International Journal
of Online Graduate Education

Structuring and Scaffolding the Online Course

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Volume 3, Issue 1 (2020)

It is well known that with its instant communication capacity and collaborative capabilities the Internet has opened up many exciting new educational possibilities (Reeves, Herrington & Oliver, 2002). However, along with the affordances of the medium, there are also challenges to overcome in realizing the potential of online learning for both the faculty and students (Buelow, Barry & Rich, 2018). Also, course development that truly takes advantage of the Internet's strengths is time and resource-intensive (Orleans, 2014; Ham & Davey, 2005).

In a meta-analysis of literature regarding teaching and creating online courses, Kebritchi, Lipschuetz, and Santiague (2017) outlined some of the challenges online learning poses for faculty and students in higher education. For faculty, they highlight the need to adopt new teaching approaches, being willing and able to use many types of learning tools, engage with collaborative learning techniques, and understand the many roles that an instructor must play in addition to teaching, all of which may be underscored by a lack of training and support. For the student, the online classroom can be a difficult one to negotiate if they are not ready for the amount of self-regulation needed to succeed both in terms of time-management and self-directedness.

It can be a challenge for faculty to develop an online course that takes advantage of the internet's collaborative abilities and, at the same time, is structured in a manner in which students can be successful. The following article describes an easy to implement, a practical framework designed to support faculty in the structuring of an online course that promotes social interaction and supports students' self-regulation. Drawing on a rich array of literature and best practices, the framework can help to structure and scaffold both individual and collaborative learning activities into the online classroom. With a focus on organizing the learning environment, the framework applies to courses across topics, disciplines, and technologies.

Literature Review

As mentioned, the process of developing an online course can be a time-consuming and resource-demanding endeavor (Ham & Davey, 2005). Often, faculty are left on their own to develop a curriculum and will likely draw on their past experiences (Baldwin, 2019; Bennett et al., 2011), which more likely than not, are based on traditional lecture-style classroom practices (Downes, 2005). While the lecture is still an essential component of learning, the collaborative social component, a vital element of learning, can sometimes be overlooked (Orleans, 2014). Additionally, since most students are used to the traditional classroom, they may be new to the online class experience and not have a realistic expectation of the amount of self-organization online learning requires (Kebritchi et al., 2017).

The digital classroom is full of possibilities, from discussion boards and online video to video discussions and collaborative authoring environments, and beyond. Also, newer concepts of teaching and learning, based on the affordances of the Internet, have emerged over recent years.

For example, the use of socially oriented collaborative knowledge building tools and approaches empower students to work together in order to reach learning goals (McLoughlin and Lee, 2007; Bruns, 2009; Scardamalia, 2002). A common thread throughout these and other newer approaches is that they orient the locus of information gathering from the external transmission to self-direction, placing the learner in a complex web of self-directed knowledge building.

These approaches have their foundations in Constructivist learning philosophy and harness the Internet's affordances through collaborative tools such as wikis, online productivity suites, data visualization and modeling tools, and social media platforms. Such tools and approaches are undergirded by our understanding of learning and can be seen through many interlinked learning theories, starting with Bloom's Taxonomy of learning (1956), which guides learners from information gathering to information evaluation. Equally important is Lev Vygotsky's (1978) work in social learning and his concept of the zone of proximal development, which posits that learning is inherently social and knowledge is often transferred from others with slightly better topical understanding and ability to problem-solve. Bruner's spiral curriculum (1960) approaches learning by teaching at levels of gradually increasing difficulty, and links with both Vygotsky's and Bloom's theories. Knowles' principles of adult learning (1980; 1984) shifts the focus to linking professional work and learning and asks the learners to be problem solvers. Giving room for learners to experiment is a crucial component for connecting learning with experience (Dewey, 1938), and reflection can encourage learners to engage with their learning (Brookfield, 1995) actively. Looking outwards, Wanger and Lave's (1991) communities of practice for teaching and learning is a staple learning theory that supports collaboration as a knowledge-building tool. Together, these theories present essential building blocks in the design of an effective curriculum for the in-person higher education classroom and should play a vital role in the construction of the online one.

Course Development and Frameworks

In order to better understand strategies towards online course development, Baldwin (2019) surveyed 33 faculty members from a range of higher education institutions who had transitioned from traditional in-person teaching to online teaching. None of the interviewees had formal training in being online teachers and, for the most part, had been discovering their methods for developing online curriculum.

