The Emergence of Practice

Two Case Studies of Moodle in Online Education

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This chapter discusses how practices, as well as technologies, can be studied as “emerging” and why such a perspective is essential if both researchers and practitioners are to understand how a technology emerges into a specific workplace context, whether in higher education institutions (HEIs) or elsewhere. As with the original version of this chapter (Whitworth and Benson, 2010), we base these discussions on some results from our “Technology at the Planning Table” (TPT) project, which ran from 2005–2007 and conducted qualitative case studies of several distance learning programs from universities in the UK and US. These cases used a variety of course management systems (CMSs), including commercial, open access/open source, homegrown, and ad hoc (academic-created) systems. We then focused particularly on the two cases that used an open access/open source CMS, namely Moodle, to construct and deliver their distance learning programs. Since the original chapter was published, one of these cases, the Public Administration Program (or PAP), has also been discussed in detail in Benson and Whitworth (2014). We have also elaborated on our ideas of “responsiveness” and “directiveness,” first mooted in Benson and Whitworth (2007) then explored in more detail in Whitworth and Benson (2014b). We use those expanded ideas here to reinterpret the analysis of the Moodle cases, which forms the second part of this chapter.
The original chapter (Whitworth and Benson 2010) presented the project’s theoretical framework, derived from activity theory (such as Engeström, Miettinen & Punamäki, 1999), and recognized that CMSs, rather than simply being technological tools, also constituted rules and divisions of labor (roles) for the subjects of the activity system. Some of that prior discussion has been retained in this revised chapter. But there is also a need to consider work on the theory of e-learning, and technology within organizations more broadly that has been published since we originally wrote the chapter in 2009, particularly that which considers the nature of practice. We have therefore rewritten much of the theoretical part of this chapter in order to give more detailed consideration to the question of practice, as it is this that can be considered the truly emergent factor here. Wenger, whose ideas regarding communities of practice (Wenger, 1999) have been so influential, collaborated a decade later with White and Smith in their book Digital Habitats (Wenger, White, & Smith, 2009), and we draw on insights from that work, particularly the notion of stewarding, to better conceptualise the divisions of labour that exist within the course teams we studied.

EMERGING TECHNOLOGIES — OR EMERGING PRACTICES?

Even in 2009 it was stretching a definition to describe CMS technology as “emerging” in the sense of it being something new or innovative—but the discussion by Veletsianos (2010) showed that “newness” is not necessarily a characteristic of the emerging technology. We wanted to observe how a CMS in context is always emergent; that is, constantly formed and re-formed from interactions occurring in many micro-level contexts (De Wolf & Holvoet, 2005, p. 3), which are structured by and yet also structure the macro-level features of a given organizational setting.

Because this construction of practice is, in principle, a continuous process, the CMS — or any other sociotechnical system — is always something new. Ideally the practices that “intertwine” (Wenger et al., 2009, p. 19) with the technology emerge within communities of practice as a result of reflection (Schön, 1991) by users, managers, and other stakeholders, and are continuously being tested “on the ground” with reflections on one iteration fed back and used to enhance the next, making practices and technologies more effective. But this ideal is far from being consistently achieved. Generally, organizational life is as much characterized by the institutionalisation (Douglas, 1986) or reification (Wenger, 1999) of incumbent practices even after their time has passed, with further change being blocked in various ways. CMSs, even in 2009, were fre-
quenty derided as “undead” technologies, sucking resources out of institutions like vampires and giving little back (see Wheeler, 2009; Whitworth & Benson, 2014b, p. xii); at best, as inflexible (Kultur & Yazici 2014) rather than dynamic and constantly evolving.

As we said in response to this critique (Whitworth & Benson, 2014a), the CMS can evolve, but

this transformation is one that does not just result in changes in software or interfaces, but the working practices that exist around the CMS . . . [these] are not givens, that is, wholly dependent on the technological features of the system. Instead, they are constructed through a combination of factors [and] . . . influenced by the diverse (and sometimes conflicting) interests of multiple stakeholders: faculty, students, administrators, IT services groups, managers, employers and governments. (p. xii)

These issues are intrinsically bound up with how practice, and the formation of knowledge, are managed and controlled within an organization. Thus how a technology “emerges” is a sociological question, and one that can only be answered with reference to specific contexts. This kind of study sheds light not only on how a CMS is used but also why there may be resistance to one’s adoption and subsequent changes in practice (Veletsianos, 2010, p. 14).

