

Chapter 2

Learning and Teaching with Social Media

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Abstract This chapter is concerned with the ways that people can and do learn together, from and with one another. After discussing the benefits of dyads (pairs of people), we explain our typology of social forms, categorizing social groupings as sets, nets, and groups, along with an emergent entity, the collective, which arises from them. We describe the pedagogies, benefits, problems faced, and tools for learning using each social form and conclude with some suggestions about how social media may best be constructed to support each form and the likely future shape of social learning.

Keywords Social media · Sets · Networks · Groups · Dyads · Learning technology

2.1 Introduction

Learning is an inherently social process. We learn from and with others and, in almost all cases, that learning is mediated by technologies. Many communication technologies, especially language but also dance, painting, sculpture and more, are so deeply embedded that we seldom see them as technologies any more. The same is true of writing. For most of us, ‘technology’ is anything invented since we were born (Alan Kay, cited in Brand (2000)). Communication technologies are the vehicles of learning, the primary means through which we both know and create new knowledge. This chapter is concerned with the intentional design of communication technologies for learning: of social technologies.

The first generations of the digital counterparts of analog communication, many of which are still a significant part of our arsenal of tools, aimed to attempt to replicate older forms, albeit often adding incremental improvements in speed, access, cost, and management. Technologies that largely replicate what we do face-

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to-face, like telephones, videoconferencing, and screen sharing, may involve great complexity and ingenuity, but they are essentially the same thing made more accessible. The same is true of social technologies that build on other social technologies such as postal mail that is replicated in e-mail, classrooms that are replicated in learning management systems and journals that are replicated as wikis and blogs. In the process, transformations occur because, though based on earlier forms, they are never quite the same. They bring with them new adjacent possibilities (Kauffman 2000) that make new uses possible and provide the foundations for further technologies to evolve (Arthur 2009; Johnson 2012; Kelly 2010). This chapter is mostly concerned with those possibilities. It categorizes a range of social forms for learning that are facilitated through social software and describes some of the significant tools and methods that can be used with them to help people to learn.

2.2 Dyads

The simplest and perhaps the most archetypal social form for learning is that of the dyad, in which only two people are involved, typically in a teacher–student, master–apprentice, or parent–child relationship. One-to-one teaching is often held up as the gold standard for education with good reason. Bloom famously posed a 2-sigma challenge to teachers and to education systems, online and otherwise, in which he observed that students taught one-to-one show, on average, a 2-sigma improvement in their grades when compared with students taught using traditional classroom methods (Bloom 1984). Unfortunately, for mainstream teaching, the costs of dyadic learning are prohibitively expensive though personal tuition is occasionally used, especially for higher degrees and project support. There are many reasons dyads are so effective but there are three very distinctive features in this relationship that we would like to emphasize:

1. Learner control—through conversation and interaction, the learner is able to implicitly or explicitly make it very clear what he or she needs, understands, finds interesting, prefers, finds confusing or hates.
2. Because of the ease with which misunderstandings and misconceptions can be uncovered, the teacher is able to adapt the method and content of teaching to the learner’s needs. There is no need to try to guess the needs of an intended audience or aim for an average of needs in a larger group.
3. The social relationship will inevitably be close: even if only as a professional requirement, the teacher is clearly interested enough in the student’s needs to engage in the first place, and can be supportive and caring in a way that is hard to match when more people are involved. This remains true to an extent, even if the dyad does not get on very well, the teacher is a bully or the student is reticent. The simple fact of the relationship’s existence places both parties in a reciprocal and generally well understood position of having to interact with the other.

These three distinctive features correlate directly with the cornerstones of intrinsic motivation as described by self-determination theory (SDT). SDT is a theory of motivation that has been tested and refined over some decades and is very well supported by countless research studies that show its applicability and relevance (Deci and Ryan 2008; Reeve 2002; Ryan and Deci 2000; Deci et al. 1991). SDT posits that there are three essential factors that must be present for someone to be intrinsically motivated to learn:

1. Control—the learner should feel in control of the process. This is clearly demonstrated in the first feature (above).
2. Competence—the task must be challenging but not too far beyond the learner’s existing skill and knowledge. This is an outcome of the second feature.
3. Relatedness—there must be a social context to the learning in which the student feels valued by and engaged with others. This is almost inevitable thanks to the third feature.