In the interviews, several themes emerged. One was organizational. The participants felt that they must present simple, consistent pathways that lead students to the course content. This is because, as Baldwin (2019) writes, "often, online courses within the same university use different formats" (p. 201). Another area of concern dealt with how to increase interaction and engagement in courses. Study participants noted that "active learning with a focus on authentic work increases communication and students' involvement with content, thus fostering students' learning

experience" (p. 206) and that reflection-based activities helped promote student-content interaction. Baldwin describes one participant who explains that students do not listen to lectures or play videos, and typically jump directly to the assignment, so "in response, she made sure online activities force students to demonstrate understanding, by implementing activities in which learners were building their knowledge (e.g., group activities, discussion prompts, and problem-based learning assignments)" (p 205).

Integrating social and active learning components into online learning is further supported in a meta-analysis by Cherney, Fetherston & Johnsen (2018), which offers that the learning outcomes in online courses are enhanced when learning occurs collaboratively, rather than individually. In their study, they found that small group collaboration in online courses generally produced better outcomes than courses where the students learned independently (p. 99).

In terms of translating between in-person and online, Priscilla Norton and Dawn Hathaway (2017) describe the challenges they had as instructors first building courses:

> When we began designing online courses, we found it difficult to identify guidelines for structuring content in the literature related to instructional design and online learning. This absence of explicit and comprehensive guidelines made it difficult to conceptualize ways in which to meet course learning goals despite the central role that well organized and structured course content plays in engaging learners with content (p. 176).

Their solution was to adopt a design pattern approach that helped them to conceptualize the overall course creation by problematizing it and then discerning patterns to help them find solutions. The approach componentizes online course creation in a way that makes it simpler for instructors to conceptualize the entire process and outcome.

Another approach that offers faculty guidance with the conceptualization of an online course is the Multimodal Model for Online Education (Picciano, 2017), which integrates several foundational learning theories with a practical way to select and link course components. This model is built upon seven couplable components that meet different pedagogical needs including types of learning, learning activities, learning assessments and includes supporting digital tools.

Noting that "the pedagogical objectives of a course should drive the activities and, hence, the approaches" (p. 181), The Multimodal Model for Online Education allows you to choose which components are needed to meet your curriculum goals. For example, a self-paced course will contain the stand-alone, but linkable, components of "content," "independent study," and "evaluation." while a collaborative course may have "content," "social/emotional," "self-paced independent study," "dialectic and questions," and "evaluation." Thus, this model is a useful way

of thinking about course construction in terms of the components needed to deliver the type of course one is interested in developing.

As seen, frameworks can be useful conceptual and organizational tools, especially helpful for faculty new to online course development and learning to navigate the space and incorporate best practices. The frameworks described work at a conceptual level, orienting the faculty with what needs to be done, but not necessarily with the implementation. The practical framework presented here operates closer to the implementation level. It considers critical elements of the learning theories and approaches and helps to apply them in the structuring of a course. Explicitly, it embeds support and scaffolding and emphasizes activities that place collaboration at the heart of the online class experience.

Framework Components

The proposed framework has three overarching components to structure a collaborative online classroom. First, there is the *scaffolding* of the learning environment (Vygotsky, 1978; Wood et al., 1976); second, making a place for *collaboration* (Wanger and Lave, 1991; Vygotsky, 1978); and third, integrating and supporting *reflection* on personal and group assignments (Knowles, 1980; Brookfield, 1995). These three components support the online learner in the following ways:

1. *Scaffolding:* provides explicit expectations and sequences to help organize students' time and learning efforts.
2. *Collaboration:* provides opportunities for students to work together on assignments, build knowledge collectively, and support each other's understanding.
3. *Reflection:* provides students an opportunity to question their understanding of the subject and explicitly think about their learning process and progress.

The focus of this framework is on the collaborative environment that is created through the structure, sequencing, and activities of the courses. The framework does not ascribe the types of assignments or assessments, and is not platform dependent, thus can be adapted to the most basic capabilities of any Learning Management System, or even none at all as long as some basic tools are available to support the necessary online activities.

Framework in Practice

The following describes each of the three components in the context of the framework (see Figure 1 for the sequencing of the following objectives):

Scaffolding: to provide explicit expectations and sequences to help organize students' time and learning efforts. Scaffolding is an effort by the instructor to provide support to the learners as they learn skills and master tasks. This support is slowly removed over time as the

students become comfortable in the subject area, eventually becoming self-sufficient at the tasks (Bonk & Kim, 1998; Wood et al.,1976).

For the student used to the structure of being in a classroom at specific dates and times, the self-management required in online learning can pose a difficulty (Kebritchi et al., 2017). The instructor should not assume that the students can self-regulate their learning (Dabbagh, 2001). Thus, the idea of providing an explicit and consistent structure online, with deadlines, is meant to help students build their self-regulation skills.

