of Engineering, 2005). The overall learning environment at the college was designed to be deliberately disruptive: all of the 350 students live on campus for the duration of their degree program and the curriculum is largely project-based with much of students' work grounded in real world and interdisciplinary contexts. In a paper describing the initial curriculum at the college, the faculty called for it to "motivate students and help them to cultivate a lifelong love of learning." (Somerville et al., 2005) In a previous effort, we explored the role of the curriculum in shaping students' learning experiences (Dziallas & Fincher, 2014). Now, we are interested in how the campus community and students' view of themselves in it shape their development as lifelong learners.

Methodology

The concept of positioning theory is about "how people use words (and discourse of all types) to locate themselves and others." (Moghaddam & Harré, 2010) Yamakawa, Forman, and Ansell use positioning theory to explore how students and teacher position themselves in the context of a third grade mathematics classroom. They consider individual speech events – for example students discussing the solution to an assignment with the teacher – in classroom discourse. They then describe implications of this positioning on students' identity construction. This discourse-centric perspective leads them to adopt a social stance on identity, which, they argue, is "temporary, changeable, and unstable in nature." (Yamakawa, Forman, & Ansell, 2009)

We employ a similar approach in this work, but rely on individual life story interviews which were drawn from a protocol originally developed by Dan McAdams (McAdams, 1997) to focus on students' learning experiences. As part of this approach, we adopt a perspective of unity and coherence in the self, as it is common in life story approaches, allowing us to trace students' wider learning trajectories and to hear echoes of past experiences. Life story approaches are grounded in a tripartite model of personality consisting of dispositional traits, personal concerns, and narrative identity. In this model, narrative identity consists of the life story that we, as adults, "[continue] to author and revise over time to make sense, for [ourselves] and others, of [our] own life in time." (McAdams, 1995) It is an internalized and continually evolving story of who we are.

Findings

Community and confidence

One of the themes we originally identified in the interviews was an academic dislocation upon entering college "that reinforces fundamentally different values of what it means to be an engineer" from students' previous, largely grade-driven, experience in high school (Dziallas & Fincher, 2014).

> First semester was getting used to Olin and is interesting, because it is the culture shock. You are surrounded by the same 300 people, and all these people are doing amazing projects, and you just feel like, especially freshman year, you feel like you aren't good enough. [Natalie Lee]

Here, Natalie (we use pseudonyms throughout) is positioning herself in relation to others in the community as somebody who, having just arrived on campus, isn't initially "good enough" despite her previous academic achievements and acceptance at Olin with its competitive admission process. In fact, this sense appears to be directly connected to her perception of others within the community. However, through opportunities afforded to her in both the local campus and wider academic community, her confidence grew.

> I was [a teaching assistant for] a class and people actually wanted my help, and I was actually useful. I felt like I could actually share my information. Olin gave me this new sense of confidence that I didn't really ever have before. [Natalie Lee]

This newfound "sense of confidence" permeated our conversations with students. For many of them, it allowed them to reposition themselves in the community. This transformation in students' perspectives of themselves and their learning appears to be driven by a change in what it means to study engineering in this new context: in terms of what kind of knowledge "counts" as engineering knowledge (Stevens, O'Connor, Garrison, Jocuns, & Amos, 2008), but also in terms of what kind of learning is supported and valued by the community at the institution. For Natalie, this shift manifested itself in her growing more confident in listening to her internal voice and taking a course she was passionate about.

> I was planning on taking some sort of bio engineering class … and then I realised that there is this other class I wanted to take at the same time. I made the decision to drop the bio classes and take "Teaching and Learning" instead. Which was actually a really hard decision to make, ... but I did it anyway. It was the best decision I have made so far. [Natalie Lee]

Faculty support

Another theme we identified involves the community encouraging discussions of classroom experiences. For example, Samuel positions himself here as somebody willing to engage with and improve his education. And to his surprise, he discovers that others have positioned themselves similarly in this new community.