As long as the teacher is moderately competent and caring, therefore, all the pieces are in place to enable the learner to be intrinsically motivated and to put the necessary effort into learning. Learning works effectively when learners are intrinsically motivated (Balduf 2009). They will work on skills until they have learned them, as long as nothing gets in the way of their motivation, such as extrinsic motivators such as grades (Kohn 1999), external demands (such as excessive family or work demands) or insuperable obstacles, which is where teachers can offer a lot of value. Time on task has the strongest correlation with learning effectiveness of any factor that has been measured by researchers so far (Stallings 1980). The difference between an expert and a nonexpert is almost perfectly correlated with the time spent learning and practicing (Quiñones et al. 1995), although it is not clear which is the cause and which the effect, and other factors are significant too. Coupled with the knowledge of an expert who can guide them in useful directions, it is not hard to see why dyadic learning succeeds. It is not a *method* of teaching but a *condition* in which almost any method can be used, fitted to the needs of the learner.

We have many tools that support dyadic distance education, including telephones, postal mail and their newer more fully featured counterparts like e-mail, Skype, Apple FaceTime, Google Hangouts, instant messaging, etc. These newer tools allow more than just conversation: they let us work together, sharing files, screens, showing videos, and social presence, with greater convenience and less effort than older tools. Furthermore, there may often be a record of interactions that will allow the learner to reflect on and rehearse the conversations, increasing the benefit and impact, and allowing misunderstandings and confusions to be explored and examined.

Although dyadic education is inarguably social, there are some very important differences between this social form and those found in larger groups. In any larger collection of people, there can be factions and majorities. A group of three or more individuals persists when one leaves. There are social dynamics and power relationships. In a learning context, a social form of organization allows for the

teaching role to be spread among learners as well as coming from the one labeled as the teacher. Learners see what other learners are doing, model how they are thinking, pick up ideas about both the content of learning and the ways that it can be achieved or refuted, and gain inspiration and motivation (or the lack of it) from those around them. In a larger group, learners are almost always teachers too, whether or not they intend to be. This can both increase the efficiency of learning and extend the breadth of what is learned. This is especially true when digital tools are used, at the very least because they enable persistence. We leave traces of our interactions in the digital space that continue to provide benefits beyond those of the immediate process of dialog. Digital tools can and usually do reify interaction so that conversations are not just a process of direct construction but also become repositories of knowledge on which we can build. Dialog and other interactions made concrete have particular benefits when many are interacting together, allowing all parties to make contributions that may be heard by others rather than be lost in the din of face-to-face interactions or, more commonly, remain unsaid due to power relationships, groupthink or simple lack of time.

2.3 Groups, Networks, Sets

The benefits of learning with others have long been known. Prior to the advent of large-scale networked technologies, most of our interactions with others were, however, confined to those in close physical proximity. This dependency led to two primary forms of social organization for learning, noted by many researchers:

1. the *group*, typically hierarchically structured, involving norms or rules and processes, with a clear focus and interests, and explicit membership, and
2. the *network*, constituted in terms of our direct connections with others, whether through friendship, relatedness, interest sharing or being in the same physical place (Rainie and Wellman 2012).

One other social form has, however, long existed: the *set*. When large numbers of people gather with no personal connection and no membership of a group with shared norms, such as at a hockey game or in a shopping mall, they may none-the-less gain benefit from (or, such as in the case of mobs, suffer from) the presence of others. Sets are simply defined as collections of people with shared attributes, which may include things like hair color, height, or religion but can also include aspects of far more relevance to learning such as interest in a subject area or topic, competence, and location. It is not uncommon to hear such collections described as ‘communities of interest’ or ‘loosely tied social networks,’ but the *set* is a preexisting and more concise term that fits these characteristics more precisely (Dron and Anderson 2014).

