Abstract
Course management systems (CMSs) display tendencies towards emergence, evolving through activity that takes place in many micro-level contexts. However, some systems are designed in more directive ways than others, and importantly, this is not just a factor of the type of CMS, but of the sociotechnical structures that exist around it. Directive systems increase the tendency that ways of working will be reified in the system, which then isolates it from organizational learning processes and blocks true emergence. On the other hand, responsive systems can act as a “boundary object” for multiple stakeholders, and can also broker the exchange of learning between activity systems in different universities. As an open source system, Moodle has the potential to be responsive, and we examine two case studies of its use in distance education. Our conclusion is that these program teams have succeeded in bringing their micro-level learning processes to bear on the central Moodle kernel, but not their host institutions.

Introduction
Between 2005 and 2007, our “Technology at the Planning Table” (TPT) project conducted eight qualitative case studies of distance learning programs across five universities in the UK and U.S. Our cases used a variety of course management systems (CMSs), including commercial, open access/open source, homegrown, and ad hoc (academic-created) systems. We concentrate here on lessons learned — by us as researchers
and by our subjects — regarding the use of open access/open source CMSs in constructing and delivering distance learning programs.

Although it is not only open source CMSs that can be emergent, we suggest that due to the way they are designed, the practices that contribute to their evolution are more likely to be inclusive and participatory. Operational proximity (Tagliaventi & Mattarelli, 2006) between technical support and teaching staff is easier to achieve with open source systems, and is of significant importance in improving the responsiveness of any CMS. We believe that these key concepts — participation, emergence, operational proximity, and responsiveness — increase the possibility that learning, from diverse professional and organizational perspectives, can actively contribute to the evolution of distance education teams and their CMSs. However, distance educators must consequently bear in mind that the CMS, and the organizational structures that surround it, will also be affected by the needs of other on-campus systems.

Emergence Through Activity

The TPT project uses the dynamic and holistic method of modelling activity developed by *activity theory* (Engeström, Miettinen, & Punamäki, 1999; cf. Bedny & Harris, 2005). Activity systems are comprised of relationships — and tensions — between many elements. Even systems built around the same basic technology, such as a CMS, will have diverse configurations of elements such as rules, divisions of labour, and external relationships (Benson, Lawler & Whitworth, 2008), which require that technologies, and organizations that create and use them, are both context-dependent and in a constant state of evolution.

De Wolf and Holvoet (2005) state:

> A system exhibits emergence when there are coherent emergents at the macro-level that dynamically arise from the interactions between the parts at the micro-level. (p. 3)

CMSs are emergent because the interactions that form them take place in many micro-level contexts. But the ways in which they *cohere* depend
on the organizational structures with which they co-evolve (Andrews & Haythornthwaite, 2007). What micro-level contexts within a system—such as a higher education institution (HEI)—are permitted to influence macro-level outcomes? Organizational structures such as hierarchy and/or strict divisions of labour, will result in emergent systems that are less inclusive. These structures promote not participation in macro-level processes, but direction of some parts of the system by others.

In Benson and Whitworth (2007), we suggested that the alternative to a directive system was one that was responsive. We characterized both of the case studies that used commercial CMSs and one of the “homegrown” CMSs as directive; the rest, including the two cases with open source CMSs, we characterized as responsive. Responsive CMSs could respond to user needs innately, through flexible design, but also by being placed in a wider activity system that promoted active and direct negotiations between users and developers. On the other hand, directive CMSs could evolve in response to user needs indirectly, at best. They tended to represent higher-level control of the teaching and learning process: a system that had been largely shaped by decisions that were not inclusive, characterized also by a lack of “operational proximity” (Tagliaventi & Mattarelli, 2006) between technical support and teaching staff. The influence of operational proximity on communication within the system shows that responsiveness can be designed into, and emerge from, a sociotechnical system, and is not simply a characteristic of CMS type (commercial, open source, homegrown, or ad hoc) alone.

Participation and Reification

Emergent systems are highly complex and dynamic, throwing up organizational problems that are ill structured (Kitchener & King, 1990) and ambiguous (March & Olsen, 1979). In such circumstances, participation is an ongoing and social process of learning. Hence the development of communities of practice (Wenger, 1998), in which actors within a context develop their own understanding of it through the sharing of practices. This takes place largely informally, and is not directed by
management decree or procedure. Indeed, it is often in opposition to them (see the example of the insurance claims processors in ibid. and in our examples below). Communities of practice can exist in any organization, but frequently develop “under the radar,” adapting to, and possibly subverting or avoiding, policies mandated from above (ibid.). For instance, they may find “workarounds,” or simply not implement decisions made by the centre.

