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From Theory to Platform: Designing Software to Support Online Wisdom Communities

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From Theory to Platform: Designing Software to Support Online Wisdom Communities

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Abstract

Online wisdom communities provide virtual spaces for diverse learners to discover collaborative solutions to real-world problems. Working for the common good, communities based on wisdom encourage both individual and collective growth. Based on sociocultural theory, we developed an instructional design framework, “WisCom,” that guides educators in cultivating culturally inclusive online environments, such as courses and web-based training sessions. Within the WisCom framework, practitioners can tailor existing tools and platforms, such as Moodle and Sakai, to encourage collaborative discussion and problem-solving. However, a platform created with the tenets of WisCom in mind has not yet been designed. Based on our previous research and practical work in higher education, we are now devising a custom platform to support an online wisdom community of instructional designers, instructors, trainers, and other practitioners. In our 2019 book, “Culturally Inclusive Instructional Design: A Framework and Guide to Building Online Wisdom Communities,” we outlined specific recommendations for building software informed by the WisCom framework. Some of the design considerations we identified included (1) integrated needs assessments and co-mentoring features; (2) built-in support to engage in the collaborative inquiry cycle, the social-learning-based process at the heart of the a WisCom experience; (3) support for a variety of input types, including verbal and visual options; and (4) well-designed communal spaces, for example, discussion forums that support both asynchronous and synchronous communication. Although existing systems can be adapted to cultivate wisdom communities, our research shows that technology designed with certain teaching or learning philosophies in mind is more likely to promote those philosophies when used by educators and students. This presents us with a core question: What would it look like to design a virtual space, from the ground up, to encourage the formation of a wisdom community? This paper attempts to provide preliminary answers by outlining the critical features of an LMS designed with the Wisdom Communities framework in mind. We first present a brief overview of the state of LMS research. We then describe core tenets of the system: communication over content, simplicity over complexity, connections to ideas and people, flexibility, and accessibility. Next, we detail six essential subsystems: needs assessment, co-mentoring, conversation, people, collaborative inquiry, and tracking. Finally, we provide concluding thoughts and outline next steps.

Keywords: Learning Management System, Sociocultural Learning Theory, Cultural Inclusivity, Software Design, Wisdom Communities.



Introduction

This paper provides a detailed blueprint for the design of a next-generation learning management system based on the tenets of the Wisdom Communities Instructional Design Framework. My colleagues and I have spent nearly two decades refining this framework and, in 2019, we published the book *Culturally Inclusive Instructional Design: A Framework and Guide for Building Online Wisdom Communities* (Gunawardena, Frechette, & Layne, 2019) to catalog our work to date. The Wisdom Communities framework provides instructional designers, instructors and trainers tangible guidance to foster group dynamics that promote critical thinking, collaboration, creativity, and other 21st-century skills. By extending the tenets of sociocultural learning theory, the framework places communication at the heart of the learning process and emphasizes the value of co-mentoring and facilitation of learning over traditional student-teacher paradigms. The result is an approach to instructional design that prioritizes process over product, collective growth over individual achievement, and context over content. Integral to the framework is the premise that productive learning cohorts — what we call “wisdom communities” — must be inclusive, especially with regard to the global nature of contemporary learning and the many cultural perspectives that learners will bring to bear. Without accommodating diverse ways of thinking, a learning experience will likely disadvantage some participants, suppressing the group’s overall potential.

Over the years, we have noted a pronounced gap between instructional theories and frameworks on the one hand and the technologies that underpin online learning on the other, especially with regard to learning management systems, or LMSs. Modern LMS platforms incorporate traditional classroom paradigms — discussions, modules, assignments, gradebooks — and borrow heavily from the design of content management systems. The application of learning and instructional design theories, meanwhile, occurs in the implementation of the LMS, on a course-by-course basis, if at all. Like all software management systems, LMSs provide significant flexibility in how administrators and users employ them. Nonetheless, the current juncture provides an opportunity to consider the conceptualization of a new LMS, designed with an instructional design model in mind. The present analysis looks specifically at how the Wisdom Communities Instructional Design Framework might inform the design of a custom learning management system. First, we review current literature on learning management systems, with a focus on evaluating the effectiveness of existing systems through the lens of the learner experience. We then outline core tenets of a learning management system designed with the Wisdom Communities framework and provide detailed guidance on how to design six interconnected subsystems. We conclude with a summary of additional features to support collaboration grounded in sociocultural learning theories.