STUDYING THE CMS AS A BOUNDARY OBJECT

A technology like a CMS originates from micro-level interactions, but once it achieves a certain finality of form and spreads outside its original context, it becomes the focus of multiple inquiries, taking place in many different contexts. It therefore resides on the boundary of different communities of practice.

Anderson (2010) invokes complexity theory as a way of understanding the contexts within which educational technology must emerge, particularly the social and structural norms in place. Anderson refers to McElroy’s (2000) idea of “the edge of chaos,” the transitional zone in which new practices can emerge. It is the “edge” because this zone is not so divergent from existing practice that the innovation can simply find no root, but there is also a required boundary interaction with something other, and through this interaction, new insights can at least potentially penetrate the structures which have formed within the institution. Fischer and Ostwald (2005) said 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. . . . The interaction around a boundary object is what creates and communicates knowledge, not the object itself. (p. 224–25)

A danger with any community is that it can become isolated and parochial, and as a result, struggle to incorporate new practices even when this would be beneficial to its operations. Boundary objects link communities of practice together, providing a conduit for information flows. Through engagement with them, communities are potentially exposed to new perspectives, giving them material for reflection and, eventually, absorption into their own practice. This is why Anderson (2010) says:

Organizational structures aid to surf at the “edge of chaos,” not function to eliminate or constrain the creative potential of actors engaged at this juncture. Further, this understanding can guide creation and management of these complex environments, not with goals to control or understand learning, but with an objective to create systems in which learning emerges rapidly and profoundly. (p. 29)

From this perspective, then, the development of new practices around a CMS is best facilitated not by the development of generic (that is, context-independent) set-piece training programs, but by creating an environment that brings together different stakeholders across the boundaries of different communities of practice, promotes reflective practice and is built around a CMS that is responsive to the learning that takes place in that environment. This latter point is crucial. As we said (Benson & Whitworth, 2014b, p. 185), if digital habitats are to be transformed as the result of learning in professional contexts, the “key tension is . . . between the outcomes of learning processes, and whether the technology can respond to that learning, or directs it.”

We touched on this distinction, between responsiveness and directiveness, in the 2010 version of this chapter (and see also Benson & Whitworth, 2007), but have subsequently developed the ideas in more detail (Whitworth & Benson, 2014b). The case studies below consider how these tendencies played out in two real distance learning settings.

STEWARDING AS A LEARNING PROCESS

In their book Digital Habitats, Wenger, White and Smith (2009) draw attention to the phenomenon of stewarding. Stewarding is the process through which communities of practice maintain the technological environments — the digital
habitats — that they use, but also continually construct, as they work and learn. It is a creative role, and a leadership one (Wenger et al., 2009).

Wenger et al. (2009) describe various processes that stewards should become involved in, including technology acquisition, supporting community members’ use of the technology, identifying and spreading good practice, and ensuring continuity across any significant disruptions. For our purposes here, a key statement is that “stewards can help transform experiments, accidents or local discoveries into community-wide practices and agreements that advance the community’s capacity” (p. 242). Stewards are thus, at least in part, responsible for maintaining the responsiveness of a technology. They should also “attend . . . to community boundaries created by technology” (p. 243).

Wenger et al.’s book is written in a style directed at the individual practitioner, who has a relatively formalized mandate to work with the community’s use of technology. Certainly such roles exist, with IT support offices in a university being an obvious example. But this also suggests the steward may not necessarily be located within the community they have a mandate to help. There are also different ways of distributing the authority that is invested in the role. The capacity to steward may be distributed widely throughout the members of the community, and not necessarily invested only in one or two people. Thus, stewarding may result in divisions of labor (see the reference to activity theory, above) but it also may not, depending on the context and its continual emergence. Stewarding may therefore become institutionalised and reified, but can also remain participatory and emergent.