Ambiguity is common in the education sector (March & Olsen, 1979). As a result, the professional practice of educators is not adequately promoted by centralized regimes of training, but is made more effective by participating in ongoing individual and group processes of self-reflection (Carr & Kemmis, 1986); of learning how to learn and becoming “reflective practitioners” (Schön, 1995). Such learning is facilitated by strong communities of practice (Friedman, 2001). Consequently, these communities are more significant and overt in educational organizations than in other sectors, except perhaps in other “professional” organizations (Mintzberg, 1989, p. 173–95). This helps explain the historic and decentralized structure of the typical Higher Education Institution, with strong community and network ties within disciplines, but only weak ties across them. What ties different communities of practice into a single HEI is not their core professional activities (teaching/learning, research, and professional development), but administration, and HEIs are “loosely coupled” (Weick, 1976) as a result. Within smaller educational communities, however, the level of participation and learning can, in principle, be high.

Wenger contrasts participation with reification:

Where participation is about acting, interacting, and living in the world, reification is about the development (process and product) of artefacts and objects that embody aspects of the practice. Reification involves making aspects of the practice tangible, what Wenger calls giving “thingness” to the often implicit qualities of the practice. (Stuckey & Barab, 2007, p. 447)
Significantly, reification can happen at each end of the top–bottom organizational scale. Values, organizational goals, and procedures can be centralized, and thus reified, into technostructures (Mintzberg, 1989): parts of an organization mandated to design and control the work of others, such as business process analysts. Through reification, ways of thinking are “pushed” at members of the organization, locking activity in place around assumptions that become unquestioned and “natural” (Blaug, 2007; Whitworth, 2009, ch. 9). Though HEIs are historically decentralized, tendencies towards centralization and thus reification have increased following the widespread integration of ICT into many of their core activities (Robins & Webster, 2002), and the consequent strengthening of HEIs’ technostructures. These are the “tangible” artefacts and objects that reify certain aspects of organizational practice. However, reification can also happen when communities of practice isolate themselves, drawing together around shared ties but excluding input from outside the community, turning “core competencies into core rigidities” (Brown & Duguid 1998, p. 97). Loose coupling between different parts of an organization makes innovations (the result of social learning processes) difficult to diffuse across community boundaries (chapter 11). This is one reason why Mavin and Cavaleri (2004) called academia “the last place to find organizational learning” (p. 287).

Both forms of reification — centralization and isolation — are often a response to the other. For example, where Bennett and Bennett (2003) say that “despite the increased pressure being placed on faculty to integrate technology in their courses, many are reluctant to do so” (p. 54), the despite might be better as because of. Communities may respond to increasing centralization with subversion or avoidance of new procedure. Their community-level solutions and workarounds become the object of their activity, rather than the CMS as a whole (Benson & Whitworth, 2007, p. 87–89). This is no more likely than centralization to lead to the questioning of basic assumptions held by communities of practice and thus locked into technological artefacts. Both organizational learning and professional development will likely suffer. A directive CMS can drive a “wedge” between communities of
practice and the technostructure, encouraging each to reify its existing practice and thus retard critique, organizational learning, and the evolution of both the system and the practices it embodies.

On the other hand, a CMS that is negotiated between both the centre and the periphery can be an architecture of participation (see Garnett & Ecclesfield, 2008), promoting both professional practice and organizational learning. This would help the system to remain truly emergent: that is, emerging from the broadest range of micro-level contexts, rather than having its nature determined by only a limited subset of stakeholders. For this to happen, ongoing processes of negotiation (Cervero & Wilson, 1998) are required between various stakeholder communities, which challenge “the limits of each [stakeholder] community’s beliefs” (Brown & Duguid, 1998, p. 98). Such negotiation is more likely to take place in informal work settings “on the ground” than in formalized meetings, and is facilitated by the existence of operational proximity between different stakeholder groups: that is, opportunities for them to work together in a shared context (Tagliaventi & Mattarelli, 2006).