> So, first off, the ability to look at [a course] and say, "Here's some concrete things that I don't like about this experience" was amazing. The second was being around people, students in this case, who were similarly engaged in this class and in their education. That I could talk with them about what they didn't like and come to a level of understanding where we could start thinking of possible solutions was further incredible. [Samuel Cline]

This kind of engagement extends to faculty members as well.

> And lastly, that I was at a place where we could talk to a professor for multiple hours on a weekend – one of the busier professors – for multiple hours on a weekend... [Samuel Cline]

Another student was even more explicit about the close faculty-student relationship she found at Olin.

> … there was a shift from looking at professors as guiding figures, to looking at professors as colleagues. People who want to know about me, as much as I want to know about them. They want to know about what I know, as well as I know want to know what they know. [Susana Clinton]

This shift affected her own approach to learning.

> I decided that it was more important to develop good relationships with the faculty, than to necessarily understand everything that they're saying in class. So while I do still attempt to understand, it's not super important that I understand as much as I understand how to learn how to understand. [Susana Clinton]

Susana positions herself as seeking "good relationships" with professors at Olin. However, in the context of the Olin community, this desire is not driven by a focus on extrinsic metrics, such as grades. She is instead looking to "learn how to understand" for herself. Indeed, in a shift from the previous model, her conception of learning appears to be linked to interactions with people in the community around her, rather than test scores.

Discussion

> If learning is conceptualized as participation, then what is learned are the norms and practices of a community (Sfard, 1998). In schools, students and teachers participate in collective work to construct, maintain, or alter the cultural and historical practices of their classroom community. (Yamakawa et al., 2009)

This perspective emphasizes the importance of community for learning. We have characterized students' conceptions of a learning environment that was specifically designed to foster lifelong learning and discovered that these conceptions include the campus community. Students repositioned themselves within this community over time which was an important aspect of becoming life-long learners. We saw commonalities of developing confidence and intrinsic motivation in their stories (similar to, for example, the concept of self-authorship). As students enter this new part of their learning journey, they describe a process of becoming empowered, feeling more confident, and adopting positions more equal to faculty. Indeed, changing educational practices in the classroom to foster lifelong learning skills alone may not be sufficient. The positions faculty and students adopt with regard to each other appear to be a central part in the development of students' conception of their learning. We contend that the community at Olin encourages this kind of behavior and that its structure influences the possible positions its members adopt – to study, to engineering, and to lifelong learning.

Non-storied narrative: Community in academic diaries

Sally Fincher

Most academics experience, if not inhabit, two communities. One is the local community of their University context, the other is as cosmopolitan researchers, reaching out to a community of collaborators and peers in other institutions. This is a well-observed phenomenon, first framed by Robert Merton who distinguished two role orientations and introduced the terms "local" and "cosmopolitan" in this way:

> The localite largely confines his interests to this community. He is preoccupied with local problems, to the virtual exclusion of the national and international scene. He is strictly speaking, parochial." whilst the cosmopolitan has some interest in the local community "he is also oriented significantly to the world outside and regards himself as an integral part of that world. (Merton, 1957, p. 447)

Merton's student, Alvin Gouldner, took this distinction into a study of 125 faculty members from a mid-range US university he calls "co-op college" (Gouldner, 1957, 1958). In this explicitly educational context, he defined his two latent organisational types like this:

> Cosmopolitans: those low on loyalty to the employing organization, high on commitment to specialized role skills, and likely to use an outer reference group orientation.
> Locals: those high on loyalty to the employing organization, low on commitment to specialised role skills, and likely to use an inner reference group orientation. (Gouldner, 1957, p. 290)

Gouldner defines these as "latent" rather than "manifest" types because people with ostensibly identical roles ("associate professor" or "senior lecturer") may, in fact, have different orientations. Nevertheless, it is clear that researchers are more likely to have a cosmopolitan orientation: they have an external community from where they draw validation and specialised disciplinary skills. Teachers, on the other hand, are more likely to have an orientation to local context and constraints, and draw validation from the institutional community. In education, these distinctions have been widely drawn on to characterise academics' activity (Baker & Zey-Ferrell, 1984), and to explore the implications for the amount and balance of academic work, including issues of status and reward (Grimes and Berger, 1970) (Tuma and Grimes, 1981). However, in this work, rather than applying these categories as theoretical distinctions, we were more interested to examine how these communities were formed and experienced. In this, we looked to the minutiae of academic life, as recorded in academic diaries.