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 reification occurs when different cognitive cultures that could potentially contribute to a system design are no longer communicating across their boundaries (Whitworth, 2007). 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. Douglas describes how these perspectives are more likely to become institutionalised, and thus cognitively locked within an organization, meaning they become unscrutinised and not open to review: “That’s not the way we do things here.”

On the other hand, a CMS that is negotiated between the centre and the periphery can be an architecture of participation (Garnett & Ecclesfield, 2008), promoting both professional practice and organizational learning. This would
help the system to remain responsive, and truly emergent: that is, emerging from the broadest range of micro-level contexts, rather than having its nature directed 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 (see Tagliaventi & Mattarelli, 2006). And, as noted by Wenger et al. (2009, p. 143), stewarding partly involves the bringing together of these different interests across their boundaries: thus maintaining their architecture of participation and not just their technology architecture.

How, then, can architectures of participation be facilitated in HEIs, in ways that are compatible with the loosely coupled nature of these institutions (Weick, 1976) and which do not encourage the reification and institutionalisation of existing practice but rather create CMSs that are responsive to the enquiries of the communities of practice that form around them?

**MOODLE AS A BOUNDARY OBJECT**

When multiple perspectives come together via a boundary object, it becomes the locus of a *community of interest*. Fischer and Ostwald (2005, p. 213–14) 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 of collaborative design, which is simultaneously a process of knowledge formation and ultimately practice formation, 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, engaging them in a joint learning process, oriented to enable the continual emergence and evolution of practice.

As we have said, responsiveness in a CMS is not solely the province of open-source technologies such as Moodle, and it would be quite possible for a Moodle solution to be imposed from the centre, in a directive way. Nevertheless the open-source approach to CMS development does provide certain channels for participation that other types of CMS 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 in a particular course to serving the need of large HEIs. In principle, *any* user can design a Moodle-based innovation that could be adapted into the central technological architecture, the kernel. Therefore, as well as being a boundary object at the organizational level, wherein various stakeholders can come together to review and develop Moodle (Bower, McNeill, & Hedberg, 2014), the moodle.org community works at an even broader macro-level to develop a shared understanding about the architecture on which local Moodles are then 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 underpin the technology (Dougiamas & Taylor, 2003; Moodle, 2008). In theory, through the “free market” operations of open-source software, these principles are being constantly validated and dynamically updated by a global community of users; stewarding is thus widely distributed.

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” (Stuckey & Barab, 2007, p. 446). Moodle could be passively consumed by users rather than being actively generated and stewarded by them. This places the burden of development on only a small proportion of users. Also, work at the community of practice level will also be subject to distortions that originate outside the community; for example, pressures placed on course teams by institutional management.

**A TALE OF TWO MOODLE SITES**

Our research included two program sites where the open-source Moodle software was the CMS of choice. PAP (Public Administration Programme) is a wholly online UK Master’s 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 Master’s program in educational technology. 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, Lawler, & Whitworth, 2008).
Program goals
Two primary goals drove the E-TECH program: to provide a site for research into online learning tools, technologies, and strategies; and 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. They were assisted in this emergency move by a colleague in a different department who had used Moodle himself in his own teaching: a clear example of stewarding.

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 should not 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 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 twofold objective of the E-TECH staff, the E-TECH philosophy tends toward an open and nonstandardized course design. Instructors are encouraged to experiment in their course designs, 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 supports Moodle.org and participates 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 of each differ (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 content experts provide activities, and then tutors, full-time and part-time, teach the courses. PAP staff is 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 supports the university’s standard virtual learning environment, Blackboard (eLearning), not Moodle.