How, then, can architectures of participation be facilitated in HEIs, in ways that work with both their loosely coupled structure and the new ICTs and external pressures; and that do not, as a result, encourage the reification and thus perpetuation of current practice, both at the centre and periphery?

**Open Source CMSs as Boundary Objects**

Embedding values into technology is how organizations learn: “through the storage of individual knowledge in organizational structure and routines” (Tagliaventi & Mattarelli, 2006, p. 293). But damaging reification occurs when different cognitive cultures (Whitworth, 2007) that could potentially contribute to a system design are no longer communicating across their boundaries. What becomes embedded will then be a singular perspective, that of an isolated community of practice (which might be core — the managers’, for instance — or peripheral).

However, a truly negotiated CMS becomes a boundary object. Fischer and Ostwald (2005) say that boundary objects have meaning
within the conceptual knowledge systems of at least two communities of practice. The meaning need not be the same — in fact, the differences in meaning are what lead to the creation of new knowledge. (p. 224)

They go on to say that

Boundaries are the locus of the production of new knowledge…. boundary objects should be conceptualized as evolving artifacts that become understandable and meaningful as they are used, discussed, and refined…

The interaction around a boundary object is what creates and communicates knowledge, not the object itself. Humans serving as knowledge brokers can play important roles to bridge boundaries that exist across or within communities. (Fischer & Ostwald, 2005, 224–5)

When multiple perspectives contribute to a boundary object, it becomes the locus of a community of interest. Fischer and Ostwald (2005, p. 213–4) suggest that these communities of interest address “the challenges of collaborative design involving stakeholders from different practices and backgrounds”; promote “constructive interactions among multiple knowledge systems”; and rely “on boundary objects to mediate knowledge communication.” Crucial to this process is “the educational impact of participation itself” (Blaug, 2007, p. 41). A negotiated, participatory, and responsive CMS brings together the various cognitive cultures in an HEI (at both centre and periphery) within the boundary object that is the CMS.

As we have said (above, and in Benson and Whitworth, 2007), responsiveness in a CMS is not solely a property of open source technologies such as Moodle. In addition, it would be quite possible for a Moodle solution to be imposed from the centre and direct the behaviour of users, thus acting as a “wedge” between core and periphery. Nevertheless, the open source approach to technology development does provide certain channels for participation that other types of CMSs do not.
Many Moodles exist throughout the education sector. Moodle was specifically designed to be easy to adapt to different contexts (Dougiamas & Taylor, 2003), and it scales easily from single, one-off uses on a particular course to serving the needs of large universities. Also, in principle, any user can design a Moodle-based innovation that could be accepted into the central technological architecture, the Moodle kernel. Therefore, as well as being a boundary object at the organizational level, the Moodle.org community works at the meta-level to develop a shared understanding about the architecture on which local Moodles are based. This is, partly, a technical, programming task. But it is also a matter of developing shared understandings about the pedagogical (or other) principles that drive the technology. Moodle is based on social constructionist principles (Dougiamas & Taylor, 2003; Moodle.org, 2008), though, importantly, “Moodle doesn’t FORCE this style of behaviour, but this is what the designers believe that it is best at supporting” (Moodle.org, 2008). In theory, through the “free market” principles of open source software, these principles are being constantly validated and dynamically updated by a global community of users. Although Moodle.org therefore exists to reify practices into the technological object that is the Moodle kernel, this reification is under constant review (chapter 1). In principle then, operational proximity is easier to design into, and be retained by, activity systems that use Moodle (or other open source CMSs) compared to other types.

In practice, however, Moodle is susceptible to distortions that affect any community that “focuses heavily on building a body of quality resources” (Stuckey & Barab, 2007, p. 446); “the ‘grab and run’ action of many new members becomes counter-productive to dialogue” (ibid.). Moodle could be passively consumed by users rather than being actively generated by them (see Luckin et al., 2010). This places the burden of development on only a small proportion of users. It is also a form of exclusion and isolation of practice. Also, work at the community of practice level will also be subject to distortions that originate outside the activity system, for example, pressures placed on course teams by technostructures and management at the institutional level.
A Tale of Two Moodle Sites

Our research included two program sites where Moodle was the CMS of choice. PAP (“Public Administration Programme”) is a wholly online UK Masters program. It originated and was funded as part of the UKeU project and survived that institution’s collapse (Conole, Carusi, & de Laat, n.d.). E-TECH is a wholly online US Masters program in education. The program originated with funding from the Sloan Foundation. The programs were very similar in organizational structure but very different in philosophies of online teaching and learning (see also Benson et al., 2008).