In this framework, there is a series of deadlines for each class session, including a contribution to a small group activity, a personal homework assignment, a reflective journal (blog) entry, and a final summary of the group activity. “Mini-deadlines” help to structure the online experience.

The following is an illustration of how this works in practice: every Monday at 7 a.m., an email is sent out via the LMS to all of the students in the class. The content of the email explains the topic for the week, as well as why the topic is vital to the student’s overall understanding of the subject matter and contains a link, or directions, to go to the lesson in the LMS. Besides, there is typically a message reminding the students about the importance of meeting deadlines, or suggestions on how to collaborate effectively.

In the LMS, the lesson may be comprised of an internal web page with any combination of text, embedded videos, images, and short hands-on activities; or a link to a presentation. After working through the topic, students are asked to review the week's assignment, located in a separate area of the LMS, which explains what is expected of them in terms of the personal and group assignments and readings. The text also reinforces the deadlines for the group and personal work.

Deadlines are critical to the framework’s operation, as it is through a series of “mini-deadlines” surrounding assignment submissions and group interactions that students work through the activities of each lesson and keep up with course expectations. The LMS acts as an organization point, a way for the instructor to efficiently and consistently structure the course materials; however, how it is used is open to the capabilities of the instructor and the LMS. It should be entirely possible to use this framework with any LMS, or even no LMS at all.

First Deadline: Group Interaction. The first deadline is for the small group activity. A designated group lead, randomly assigned by the instructor for each week of the group activity, kicks off the activity. The group leader will reiterate to their small group the task assigned and begin the conversation or activity. This deadline serves two purposes: one to ensure that the

students do not wait until the deadline to begin the classwork, and two, to make sure there is time for collaboration.

Second Deadline: Individual Contributions to Group Work. All students are expected to respond to the group leader's initial post within a day of its posting. For example, if the post went up on Thursday, then the first set of replies are expected by Friday evening or Saturday morning.

Third deadline: Individual Assignment, Group Work Summary, and Personal Blog Post. The last set of deadlines contains a summary of the group's work, the result of the individual assignment, and a reflection posted in the personal blog. These three items are to be posted by the last night of the session.

Together, these three pieces wrap up the session's topic. For the group work summary, the onus is on the group leader to share what the group has done together in response to the activity. The role of the group leader changes every session and typically there are enough students to ensure that each student has a chance to lead a group at least once. The individual assignment reinforces the lesson's theme and often requires students to upload a document, provide a link, or input text in the LMS assignment section. Finally, the blog entries, which can be private between the student and the instructor, or publicly viewable to the class, serve the dual purpose of asking the students to reflect on their learning and giving the instructor some insight into how the students are feeling about the class.

These deadlines are the critical scaffolding element in this framework, however as Dabbagh (2003, p. 40) points out "scaffolding is all about providing the right amount of structure in a learning environment, keeping in mind that some learners may require little or no structure and others may require much structure. Thus, the actual dates and times of the deadlines are less important than the fact that these are key points that can be used by the instructor to send reminders and help structure the students' time.

Collaboration: to provide opportunities for students to work together on assignments, build knowledge collectively, and support each other's understanding. The work of Lev Vygotsky (1978) is an essential touchstone for this framework. His concept of the Zone of Proximal Development (ZPD) is a cornerstone for collaborative learning: students or an instructor with more knowledge help the learner to learn and master skills and problem-solving. Also, it is essential to consider the ideas of constructivist learning theorists like Savery and Duffy (1996) who state:

> The social environment is critical to the development of our individual understanding as well as to the development of the body of propositions we call knowledge. At the individual level, other individuals are a primary mechanism

> for testing our understanding. Collaborative groups are important because we can test our own understanding and examine the understanding of others as a mechanism for enriching, interweaving, and expanding our understanding of particular issues or phenomena (p. 2).

Another significant influence is Lave and Wagner's (1991) work on communities of practice. Such communities often occur naturally based on shared interests, as well as being created to gain knowledge in a domain area. By sharing information and experiences, group members can learn from each other. The idea in the online environment is to encourage (or create) such small groups based around problem-solving or information gathering.

In support of this component, each class session typically contains a collaborative activity. The type of activity is in line with the session's topic and can run the gamut from traditional threaded discussion using the LMS's built-in discussion board tools, to conceiving and developing fully interactive, collaborative projects. The point is to encourage student interaction and ensure that they are working together and helping each other develop a better understanding of the course topics.