RESPONSIVENESS AND DIRECTIVENESS IN E-TECH AND PAP

Responsiveness and directiveness are not uniform. A digital habitat can be responsive in some ways and directive in others. E-TECH and PAP are primarily responsive digital habitats. E-TECH can be characterized as responsive at the content, pedagogy, architecture, and system levels; while PAP can be
characterized as directive at the content level and responsive at the pedagogy, architecture, and system levels. At each level, team members use a variety of strategies (accommodation, evaluation, and subversion) to learn about and/or handle inconsistencies between the system and the environment in which it is was deployed. Likewise, parties external to the team may employ strategies (relaxation, acknowledging feedback, and blocking) to address these inconsistencies.

*Accommodation* occurs when team members change ways of working or teaching to align with system standards; *relaxation* occurs when tight system procedures are allowed to slip, or management “turns a blind eye” to them. *Evaluation* occurs when team members, systematically or informally, gather data, reflect, conduct action research, deliberate, and thus make informed decisions about a technology that may enter or has entered the digital habitat; *acknowledging feedback* occurs when, in response to user feedback, a new version of the system, technology, or procedure is released or the current one upgraded. *Blocking* occurs when system changes cannot be made due to extant procedures, with architecture or systems taking precedence over user demands; *subversion* occurs when team members ignore or bypass the imposed system change, possibly giving the appearance of compliance but not actually changing behaviour. The primary types of responsiveness exhibited in E-TECH were acknowledging feedback and evaluation, while PAP exhibited all types except subversion.

**System**

At the system level, team members may choose the CMS they use (responsive) or the CMS may be chosen for them at a higher level in the organization (directive). E-TECH faculty chose Moodle as their CMS (or other online medium, such as wikis or blogs), and thus had a responsive digital habitat at the system level. While instructors were subtly encouraged to gravitate toward Moodle because it provided certain administrative benefits such as reducing support costs, having a single access point for records of student logins, they were not forced to do so. The type of responsiveness exhibited by E-TECH was evaluation.

Likewise with PAP, Moodle was the team’s choice for CMS, making PAP also responsive at the system level. When “Churchampton” (a pseudonym), PAP’s host institution, tried to compel PAP to move to the Blackboard system that it had purchased, PAP made a strong case for why it should be allowed to continue Moodle use. The type of responsiveness exhibited by PAP was also evaluation.
Had Churchampton succeeded in making PAP move to Blackboard, PAP would have been considered a directive habitat of the blocking type.

**Architecture**

At the architecture level, team members can make changes to the technical features of the CMS (responsive) or be restricted from making such changes (directive). Since Moodle is open-source software, by definition E-TECH and PAP can make changes to its technical features, making both responsive at the architecture level.

E-TECH (which uses Moodle significantly but not exclusively) does not just consume the expertise of the Moodle community but actively contributes to it, having developed enhancements that have been incorporated into the Moodle kernel. E-TECH has also made financial contributions to the Moodle community. The team recognizes that its participation in the Moodle community helps the CMS actively respond to its needs. The type of responsiveness demonstrated from the Moodle community perspective was acknowledging feedback and evaluation from E-TECH’s perspective.

Likewise, PAP team members can, and have, proposed changes to its architecture, and engaged contract programmers to create these changes, which were embedded in the Moodle kernel. As noted for E-TECH, this is a form of responsiveness, through evaluation and acknowledgement of feedback within the wider community of users, and is unique to the open-source CMSs.

**Content**

At the content level, team members may be able to create and/or adapt the teaching materials (responsive) or the teaching materials may be prescribed or created outside the team (directive). Teachers on PAP (known as e-tutors) are not content creators. External consultants who are content area experts write PAP courses, making PAP directive at the content level. Since PAP teachers cannot make content changes, the type of directiveness exhibited is blocking. E-TECH took a different approach. Members of the E-TECH instructional team write E-TECH courses and individual teachers are allowed to change course content, making E-TECH responsive at the content level.

**Pedagogy**

At the pedagogy level, team members can change instructional methods and delivery modes (responsive) or methods and delivery modes may be assigned (directive). In its first few years, PAP imposed standardized course templates on
e-tutors, and thus was directive (blocking) at the pedagogy level. This require-
ment has recently been relaxed, allowing e-tutors more freedom to experiment
and evaluate new methods. As an example, in PAP, tutors who earlier in the pro-
gram’s history had no ability to choose pedagogical methods were, over time,
given more freedom to do so, but no obligation to do so. Thus, PAP changed
from a directive (blocking) habitat to a directive (relaxation) habitat at the
pedagogy level.