Program goals

Two primary goals drove the E-TECH program: 1) to provide a site for research into online learning tools, technologies, and strategies; and 2) to provide a stable and effective online E-TECH program. PAP’s primary goal was to provide a stable and effective online program that was self-supporting.

Program and campus technology

E-TECH’s selection of the open-source Moodle software as its course management system is reflective of the program’s goal to be a research bed where instructor researchers could perform trials and demonstrate online technology tools and strategies. PAP’s selection of Moodle was more practical. They had to quickly move from the vanishing UKeU platform, and Moodle was a reasonable alternative that was available on a local server.

E-TECH used Moodle and several other commercial and open source supporting technology tools in its courses, while PAP was a strict user of Moodle-only tools. Both the PAP and E-TECH campuses adopted Blackboard as the campus-wide commercial course management system. PAP’s university did so despite PAP staff lobbying for Moodle. After this decision, the PAP program was directed to move PAP to Blackboard. PAP staff had to make a case for why they shouldn’t move to the new system. The process was contentious, but PAP was allowed to continue its use of Moodle, though not indefinitely.
E-TECH staff have not been directed to move E-TECH to the campus system. In fact, the campus office that administers external programs like E-TECH provides E-TECH with technical support for Moodle and the other technology tools the program uses. The research objective of the program and the researcher roles that instructors play may keep E-TECH shielded from such influence in the future.

Program cultures
Because of the two-fold objective of the E-TECH staff, the E-TECH philosophy tends towards an open and non-standardized course design. Instructors are encouraged to experiment in their course design, which results in students having drastically different experiences in each course in the program. E-TECH operates its own budget, using funds generated by student enrolment and subsidized by the academic department in which it is housed. Finally, E-TECH staff fully support Moodle.org and participate frequently in its forums.

The PAP culture tends toward standardization of course design and tutor practice with the use of compliance documents, such as course development guides, tutor contracts, and student guides. PAP sponsors a yearly conference for tutors to further enhance the community aspect. PAP operates its own budget, using funds generated by student enrolment and subsidized by the academic department in which it is housed. PAP also fully supports Moodle.org and submits each new feature it develops to Moodle.org for inclusion in the base Moodle product. However, this is not quite as inclusive a process as it is with E-TECH, as the next section will show.

Program communities
Several stakeholder groups participate in the development and ongoing administration of both programs, but the divisions of labour differ between each system (here, see also Benson et al., 2008). For example, in E-TECH, instructors and developers work together to provide course content and activities. E-TECH staff (teaching and development assistants) build the courses, and instructors teach them. E-TECH staff and developers serve as the first line of technology and administrative
support for instructors and students. E-TECH also benefits from a university-level academic support organization, which works with them to provide advanced software support, including fixes and new feature development.

Likewise, several stakeholder groups participate in the development and ongoing administration of PAP, but the relationships are different. While PAP staff remain the builders of courses, content and activities are provided by content experts, and then tutors, full-time and part-time, teach the courses. PAP staff are the first line of technology and administrative support for tutors and students, but advanced software support is less integral to PAP than it is in (and around) E-TECH. An external contractor provides advanced software support, including software fixes, new feature development, and Moodle.org liaison for submitting locally developed features. The university’s technical support staff only support the university’s standard virtual learning environment, Blackboard (eLearning), not Moodle.

Lessons Learned

Summary

While E-TECH and PAP have similar organizational structures, their reasons for choosing an open-source CMS such as Moodle and their philosophies of using it are very different. Within the program, PAP tutors are directed to use Moodle in certain ways, whereas E-TECH’s researchers and instructors have more freedom to explore alternatives if they feel these would be more pedagogically effective on their course. However, PAP has moved over time to a less directive stance vis-à-vis its tutors.

These differences point to a key feature of open source systems: they can be standardized for users who want standardization and they can be individualized for users who prefer customization. This feature sets open source systems apart from commercial systems.

No cost vs. different costs

Often people think of the open source option for course management systems as a free or low-cost alternative to the major commercial
systems. While it is true that the source code may be free or less expensive, there are hidden costs associated with the use of open source course management systems. The biggest of these costs is technology support and administration. E-TECH employed a Moodle programmer and technology support staff, while PAP purchased a Moodle programming and technology support contract from an external provider. In addition, these programs require pedagogical expertise in online course design and delivery. These skills are not necessarily found in Moodle programmers or technical support, so additional pedagogical support staff are also needed.