2.3.1 *Collectives*

There is one further form that must be considered to provide a full characterization of social technologies: the *collective*. It is traditional to divide communication that is enabled via digital technologies into one-to-one, one-to-many, and many-to-many variants: this is what we see in each of the social forms we have identified in greater or less degrees. Collectives, however, are concerned with *many-to-one* communication. Individuals in any combination of social forms may exhibit collective behaviors, such as when a crowd gathers around a street entertainer, a footpath emerges across a park as a result of many feet following the same trajectory, or (negatively) when a traffic jam forms emergently as a result of local behaviors. This is not a social form as such but a *consequence* of the actions of individuals that are aggregated from within other social forms, especially from sets but also, to a lesser extent, from networks and, occasionally, from groups (Dron and Anderson 2009). A collective acts as a single agent that can have a large effect on individual people, who may themselves be participants in the crowd that drive it. While collectives can occur without intentional design, simply through the decisions made by their constituents, digital technologies allow the crowd to gain more complex agency through manipulation of interface and algorithms for aggregating crowd behaviors. When we interact in a networked system, traces of our interactions may be mined and manipulated in ways that are not directly intended to communicate other things with others than the interactions themselves. For example, social navigation technologies such as tag clouds, trails, and presence indicators may be used to identify things that people find interesting or relevant. Google Search employs an archetypally collective design in its PageRank technology that uses a crowd's implicit recommendations to order the list of search results displayed to individual searchers (Page et al. 1999). Other common collective tools include rating systems, reputation management systems, and voting systems, in which the aggregated recommendations or ratings of many people are used to help individuals to make decisions.

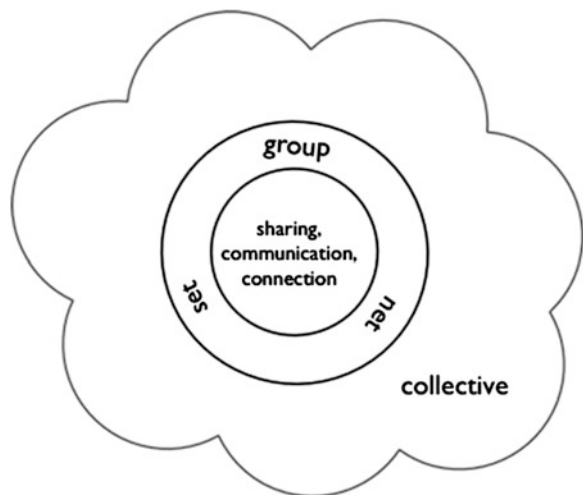
2.3.2 *Combinations*

Groups, nets, and sets are overlapping categories that, more often than not, blur and blend, and all may contribute to a collective. Every group is also a set and nearly always a network. Every network is a set, the shared characteristic being connection in the network. But there are also many overlaps where one or more form is blended with another. For example, tribal groups like Goths or hockey supporters may be seen as sets, though they have shared norms and behaviors of the sort typically found in groups. Religious or political organizations are also set-like, but may involve greater group-like aspects such as hierarchies and explicit rules of behavior albeit without (necessarily) close personal ties. Communities or networks of

practice (Wenger 1998; Wenger et al. 2011) share cohesiveness and common goals with groups, but have fuzzy edges and are formed of personal networked connections like networks. The social forms of sets, nets and groups are thus more like a palette of colors from which social organizations may be painted than mutually exclusive categories. The proportions of their distinctive features in any learning activity involving other people can strongly shape both interactions and the effectiveness of particular learning interventions. Figure 2.1 provides a visual diagram of these entities, indicating the blur between the categories and the fact that a collective can emerge out of any or all of them.