The corpus

The Share Project (SP) ran from 2008-2012 and aimed to gain insight into how educators share teaching practice; how they represent it; and how, when and with what evidence they change their practice (http://www.sharingpractice.ac.uk). The project comprised several inter-related investigations and used narrative both as a medium with regard to representing practice and as a methodology in research studies. In investigating teachers' practice, SP undertook four distinctly separate narrative enquiries (Fincher, 2012). One of these, modelled on Mass Observation (MO & Harrisson, 1943) asked academics to keep a diary on the 15th of every month between September 2010 and August 2011.

In using a diary elicitation, we were anxious to find out what was significant in academics' lives - not what someone else thought should be significant. The solicitation was explicit: "We want you to tell us what you really do. We're interested in detail and nuance, in the gaps between what is supposed to happen and what does happen, between staff and student, between institution and individual."

The texture of academic lives is distinctively different depending on their disciplinary orientation. For simple example, Humanities scholars tend to work alone, or in very small teams, with modest grant income; Science academics tend to work in labs, often in substantial research groups, on substantially funded projects. This paper eliminates the variance of discipline by reporting a study of computer science academics that draws on a subset of 82 diarists from 389: this selected corpus comprises 575 entries.

Method

The day-survey diaries have an overwhelming emphasis on the quotidian, the ordinary, the matter-of-fact. This collection allows us an ant's-eye view of academic life, from the small, daily interactions that the diarists report, either as commonplace, or as unusual. Rather than seek "themes" we coded for concrete action and activities and systematically extracted details in several groups:

1. *Interactions and activities*: in this category we noted personal interactions that might indicate involvement in personal and professional networks. We noted conversations with Heads of School, IT departments, professional colleagues, etc. We also included interactions in regard to professional activities more broadly meetings with research students, attending conferences, work on grant proposals, etc. These latter items helped form a more complete snapshot of the kinds of things a diarist is doing. Description of meetings over food (lunch, coffee etc.) were separately noted.
2. *Representations of practice and artefacts of practice*. This category included references to lecture slides or assessment activities, as well as implicit use of representations (e.g. at meetings discussing curricular revisions).
3. *Change Examples*. We extracted all examples of change in teaching practice in two groups. One group contained description of changes in practice and preparation habits, the other was composed of references to student-driven change, where the diarist adjusted their delivery or materials in response to student feedback or observation.

Academic community

In the diaries most often (although not universally) both of Gouldner's community constructions were evident, and often illuminated when they come into conflict. One way in which conflict occurs is when boundaries are breached, and we saw several variations of this (Cohen, 1985). Sometimes the boundaries are internal, where institutional priorities conflict with departmental work:

> Looking back, I don't think I did a single stitch of actual computer science work or even thought about the process of actually teaching computer science. All of today was strategizing about outreach or administration of programs. [264, June]

More commonly, however, the diarists identify the conflict of local and cosmopolitan community in terms of finding time and space to do justice to the work of both:

> Snuck a few minutes to read reviews of our CHI submission. It's a new community for us and I found the reviews really informative … It's nice to think about research, even if only for a few minutes in the day. [47, Nov]
>
> Managed to get some of the research work completed. It is a struggle to balance the good teaching with good research [73, Nov]
>
> Having spent the last two days reviewing student project reports, it was good to be able to get back to revising a research paper this morning. I have now sent off the revision to my co-author in Canada. [75, Sep]