However, although the operational proximity between instructors, developers, and Moodle itself was slightly less in PAP than E-TECH, both teams were active users of Moodle, not just passive consumers of its benefits. In both cases, these teams did succeed in having the results of their reflective practice—their learning about the system-in-use—embedded not only into their local Moodle but also into the Moodle kernel. Particularly for PAP, in which members of the course team had less freedom and fewer resources with which to experiment and innovate with alternative technologies, this was a way of stabilizing the system-in-use, rendering the team as a whole less vulnerable to updates to the system coming in from outside, that is, being imposed on them as a result of changes to the Moodle kernel developed elsewhere. Their reflective practice, therefore, has increased the knowledge base of the team as a whole, and embedded that knowledge, at least partly, into the technological architecture. Active use of the CMS, therefore, leads to a more negotiation-based, participatory, and responsive system, as opposed to a directive one.

Centralization vs. localization

One observation that can be made from the PAP and E-TECH programs’ use of Moodle is the tension that exists between campus-level administrators and systems and program-level administrators and systems. This tension exists because campus-level administrators and program-level administrators have different primary goals. In both E-TECH and PAP, campus-level administrators were concerned about
security and the integration of course management systems with other campus systems for registration, security, and grading. These were not the primary goals of either of the programs.

The tensions suggest a question that campus administrators must address: what is gained from the centralization of course management systems and their support as opposed to what is gained from de-centralization? There are no easy answers. Benson and Whitworth (2007) determined that centralized systems tended to be less responsive to their users at the program level than de-centralized systems managed locally by the programs themselves. As a result, program-level administrators tended to use subversion tactics — employing workarounds to address system shortcomings instead of working with campus-level staff to address them — when required to use campus-level systems. Examples of subversive tactics include using the centralized CMS as a front-end to the program courses, but providing the actual content directly on the Web or with locally managed external applications. As we noted above, this is an example of the workarounds becoming the object of activity rather than the CMS, and the learning that these course teams engage in is consequently not feeding back into the system. In situations where this “subversion” happens — which included all three of the directive systems we researched (Benson & Whitworth, 2007) — the system cannot be said to be truly emergent.

This did not happen so obviously with either of our Moodle case studies. Both were self-contained in technological terms, and both expressed a commitment to a management style that they self-termed “laissez-faire” (E-TECH’s course director) and “inclusive … enabling the people who work on the team to have as much responsibility and as much ownership as possible for their work” (PAP’s course director). E-TECH’s director continued:

You bring your best ideas in for your course, and we’ll help you mix and match and merge that with the best ideas from technology, and we’ll get the course up. And if you wanna ask some questions of us, we’re there to help you. But we’re not there to pass muster on your ideas, [your] pedagogical and course information ideas.
E-TECH’s policy is facilitated by a research student who is also paid to act as the local Moodle developer, and as noted above, he has an active relationship with the kernel and Moodle.org. There is thus an ongoing process of negotiation occurring here, not only between members of the E-TECH team, but through this brokerage (see Fischer & Ostwald, 2005, p. 225, and above), E-TECH and other activity systems that share its technological architecture. For E-TECH, Moodle is a genuine boundary object working at both the micro-level and the wider macro-level structure. Though divisions of labour are stronger in PAP, this is at least in part explained by its courses being targeted at civil servants, rather than at educational technologists. Deliberate policy decisions were taken to standardize certain practices, as it was believed this would make the technology easier to use for its students. Teaching staff were also not expected to engage with CMS technology at the level of research and active use. Nevertheless, over time, a more participatory system is emerging at the micro scale, and Moodle has always been a boundary object between PAP and other systems.

Ideally, campus-level administrators must be sensitive to the different types of CMS users. Users who are delivering full programs online have different needs than users who are supplementing their traditional campus courses with online content, activities, and resources. The campus-level administrators on the E-TECH campus were sensitive to the needs of the program and supported the open source system. The campus-level administrators on the PAP campus were also sensitive to program needs, but they felt the campus security needs overrode those needs. As noted above, however, PAP has been able to defend itself from the top-down directives to change. Indeed, as a result of the case made by the staff, the campus-level e-learning administrator has requested certain changes be made to the Blackboard system before PAP’s host institution fully adopts it. The investments made in learning about the technology have, in this case, been able to change practices in other parts of this loosely coupled HEI, albeit indirectly.