As the Internet has grown, different toolsets have been developed that support or encourage different social forms' emergence. Tools for groups, tools for social networks, and tools for communities of interest, or sets, not to mention support for using the wisdom of the crowd as collectives to help guide and shape our interactions. The aforementioned benefits of reification, combined with the massive interconnectivity of the Internet, have significantly increased the scope, breadth, depth and sophistication of the ways these social forms and their emergent collectives can support our learning. Every day, new ways of connecting with others are developed, often in ways that can positively or, sometimes, negatively affect our capacity to learn from and with other people. From the trivial—shared images of cats, say, or mind-numbingly stupid memes—to the profound, such as new forms of academic publishing, new scales of course delivery in MOOCs (massive open online courses) and new ways to discover knowledge, we are finding new ways to learn, engage and connect with other people. To those who question whether online social learning can work, we offer a simple challenge: to what do you first turn when you need to know something? For those with an Internet connection, the answer nearly always lies in Google Search, Wikipedia, Twitter, Facebook, or some other deeply social networked technology, some product of the read/write web.

Fig. 2.1 Sets, nets, groups and collectives (after Dron and Anderson (in press))



Online social learning is perhaps the most significant broad category of deliberate learning in the world today, though language and writing still underpin these technologies and remain of greater primary importance. But, as well as magnifying our capacity to know, we are also discovering new ways to be stupid (Keen 2007), new ways to narrow rather than broaden our focus (Pariser 2011), new ways to be distracted and shallow (Brabazon 2007), new ways to become disconnected from one another (Turkle 2011). If we are to avoid the pitfalls and make the best possible use of these new technologies, learners and teachers need to understand what they are capable of, how they affect us, what are their weaknesses. At the heart of these problems lie the kinds of social form that are involved. Different social forms bring different values as well as different risks. We present here a very brief overview of issues covered fully in our forthcoming book, *Teaching Crowds: learning and social media* (2014) to provide a sense of the technologies and concerns with each social form and the role of collectives in supporting them. It should be noted that it is almost impossible to find a pure group, set, or net in the wild, so our brief overviews necessarily present caricatures of their behaviors. In real life, human interactions are complex, forms overlap, and people are members of many different communities that support their learning.

2.4 Groups

Groups are the stuff of formal institutional and organizational learning. They typically have labels ('COMP266', 'Introduction to Philosophy', etc.) and rites of joining and of leaving. They have rules, unwritten and/or written. They have hierarchies and roles, usually being led by a tutor of some kind. They enable collaboration, teamworking, and scheduled activities. They usually have a fairly clear purpose or focus. They are designed. In an educational context, they exist as classes, courses, cohorts, tutorial groups, seminar groups, schools, colleges, faculties, committees, and other deliberately created structures in which people work and learn.

2.4.1 *Group Pedagogies*

Group pedagogies typically emerge from a social constructivist tradition (Vygotsky 1978; Dewey 1916), in which learners help to construct knowledge through dialog and shared inquiry. Teachers in groups are, ideally, guides on the side, supporting and nurturing knowledge, growth, and facilitating discussion, debate and problems designed to challenge learners. Collaboration and/or competition tend to play important roles.

2.4.2 Group Benefits

When done well, group learning offers many of the benefits of one-to-one teaching, with further benefits emerging from the fact that all those in the group may play some teaching role, supporting one another's learning and helping to provide motivation. Groups are highly developed social forms that exist in many different configurations and have done so since prehistoric times. We know how to work together in groups, and there is a wealth of theories and models that explain group dynamics, group formation, processes for managing groups, and so on. Our institutions and organizations tend to be highly group-based. Groups are great for enabling collaboration, the development of trust and mutual support, for supporting planned learning journeys with clear directions and goals.

2.4.3 Group Problems

Groups are expensive to maintain: there is typically a need for administrative overhead. They often come at a cost of restricting time, place or pace of learning: as commonly used in education, they necessarily inhibit the control of at least some members. Because they are led and planned, topics may be of limited interest to at least some of their members some of the time: there is usually an averaging that makes some things boring, some too complex so, although social interactions allow negotiation of control and the potential for people to help others to understand things, their support for control and competence is a little coarse and uneven. They are subject to groupthink and are highly influenced by the quality of the group leader and the dynamics of social interaction. Group leaders may have limited knowledge when compared with all that might be known about a topic.