As well as these expected constructions, in narrowing our focus to a single discipline we were struck by the quality of activities and interactions that related specifically to these academics' disciplinary orientation, as something separate from their engagement with institutional and research communities. The field and subject matter of computing is driven by fast-moving technological advances, and is in constant flux. Student expectation is conditioned by current devices, and there is no sense in which the same lectures can be delivered year-on-year, as in subjects with less volatile material. Most often this was mentioned regard to the currency (and credibility) of teaching material. Sometimes references are immediate and personal, a matter of knowledge and challenge:

> Beej changed all of his examples to take advantage of IPv6 networking routines … My examples (and notes) will need to be almost completely rewritten because the technology changed. [50, Sep]
>
> I teach computer science. Today will be spent trying to learn a programming language that I may be called on to teach in the future. Won't spend a lot of time on it, but I should get started. A few months ago, I started wondering just how many programming languages I have used, or at least studied in my 40 years in the field. It was 14. After 14 languages, number 15 won't be hard, I think. [45, Aug]
>
> Also took a look at some material on ASP.NET MVC as I'm due to teach this to postgrads soon and I'd better know something about it by then!" [38, Oct]

Sometimes the reference is more general, linked to departmental concerns and local community:

> We discuss plans for the revised Masters' program. It seems our programs need constant revision to keep up with industry expectations." [60, Nov]

We characterised this consistent external reference as a "third community". Diarists assumed on-going engagement with current technology as part of their pedagogic responsibility to their local community, not only in its impacts on their personal practice, but also in regard to students' development.

> I had a chat with people in my department who were playing with the latest iPad technology and discussing how they were incorporating it into their multimedia lectures. [28, Jan]
>
> I really like to use practical tools in my courses. I think it's important for computing professionals to develop skills in finding their way through new technology. The challenge is that requires a significant time investment in not just learning the tools, but also updating assignments, lab description, and installation instructions. [116, Oct]

Implications

Diaries (and quotations from diaries) are, by their nature, unremarkable. But they are also revealing in their record of the routine; these narrative fragments expose the everyday dance that academics tread, reconciling the demands of different communities, and different community pressures, that inform their professional lives. The "third community" that the computer science diaries expose suggests a different sort of academic engagement, one that sits between Merton and Gouldner's local and cosmopolitan constructs. It is distinctive because "membership" of the third community crosses boundaries, requiring that materials and methods from an external reference group are not simply used to validate external standing (as is the case with cosmopolitan research) but must be imported and instantiated to maintain standing in the internal, local, community (in teaching). The daily-constructed stories of *actual identity* (Sfard and Prusak, 2005) recorded in the diaries might indicate that professional academic identity in computer science is supported by a powerful, engagement with life-long learning.

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The need of community of equals at times of changes: The narratives of Israeli CS leading teachers

Yifat Ben-David Kolikant and Ofra Brandes

Supporting and nurturing life-long learning skills and disposition among teachers is an important and challenging task in this era. Teachers need these skills to rapidly adjust to frequent and substantial changes in curricula and policy (Gilbert, 2006). Many models of teacher growth assume that the content knowledge is stable (e.g., Berliner, 2001) and put the emphasis on what Shulman termed as pedagogical content knowledge (Shulman, 1986; 1987). CS education is characterized by extreme instability of the curricula and teaching methods (Roberts, 2004) and as such it can serve as, metaphorically, a mirror into the future school reality of rapid changes.

Here we report on a study conducted in Israel at a time of a dramatic change. CS has been an elective course in Israeli high schools for many years. In 2008 the Israeli high-school CS curricula moved from procedural programming to object-oriented programming (OOP). CS teachers had to teach a paradigm they did not learn in the university and did not use for their own programming projects. Teaching materials (textbooks, teacher guides,

laboratory sessions, and so forth) were developed by groups (of teachers and researchers) appointed by the ministry of education. Yet, the dissemination both of the new content knowledge and of the "best" ways to teach it were, and still are, a challenging task.