We suggest that one way campus-level administrators can address the centralization-decentralization question for fully online programs is to centralize the course management function but decentralize the
technical support. By definition, open source systems can be responsive to user needs, but that responsiveness requires a strong set of technology skills and a high level of knowledge of the systems’ features and processes. Unless this knowledge and skill sets are made available locally to the online program, the system will not be fully utilized by the program or made fully compatible with the program’s needs. This corresponds to Tagliaventi and Mattarelli’s (2006) suggestion that operational proximity is most helpful for facilitating the transfer of knowledge and innovation between different stakeholder groups.

**Standardization vs. individualization**

PAP and E-TECH adopted different philosophies for course design and delivery. The operating practices of the PAP staff yield a structured and controlled online course environment in which students face a consistent interface and operation in each module in the course. As noted above, since students are not technology experts and courses are not technology-related, this standardization is a positive characteristic of the program. There is, though, a downside to this standardization: it severely limits tutor decision-making when teaching a course. Thus, even though the PAP use of Moodle was responsive (Benson & Whitworth, 2007), standardization in course design limits that responsiveness at the tutor level. The PAP staff have recognized this unintended consequence and is working towards loosening some of the course standards.

E-TECH’s course design philosophy, on the other hand, is that course design should reflect the interests and preferences of teaching faculty, yielding a set of courses with designs that vary by course and instructor. This philosophy is effective in E-TECH since the program’s content is related to teaching with technology, so the students are enriched by the variety of course designs. The philosophy may not be appropriate, though, for programs where the content is not related to technology use. In those cases, the philosophy could become a hindrance to student learning.

Online program administrators would be better served by staking out a middle position along the standardization-individualization
continuum, since neither PAP’s extreme standardization nor E-TECH’s extreme individualization is ideal (see chapter 3). A better solution would be one that balances the need for instructor flexibility in meeting course objectives with the student need for a non-intrusive use of technology. Once again, this is an example of how negotiation, participation, and responsiveness could be designed into an activity system.

Conclusion

Open source course management systems present the appearance of a low-cost, flexible solution to online course delivery, but that appearance is deceiving. The cost of the required programming and technical support must be added to the low cost of the source code. The inherent ability to customize an open source system for a particular use must be balanced with the need to provide students with an interface that does not detract from their learning. Finally, the ease of acquisition of open source systems by programs within institutions challenges the economies of scale that many institutions gain with centralized systems. Campus-level concerns can lead to distance educators being directed towards solutions that are less appropriate for their specific contexts.

In both our case studies, however, learning processes were taking place that were facilitated by the design of both the CMS itself and the sociotechnical activity system that surrounded the technology. Both case studies were differently configured, but both configurations were clearly the result of conscious design decisions made by program managers and (in E-TECH’s case only) campus-level administrators. Operational proximity helped create “knowledge brokers,” who were able to feed the reflective practices of course team members back into an emergent system. However, in each case, this was more apparent vis-à-vis Moodle itself than vis-à-vis each program’s host institution. Though these examples show that loose coupling does not necessarily have to lead to “bottom-up” reification by isolationist communities of practice, they do suggest that it remains easier to develop communities of interest between different HEIs than within a single one.

Stuckey and Barab (2007) write that
community design is never final: it requires a commitment to ongoing and sustained design, and management focus should be on community as a negotiation process. (p. 442)

Our research has led us to believe that to truly address the issue of organizational learning within HEIs, such a commitment is required both from management and the communities of practice, and is easier to sustain with a system that is responsive. Distance learning course teams should be aware that the responsiveness within their system is not, however, a given. It can be designed in, as a factor of management style, but it may also be challenged from without, or could decay, if not continuously refreshed by professional practice. The result may be a more directive system that ultimately could retard both the teams’ and their host institutions’ ability to learn about, and adapt to, the changes wrought by emergent technologies. Investing in operational proximity, which can both create knowledge brokers and boundary objects, and thus increase the knowledge base of the team as a whole, may be a significant investment for distance learning teams wishing to maintain their autonomy in the face of campus-level concerns.

REFERENCES