Review of Literature

LMSs have become a cornerstone of online education. Nearly every college and university in the U.S. has adopted an LMS platform, and, worldwide, their usage continues to grow (Soykan & Şimşek, 2017), particularly in the developing economies of Asia and Africa, where researchers predict rapid adoption in the years ahead (Mtebe & Kissaka, 2015). Outside of academia, however, LMS adoption remains relatively low (Dousay, 2019), suggesting another potential area of growth.

Researchers have considered the quality of LMS solutions since their inception, with a focus on student perceptions around ease of use, reliability, functionality, and accessibility (Radwan, Senousy, & Riad, 2016). In one review of the factors that matter most to students when assessing in LMS, researchers found that



service quality, or the quality and timeliness of support, most impacted satisfaction (Ohliati & Abbas, 2019). Other researchers have emphasized the importance of systems that promote student enjoyment, satisfaction, along with interactivity (Fındık-Coşkunçay, Alkış, Özkan-Yıldırım, 2018). Still others have found the use of learning design models to shape the implementation of a class matters most to learner perceptions of practicality and engagement (Hagen, Hibbert, & Kinshuk, 2006). This finding speaks to a limitation of LMS evaluation research, which tends to conflate the design of an LMS on the one hand with its implementation on the other. One early effort to establish a comprehensive approach to evaluation (Passerini, 2006) emphasized course design decisions such as limited content on each page and strategic link placement.

Another systematic review of learners' satisfaction with LMS (Ozkan, Ali, Koseler, & Baykal, 2009) focused on factors not endemic to an LMS, such as instructor quality, information content quality, and service quality. Another limitation of research into the effectiveness of LMSs concerns the depth of evaluations. Beyond assessing learner perceptions, analyses (e.g., Alenezi, 2018; Anand & Eswaran, 2018) tend to consider whether an LMS provides built-in email, messaging or discussion board features, without considering the quality of the tools' designs. Not surprisingly, when taking a "feature list" approach, comparative reviews of open source LMSs have found that leading platforms offer comparable functionality and usability, with nearly identical feature sets (Albarrak, Aboalsamh, & Abouzahra, 2010).

Some researchers have documented myriad types of engagement that LMSs encourage, including "offline" engagement with institutional resources and support staff (Barua, Zhou, Gururajan, & Chan, 2018). Yet, when an LMS faces more intense scrutiny, the results appear less clearcut. Moodle is the most popular open source LMS, particularly in Europe (Anand & Eswaran, 2018), and has been a frequent subject of evaluative research, with mixed results around its effectiveness. Some researchers found frequent problems with basic functionality, such as online chats and discussion forums, in the earlier years of Moodle's development (Kakasevski, Mihajlov, Arsenovski, & Chungurski, 2008). Others have found Moodle's functionality to be sufficient, but raised questions about how the platform organizes resources and content (Konstantinidis, Papadopoulos, Tsiatsos, & Demetriadis, 2011). More recent research found that at least one implementation of Moodle failed to foster collaboration and active learning, instead emphasizing the distribution of information and tracking of student performance (Theohari, 2019).

One area of promise in LMS research concerns the analysis of access logs, which include detailed notes about how and when learners interact with class content and one another (Lerche & Kiel, 2018). Despite limitation in what they can reveal about real-life behavior (Juhaňák, Zounek, & Rohlíková, 2019), logs provide valuable insights into learner behaviors to complement attitudinal surveys into their perceptions and opinions.

Despite their prevalence, at least in higher education, and the increasing reliance many institutions have on them, several promises of LMS technology remain unfulfilled. Early on, researchers saw potential for LMSs to foster collaboration and communication, predicting growth in the sophistication of these tools (Kljun, Vivic, Kavsek, & Kavcic, 2007). Yet, LMS communications functionality has changed little in the past 20 years. Others have concluded that the full potential for personalized online learning experiences that adapt to learners' needs and preferences remains untapped (Santos, Boticario, & Pérez-Marín, 2014). Meanwhile, whether learners receive adequate training and support remains a concern (Alenezi, 2018).