2.4.4 Group Tools

Digital group tools include, notably, learning management systems like Moodle or Blackboard, content management systems like Drupal or SharePoint, discussion forums, email. Such systems usually provide authorization and access control organized through roles and/or hierarchies.

2.5 Networks

Networks are concerned with the social connections between individuals, and the emergent clusters and circles that occur as a result. Joining a network consists of connecting with another person. Networks are therefore not designed, like groups,

but emerge out of connections with others. They have fuzzy edges and may often only be clearly distinguished through complex analyses of social ties. Networks are built out of trust and social capital. We learn from and with people that we know who help us to discover things, solve problems.

2.5.1 Network Pedagogies

Network pedagogies typically evolve from a connectivist tradition (Siemens 2005; Downes 2008), in which knowledge is seen as an emergent network property, and connection and creation are valorized. In a network, everyone is a potential teacher but those who are most valued tend to act as role models and exemplars, sharing and connecting knowledge and people effectively, sharing cooperatively. Reflection, especially when shared with others, is vital. Many people make use of learning diaries, typically kept as blogs or portfolios to gain control of the disparate and loosely connected sources. Others use curation tools to provide a way of reifying their interactions and discoveries. Networked learning is about making sense of complex connections with the support of others, who may also help with a process of wayfinding—many people can explore multiple paths more efficiently than single individuals.

2.5.2 Network Benefits

Networks offer far greater freedom than groups for learners to discover and follow learning paths that are of interest to individuals, without following the plans or being subject to the constraints of others. Of all the social forms, networks are most firmly focused on the individual—what Rainie and Wellman (2012) describe as ‘networked individualism.’ With a focus on individual needs but with social ties to rely on, network-based learning is great when goals are unclear or emergent, when many heads are better than one, and to support the interests and motivations of learners. Networks provide relevance and meaning to individual learners, providing much control. The use of personal connections means that social motivation is well supported, with knowledge spreading through trusted networks.

2.5.3 Network Problems

Networks may lead to filter bubbles as people tend to connect with those they share some affinity. Furthermore, with little inherent structure beyond what emerges as ideas and memes spread around a network, learning paths may be inefficient and making choices between alternatives may be confusing. Depending on the other

people in an individual's network, support for setting tasks that are appropriate to a learner's current level of competence may be patchy. There are risks of the blind leading the blind. Cultivating skill in the use of networks is important and, for less adept learners, may present a barrier to success. Networks offer many potential distractions unless methods or technologies are provided that allow the network to be segmented into relevant circles.

2.5.4 Network Tools

Digital network tools include, notably, social networking systems like Facebook, LinkedIn, Academia.edu. @mentions and following in Twitter, links between personal blogs. Such systems typically provide means to assert identity such as profiles, as well as authentication that provides trust in such identities. There is rarely much support for roles or hierarchies. Instead, many network systems allow parcellation of the network into lists or circles, allowing individuals to cluster their connections to support different learning needs. Alternatively, different tools may be used to support different subsets of one's network. For the purposes of assembly and construction, some form of personal learning environment (PLE) is useful. This can take the form of an aggregation tool like Evernote, Pocket or ReadItLater, or a purpose-built tool such as the personal dashboard provided by Elgg, which allows the user to fill a personal space with not just curated objects but also dynamic content and interactions from their network. Collectives may play an important role in networks in allowing the discovery of 'friends of friends' who may have the knowledge or competence needed to support learning needs, as well as potentially supporting the wayfinding process (Tattersall et al. 2005).

2.6 Sets

Sets mainly revolve around shared interests, with little or no explicit social connection of the sort found in networks and little or none of the design found in groups. In this way they are almost the polar opposite of networks, reducing the significance of individuals within the collection of people, and emphasizing the importance of content and subject-matter.