The concept of "CS leading teachers" course was developed to address this challenge. The courses are annual and involve a small group of teachers with good teaching reputations. The underlying assumption is that these teachers can serve as agents of change in their field. The courses have been run by Machshava, the Israeli CS national teacher center. Each year is devoted to a certain topic and contains a component of participants' work for the wider community of CS teachers, for example, the preparation of laboratory assignments and exercises. Specifically, in 2008, when the Israeli high-school CS curricula moved from procedural programming to OOP, these teachers were taught OOP in the course. In parallel, they taught it in their classroom for the first time. They were also asked to conduct workshops on OOP for fellow teachers. The course supported these activities by providing time and a framework for discussing how to teach the new content in their own practice and to fellow teachers.

The study reported here is a part of a bigger project launched in order to understand the professional growth of these teachers. As part of this, we solicited the professional narratives of these teachers as well as their professional self-perceptions (Van Driel et al, 2001). To this end, we asked 12 teachers who participated in these courses to write their "professional biographies". Participants included all the teachers who participated in 2008 and who conducted a workshop for fellow teachers. All participants also participated in the course at least three more times, in subsequent years. The instructions were to write 2-3 pages with the guidelines: "don't provide us with a list of formal training opportunities; we are interested in a description of important junctions, significant decisions and deeds as well as your self-perceptions as a teacher."

It seems that these teachers are life-long learners. Specifically, several characteristics emerged in the teachers' description of their professional path. All the participants defined themselves as pioneers, or, using the words of one of them as "jumping into deep, cold water". Not only were they accustomed to the rapid changes, they were also looking forward to new programs and projects, being eager to challenge themselves. Seven teachers (58%) described their professional growth using the words "in parallel" or "at the same time", emphasizing that they were never content with "just teaching", but rather were always engaged in additional, self-motivated professional activities, such as studying in the universities, taking (or giving) professional development courses, initiating a new track in school, working in programming in the industry, and developing teaching materials and books. The majority (75%) mentioned that requirement to teach a new paradigm meant that their content knowledge (let alone pedagogical content knowledge) was often far from perfect, however they embraced the fragility: "never mind. If I made a mistake, I'll fix it in the next lesson". The main difficulty they experienced was loneliness, having to cope with innovations by themselves. Some participants mentioned creativity as an important feature, having to develop materials for themselves.

Two thirds of the participants mentioned the course as a significant step in their professional growth, all of them justified it with the opportunity to form a community, a tighter collaborative relationship with peers with the similar propensity of embracing change and challenge. These relationships were valuable in the contexts of teaching new programs, they helped them to better cope with their fragile (pedagogical) content knowledge, consulting and exchanging ideas, tips, and materials.

Five participants (42%) mentioned that the course enabled them to extend their professional actions beyond the walls of their classrooms, especially to help peers, directly or indirectly (e.g., by producing teaching materials), and make an impact on the CSE community by serving on committees and attending conferences. Most of the teachers valued the course because of the community it had helped them to form and not, for example, because of the exposure to new content and the encounter with University academics. This result suggests that although these expert teachers were far from being novices, and certainly were capable of learning by themselves, they valued the community, which in turn suggests that what life-long learners in this domain need is a continuous opportunity to have a community of equals, where they can elaborate difficulties emerging from their fragile content knowledge as well as share and exchange pedagogical ideas.

The fact that only 42% of the teachers mentioned the course as preparing them to be agents of change in the bigger community of computer science teachers aligns with a previous study on an earlier course of CS leading teachers, that of 2004, in which participants' initial self-perception was that of knowledge consumers, interested merely in their own teaching, rather than that of contributors to the greater community (Ben-David Kolikant and Pollack, 2004). We believe that a focus on become change agents can and should be nurtured throughout the course. For example, the design of the course by Ben-David Kolikant and Pollack (2004) supported such a change. More work is needed in order to pursue ways to recruit these teachers' enthusiasm towards challenge and change for the benefits of the wider community of CS teachers.

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