Basic Tenets of the Wisdom Communities Learning Management System

On the whole, a review of existing research into the effectiveness of LMS technology points to significant opportunities for improvement and innovation. Based on this research, and on the sociocultural underpinnings of the Wisdom Communities Instructional Design framework, we propose a new kind of LMS, called *Colectivo*, designed around five core tenets. First, to support sociocultural learning, the system should prioritize communication over content. Rather than serving primarily as a means of organizing and distributing lessons and learning modules, the LMS should foster collaboration among learning cohorts (Sheshasaayee & Bee, 2017). Content, therefore, emerges not from premade lesson pages but rather via the interactions that unfold among learning cohorts. Second, the system should prioritize simplicity, eschewing complex feature sets in favor of sparse but well-designed subsystems that learners return to repeatedly (Kljun et al., 2007). Third, the system should facilitate connections to ideas and people. These connections can be conceptualized at three levels: within the cohort; within other cohorts who have adopted the same platform — the possibility of knowledge-sharing across learning cohorts remains underdeveloped; and elsewhere on the web. To facilitate the discovery of content and connections within a cohort, the system should offer a fast, intuitive full-text search feature. Fourth, the system should remain flexible, providing a high-quality set of default options but allowing learners to customize their experiences whenever feasible. These customizations might involve visual options such as color schemes, font sizes, along with how the system organizing information, for instance, whether it displays posts from newest to oldest or oldest to newest. Fifth, the system should be as accessible as possible. Accessibility can be understood both in terms of input, or how learners interact with the LMS, and output, or the ability to access content within the system. With regard to input, all critical functions should be achievable through any combination of mouse/trackpad/touch, keyboard and voice-based entry. For example, it should be possible to navigate the interface exclusively through the keyboard, or participate in discussions entirely through voice-based commands. With regard to output, accessibility improves when text-based alternatives accompany multimedia content, for example, alternative text descriptions of images, and closed captioning alongside videos and audio. Textual representations of content benefit learners with both visual and auditory impairments, along with students learning in a non-native language and participants logging in from noisy environments (Morris et al., 2016).

Subsystem Descriptions

The aforementioned tenets manifest in the Wisdom Community LMS across six subsystems, which constitute the backbone of the learner experience. We envision close connections across the subsystems, most of which would appear as distinct navigational options within the LMS, accessible from any part of a class.

Needs Assessment Subsystem

Needs assessments provide an understanding of participants' strengths, weaknesses, and preferences, prior to the start of a training session, or other educational experience. Traditionally, when needs assessments occur in the context of online learning, educators deploy them outside the confines of an LMS, for example, via standalone survey software. Although the results of a needs assessment delivered in this manner could be used to tailor what participants encounter once they reach the LMS, tighter integration makes it easier to use needs assessment results to inform participants' experiences. The first subsystem in the *Colectivo* LMS integrates needs assessment functionality and uses the results to build automatically a learner profile that



accompanies each participant throughout their development in the class. Facilitators can create custom assessments or choose questions from pre-existing banks populated by previous efforts to gauge learner readiness in other classes. For example, if the facilitator of one class creates questions to measure participants' familiarity with mobile technologies, those same questions could be adopted by the facilitator of another class to gain a similar understanding. In this way, the LMS creates connections across courses, and perhaps subject areas, to provide resources to future designers and facilitators. A needs assessment can be configured as a kind of checkpoint, wherein it must be completed before participants gain access to other class features. This also allows needs assessments to be used as pretests — a means of establishing baseline knowledge or attitudes prior to the start of the learning experience. When adding items to an assessment, designers can choose which groups have access to the results: the participant in question, facilitators, mentors, or the class at large. Results can become part of learners' profiles or appear in reports available to facilitators.