2.6.1 Set Pedagogies

Set pedagogies tend toward cognitivist and behaviorist models of content transmission that are concerned with how individuals learn. However, the choice of set and thus of content is entirely due to the individual learner, so they are pedagogically

situated within a heutagogical tradition of self-organized and self- or peer-guided learning (Hase and Kenyon 2000; Dron 2004; Mitra 2012; Saba 1999). As for nets, individuals, supported by anonymous or barely known others, are concerned with sensemaking and wayfinding.

2.6.2 Set Benefits

Of all the social forms, sets offer the most freedom to the individual learner to guide his or her own learning. Without the filter bubbles and affinities of networks or the groupthink of groups, sets can be highly diverse, allowing many different and antagonistic viewpoints to coexist. They are thus a great source of creativity and discovery. Sets are also a useful way to gain entry into a community surrounding a particular subject area, to become familiar with norms, vocabularies and issues without having to be deeply engaged or committed to the community. They also have great value as a means of extending and developing networks. Some may evolve into or provide an entry into groups. Finally, sets can be excellent for problem solving, where diverse perspectives on problems can provide plentiful alternative solutions.

2.6.3 Set Problems

It is hard to judge the value of content and hard to trust individual people in a set. It is also sometimes difficult to find the right combination of people in a set with the right level of expertise: too little, and they are useless, too much and they are bewildering and demotivating. The relative lack of social structures or social ties mean that flaming, grieving, and trolling are commonplace. While sets are all about the subject, individual learners have the responsibility of choosing which sets to engage with and which people to pay attention to. For these reasons, the role of collectives in set-based learning is crucial and paramount. Crowd-based methods of ascertaining value such as reputation systems, collaborative filters, rating mechanisms, voting systems and crowd-based spam control are central to the effective operation of public set-based learning systems.

2.6.4 Set Tools

Digital set tools include, notably, Wikipedia pages, curated pinboards such as Pinterest and Learnist, Q&A sites like StackOverflow or Quora (though the latter has strong network elements too), shoutboxes like SlashDot, Reddit, Digg or news site discussions, #hashtags in Twitter. Like networks, PLEs and curation tools can

be very valuable to the set-oriented learner, enabling sensemaking and organization of an individual learning path. It is also important that the set-based learner can make use of collective toolsets such as collaborative filters and tag clouds effectively. While, for systems like Google Search or tag clouds, this may be fairly intuitive, some set-oriented systems allow a great deal of customization and personalization of crowd recommendations, from the fine tuning of Amazon recommendations to the hundreds of different combinations of options on SlashDot.

2.7 The Future of Social Learning

As our brief overview has shown, each social form has strengths and weaknesses. There is a tension between the decentralization and individual autonomy promoted by network and set social forms and the centralization and manageability of group-oriented forms, which we see played out in the technologies used to support them. The rapid shifts in technologies that we see in the social software field are constantly moving targets. For network-oriented tools, network effects can lead to explosive growth and, as quickly, rapid shrinkage in uses of tools and systems. Similarly, and with the same network dynamics, sets come and go, existing on an evolutionary landscape with many niches within which only a few thrive and, again, the field is volatile. With a few notable exceptions (Wikipedia or YouTube, for example, both appear at the time of writing to be fairly unassailable) set-oriented systems come and go with startling rapidity. As we write this, Twitter and Pinterest are pack leaders, but this could change within a short period. The relative demise of giants like MySpace, Digg, Bebo, and Friendster amply demonstrates that tens of millions of users can become a trickle in the space of months. And the pace is accelerating. It took many years for Usenet News and Gopher to slowly decline, while Digg collapsed in a matter of weeks. This is the flipside of Metcalfe's Law (Metcalfe 1995), that the value of a network is proportional to the square of the number of connections: networks can shrink geometrically as well as grow. Within group-oriented systems like schools and universities, the opposite is true: massive investments in tools and systems to support interaction leave such deep and expensive traces that it becomes economically and practically infeasible to change platforms, especially where (following the group hierarchies) such systems are embedded from the top down. What felt like rational decisions to consolidate disparate LMSs in order to gain efficiencies and benefits of shared resources have come back to bite universities and schools hard now that they are effectively locked into single tools and systems. With every passing year and every bit of content loaded, training accomplished and systematic interdependence established, the systems become so integral to an institution's operations that the effort to move to a different platform makes a shift unthinkable. Canny publishing houses such as Pearson are rapidly moving into enhance and extend these tools in ways that, while making the lives of some teachers easier, make the lock-in worse. Meanwhile, set-based and net-based tools, often hosted in the cloud, are encroaching. This is most