No obligation was placed on E-TECH faculty to teach in particular ways and
the laissez-faire managerial ethos of the team resulted in support being offered,
or at least investigated, by the in-house team for any approach the faculty wished
to explore. Irina, the course manager, said their approach to tech support was
“proactive.” Like PAP, E-TECH had a research interest in educational technol-
gy and this strongly influenced the approach, which is best characterized as
responsive at the pedagogy level. E-TECH placed great reliance on the ongoing
evaluation of new technologies, whether by the faculty or the technical support
staff (who are actively tasked, via job descriptions, to anticipate tensions before
they arise, hence the idea of “proactive” tech support). Thus the type of direc-
tiveness exhibited by E-TECH was evaluation.

LESSONS LEARNED

While E-TECH and PAP have similar organizational structures, their reasons for
choosing Moodle, an open-source CMS, and their philosophies of using it are
very different. This section presents several lessons learned about open-source
CMS selection, implementation and use from the PAP and E-TECH experiences.
The lessons relate to responsiveness/directiveness, cost, centralization/local-
ization, and standardization/individualization.

Responsive vs. directive habitats

A key feature of open-source systems makes them more likely to result in a
responsive digital habitat: they can be standardized for users who want stan-
dardization and they can be individualized for users who prefer customization.
This feature, which sets open-source CMS apart from commercial CMS, made
PAP and E-TECH responsive habitats. E-TECH was characterized as respon-
sive at the content, pedagogy, architecture, and system levels; while PAP was
characterized as directive at the content level and responsive at the pedagogy,
architecture, and system levels. The differences between the two programs have
been reviewed in detail above.
The E-TECH example suggests that while it is possible to sustain a highly responsive system, which thus creates a participatory architecture, where the stewarding role is widely distributed throughout the community, one must remain aware of the resourcing implications of doing so. E-TECH’s program objectives offered incentives, for the program and institutional managers, to directly or indirectly allocate a certain amount of the program’s resources to this end, and thus to support evaluation, acknowledge feedback, and consequently revise the continuously emerging technologies and practices of the team. Programs or departments, which do not have such an objective, will undoubtedly welcome a certain amount of directiveness, particularly where a proportion of the budget has already been “top-sliced” to fund these kinds of centralised activities. But the danger in this latter case is that stewarding could be completely separated from the community. PAP was largely able to retain control over its emerging CMS precisely because it had retained within the team significant amounts of knowledge about its digital habitat (technology and practice), and was then able to express this not just within itself but across the boundary, making arguments that other stakeholder groups could engage with, for instance that Moodle was an essential element of sustaining teaching quality and student satisfaction scores. A more directive architecture would have been less likely to allow this.

**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 is also needed.

Although the operational proximity (see Tagliaventi & Mattarelli, 2006) 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 decentralization? 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 decentralized 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.

A research student, who is also paid to act as the local Moodle developer, facilitates E-TECH’s policy. As noted above, this person also has an active relationship with the kernel and Moodle.org. There is thus an ongoing process of negotiation occurring here, not only among members of the E-TECH team but through this brokerage (see Fischer & Ostwald, 2005, p. 225), 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 is 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 them. As noted above, however, PAP has been able to defend itself from
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—literally, sharing a context—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 has recognized this unintended consequence and is working toward 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. A better solution would be one that balances the need for instructor flexibility in meeting course objectives with the student need for a nonintrusive use of technology. Once again, this is an example of how negotiation, participation, and responsiveness could be designed into an activity system and, thus, a digital habitat.

CONCLUSION

Open-source course management systems seem to be low-cost, flexible solutions to online course delivery, but that appearance can be 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 toward 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. In each case, however, 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. Online learning course teams should be aware that responsiveness within any system is not a given. It can be designed in as a factor of management style, but it may also be challenged from without or it 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 create both 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.

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