Co-Mentoring Subsystem

We also envision a robust co-mentoring system that fosters productive mentoring relationships. This subsystem provides facilitators with a means of tracking and assigning mentor-mentee relationships. Unlike traditional approaches to mentorship, which delineate strict lines between mentor and apprentice, the Wisdom Communities framework takes a more nuanced approach, recognizing that coaching roles can be situational, and a mentor in one context might be a mentee in another. Likewise, one person's mentor could be another's mentee. With this in mind, the LMS would allow facilitators to make and review assignments in a non-hierarchical fashion, for instance, by drawing lines between circles of nodes to designate relationships. Once their roles have been defined, participants access lists of their assigned relationships from a control panel. Here, they can initiate communications with their connections and, in the case of mentees, monitor contributions to the community, giving feedback when appropriate. Commenting and annotation tools can be used to provide feedback on submissions, and facilitators and peers can provide feedback via the same vehicles, providing the opportunity for multiple layers of feedback on a single submission. Participants can then filter comments by role and engage in follow-up conversations with community members who have offered feedback on their work. Alerts can help mentors and mentees stay connected as a community develops. Mentors could receive alerts when their mentees engage in forums or submit work, for example, and mentee could receive alerts when their mentors comment on their work. Alerts can appear via email, SMS, and/or within the LMS, depending on an individual's communication preferences. Based on previous research, learners appear to benefit from timely, flexible reminders, especially when delivered to their phones (Iskandar, Thedy, Alfred, & Yonathan, 2015).

Conversations Subsystem

This subsystem provides a set of tools for designing and managing collaboration across the LMS, replacing the discussion forums common to most other learning platforms. A key feature of communal spaces within the Colectivo LMS is support for both asynchronous and synchronous communication to accommodate diverse learner needs (Wang & Chen, 2009) (Kabassi et al., 2016). Rather than strictly differentiate the two forms of communication, as other LMSs might via "live chat" and "discussion forum" features, this LMS integrates them, providing a unified tool for both kinds of communications. Threading is possible up to five levels, providing ample opportunities to create structured conversations around themes. Documents can be



shared via attachments to messages, and a short profile accompanies each post, with an avatar, role identifier, and brief biographical sketch. These summaries link to full profiles and permit one-on-one communication, as detailed in the following section on the “people” subsystem. To enable synchronous communication, each space includes an indication of who’s present, with differentiation between presence in the class and presence within the specific forum. Visual cues indicate when someone is typing, and new messages appear in near-real time. Participants have the option to go “off-the-record,” that is, respond privately to a colleague, and facilitators can access dashboards with statistics and insights into when contributions have been made to the discussion, and by whom. Facilitators have fine-grained control over the visibility of posts in a conversation, making this a flexible tool that can also serve the purpose of an assignment-submission platform.

People Subsystem

This subsystem extends the functionality of conversations with robust user profiles to increase social presence and an interface for one-on-one communications that mirrors the functionality of the conversation subsystem. User profiles include avatars, biographical sketches, links to contributions the learner has made throughout the class, and prompts to begin one-on-one chats. Those conversations can unfold in real-time or asynchronously, and participants receive alerts when they are not present to engage in a conversation immediately.

Collaborative Inquiry Subsystem

The collaborative inquiry cycle (CIC) provides a structured approach to group problem solving within a wisdom community. Most interactions within a wisdom community center around the CIC; accordingly, a robust system for designing and deploying collaborative inquiries undergirds the Colectivo LMS. The CIC involves six stages, and this system accounts for each. At any given moment, a community could be involved in multiple collaborative inquiries, and facilitators and designers can configure and queue inquiries in advance. In this sense, a collaborative inquiry is a foundational building block in the Wisdom Community LMS — a core type of content around which most interactions flow. First, each collaborative inquiry must receive a title, or label. Then, when creating a new inquiry, designers and facilitators must articulate a problem statement by providing short answers to several key questions. They must define the nature of the problem, why it matters, and, in general terms, the task, or challenge, learners face. Successful collaborative inquiry relies on good problem statements, and, over time, new problems populate a repository of prompts from which designers and facilitators can draw inspiration. The next five stages in the CIC — exploration, resources, reflection, negotiation, and preservation — appear as subsections with the defined problem, each with its own layout and structure. These stages draw heavily on the affordances of the conversation system, providing consistent interfaces for interaction. Facilitators can control movement through the process, restricting access to steps until they deem the cohort is ready to move to them. In the exploration stage, the cohort defines a goal statement for their work, describes the deliverable that will emerge from the process, and lists action steps — to do items that will lead to the deliverable. Working individually and in small groups, in the resources stage, participants gather links and upload applicable documents, building a database of material tied to the action steps to which they have been assigned. In the reflection stage, the cohort convenes in breakout groups to assess the collective resources they have organized and journal impressions. In the negotiation stage, the larger group reconvenes to synthesize findings. In the preservation stage, the