visible in the emergence of MOOCs and open educational resources that offer alternative and often disaggregated tools for learning. This decentralization is a two-edged sword. Though there are many options for those seeking to learn, such systems are again centralized at an individual system level and, in many cases, lock content and processes into specific systems from which it becomes hard to extricate oneself. On the other hand, they are distributed and have a rapidly expanding number of competitors. When the cost of engaging in a MOOC as a teacher or as a learner is low, it takes very little effort to shift from one to another.

We believe that, to take full advantage of the opportunities afforded by tools that support network and set social forms, it is crucial to build distributed systems without single points of control. Connectivist models of learning work on an assumption of open and unfettered connection, communication, and sharing. This makes them scalable and resilient, as well as highly adaptable to fast-changing needs and technologies. Systems built from small pieces are inherently more flexible and, ultimately, more reliable than carefully managed centralized systems.

To support such distribution, we need to look at different models of control and accreditation than those based around groups and hierarchies. The Open Badges project (<http://openbadges.org>), an open set of standards and technologies supported mainly by the Mozilla foundation, suggests an accreditation framework that has the flexibility and authority to compete with centralized models and allow evidence of lifelong learning outside closed group-oriented institutions to be counted. Anyone may award a badge to anyone for anything, each badge certified by the signature of its issuer and, through the same technologies, untransferable to another recipient. The system is very flexible and allows for an incremental shift in authority. Badges may be awarded, for example, for courses and degrees by institutions that are already known to be reliable. However, they can equally be awarded by individuals, whose reputations may equal or exceed those of institutions. We are already seeing effective use of a similar approach, albeit within a closed system, in the form of LinkedIn endorsements, that allow people to endorse the skills of others within their network. A network of people that you trust thus is enabled to provide a fairly reliable indicator of the skills and abilities of others in the network.

2.8 Conclusion

Social technologies are soft tools that can and must be seen as consisting of both tangible digital software and devices and less tangible social behaviors, norms, rules and methods of the people that use them. There is an intimate relationship between the constraints and propensities of those tools and the behaviors that occur within them. The tools both embody and facilitate the use of pedagogies that are entwined in a dynamic dance. Different tools lead to different behaviors but, equally, the same tools can lead to very different behaviors when applied to different social forms. As our tools become more sophisticated, they open up new

possibilities and lead to the development of yet more sophisticated tools and methods, so we are in the midst of an explosion of invention in which the goalposts move on an almost daily basis. In this chapter we have provided a framework for looking at and understanding this evolving landscape from the perspective of how social learning can be supported. As our education comes to be seen not as (just) the outcome of institutional and commercial courses, but something that is ongoing and lifelong, the traditional group-based approaches to teaching are beginning to look clunky, inflexible and expensive. The ability of net-based tools to support and enhance the old social patterns of sets and nets, especially when combined with analytics that enable the collective to gain greater power and agency, makes them of huge importance for learning not just in the future but for today. We are just beginning to learn ways to take advantage of this enormous power and there is much research and invention still needed before they can release the strong hold that group-oriented learning methods have on our society, and some large problems to be overcome. We have evolved as a species in groups, and the forms that have evolved are highly sophisticated and well developed. There will probably always be a place for group-based methods, albeit greatly enhanced by the power of social forms that extend beyond them but, if we are to move forward and allow rich, lifelong learning for all, we must find ways to take better advantage of the large and richer networks, sets and collectives that the Internet makes possible.

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