group saves final outcomes and finalizes the deliverable, which could take the form of a handbook, white paper, timeline, schematic, or other document.

Tracking Subsystem

A tracking subsystem provides facilitators and learners alike with a toolset for understanding both individual and collective development. This component provides quantitative and qualitative insights into the communications that unfold in the community, emphasizing engagement in collaborative inquiry and conversation over grades or late assignment ratios. Participants can view self-reports, and facilitators can participants' individual performance. Both groups can monitor the overall health of the community, and all data available via the tracking system fall within one of four categories, each tied to another subsystem: needs assessments, co-mentoring, conversations, and collaborative inquiry.

Additional Features

The Colectivo LMS incorporates several features across each subsystem to improve accessibility and usability and enhance learner satisfaction. First, whenever possible, participants encounter multiple ways to add content to the system. Multimodal options allow for text input, file uploads, audio and video recordings, SMS-to-web connectivity, and more. Designers and facilitators can access a dashboard where available input options can be managed from a single screen.

Second, accessibility warnings flash whenever a configuration might deviate a standard of accessibility with regard to visual design, readability, or interactivity. Whenever possible, the warnings include proposed workarounds or solutions to the accessibility concern, for example, increasing the contrast between text and the background behind it. At any moment, a designer or facilitator can access an accessibility report that gauges the overall status of the class and run through a list of outstanding issues to make improvements.

Third, opportunities for learner support appear throughout the interface, in line with the finding that learning a system without difficulty correlates most strongly with perceived ease of use (Binyamin, Rutter, & Smith, 2019). A constant "Support" tab provides immediate access to assistance across multiple domains: transactional, or support related to communications within a class; pedagogical, or support related to instructional content; and technological, or support related to hardware and software, including compatibility issues and bugs. The LMS delivers support through several channels. A chatbot uses natural language processing to provide real-time responses to participant inquiries, providing links to relevant knowledge base entries, whenever possible, to provide answers. Assigned mentors and facilitators can also field questions they receive directly or through the support portal. Other participants can be alerted through the support portal when they, too, may be able to provide answers or clarity. When applicable, responses from mentors, facilitators and peers can be added to the knowledge base of support documentation to enhance the usefulness of the chatbot for future inquiries. Lastly, the LMS provides equal access to content and functionality, regardless of the device participants use to connect, addressing the concern revealed in previous research that learners do not see their phones as suitable for accessing online instruction (Bele, Mujkić, Bele, & Mujačić, 2015).



Conclusion

To date, learning management systems have clustered around a common set of features, presenting similar affordances and limitations, with some variation in interface, ease of use, and interoperability. By and large, however, modern systems closely resemble not only one another but also their progenitors from the late 1990s. Not surprisingly, theoretical approaches have influenced the instructional designers and instructors who design and deliver online classes to a far greater extent than the technologists who build the platforms on which those classes run. Accordingly, learning and instructional design theories have influenced the implementation of LMSs to a far greater degree than the composition of the systems themselves. However, the emergence of new models and frameworks centered on communication and collaboration provides fresh opportunities to challenge assumptions about what a learning management system should accomplish. This paper has sought to provide detailed blueprints for developing a new LMS based on the principles of the Wisdom Communities Instructional Design Framework. First, relevant research was cited. Next, core design tenets were reviewed, followed by the six subsystems that comprise an LMS focused not on content but rather communication. Lastly, additional design features common to all subsystems were reviewed. We look forward to continuing to develop functional prototypes of Colectivo and to seeking out feedback from instructional designers, instructors, and students to make refinements to outlined features, refining the system in an iterative fashion.



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