To manage this aspect, the instructor can assign students to small working groups of up to four students (Cherney, M. R., et al., 2018; Morrison, 2012), depending on the course size and the assigned activity. Each grouping lasts for the length of the assignment. The small size of the group and its duration is purposefully done in order to allow the students to meet and work with each other, and for each member to feel a responsibility to the whole (Morrison, 2012).

As mentioned previously, one student in each group is given the responsibility of being that group's leader for a session. This designation has some expectations attached, for example, the appointed student is asked to start the conversation on a designated day, re-state the activity or problem that the group must solve and ensure that there is a summary of the group's work at the end of the session. The summary is particularly helpful if the students take their conversation into other mediums beyond the LMS, where the instructor may not have oversight.

Last but not least, students are encouraged to engage with their classmates on questions that they have about the class topics. The idea behind this is to develop a community of practice, where students can freely exchange ideas and offer help to each other. To get this started, the instructor should create a forum for general questions and should monitor the questions and encourage classmates to answer each other, possibly even facilitating mentor/mentee relationships between students.

Reflection: to provide students an opportunity to demonstrate and question the understanding of the subject and think about their learning progress and process. Reflection is a critical component in learning and is something that goes back to the philosophy and work of the influential educational reformer and psychologist John Dewey. Dewey (1916) argued that learning did not come as a result of experiences; rather, it developed from the resultant reflections on such experiences. Reflective thought, according to Dewey, includes questioning one's experiences and connecting it to what came before and after, as well as developing critical thinking skills.

The reflective process, which requires the synthesis of experiences, can offer advantages to both the learners and instructors. Di Stefano, Gino, Pisano & Staats (2014) noted the impact of reflection:

> Articulating and codifying prior experience does entail the high opportunity cost of one's time, yet we argue and show that thinking after completing tasks is no idle pursuit: It can powerfully enhance the learning process, and it does so more than the accumulation of additional experience on the same task (p. 27).

Individual blogs provide students a place to reflect on their classwork and experience in either a semi-private (viewable to the student and instructor) or semi-public mode (viewable to the whole class and instructor). Prompts for the reflection are given in the session assignments, with different questions asked over the weeks to elicit open-ended thinking about the learning process, topics, and the learner's progress.

Technically speaking, if the LMS supports blogging, students can create either public or private (to the student and instructor, for example) blogs. If the LMS does not support this, the instructor could use shared documents in a collaborative productivity suite or a blogging service. Irrespective of the technology, the blog is a way for the students to reflect on their understanding of the materials, share their experiences in the collaborative assignments, or record their thoughts at the time. For the instructor, the student blogs can help identify areas of instruction that need to be addressed or even suggest new directions for the course.

Summary of the components

In this framework, the three components of *scaffolding*, *collaboration*, and *reflection* provide the foundation for the development of an online course. The course, which features both personal and collaborative learning activities, is developed around a series of deadlines designed to provide an underlying structure for the class. This framework does not assume the use of any particular technologies and can be fitted to any LMS with basic functionality and even function

possibly without the use of one, as long as tools are in place to meet the basic needs of email, content presentation, threaded discussions, collaborative production, and blogging.

The essential layout of a session of a course developed according to the components of the framework can be seen in Figure 1. Within this structure, the instructor can provide learning materials, develop or adapt classroom activities, and generally employ the type of instructional media and activities that fit the learning needs best (as seen in Figure 2). This is what makes the framework practical, as it does not expect content or activities of any particular type but gives the general structure of how such things can be arranged and aligned.

Figure 1 outlines the basic deadlines structure of the framework. Listed across the top are types of activities. Along the left-hand side, the deadline sequence for each activity is listed. The deadlines in the figure are placeholders and can be adapted in any manner that suits the course schedule; however, they are meant to be kept as consistent as possible in order to provide a reliable class structure.

Within the deadline set-up, the activities for each session can vary greatly, as can the duration of the learning activities. For example, group activities can easily span several sessions with phases of the project set up to correspond with the session's deadlines. For example, the group may be building, or discussing, a small project that is constrained to one session, but then are asked to build upon it in the following session as they expand their learning. The group then may stay together, with a shifting leadership, for the duration of the project, with deliverables in each session.

Deadline	**Collaborative Activities**	**Individual Activities**
Session begins		The class opens in the morning, students can access the learning materials
Deadline 1	Group leader kicks off collaborative activity	
Deadline 2	Group members offer initial responses	
Deadline 3 / Session ends	Group leader wraps up the collaborative work with a summary posting in group work area	Individual assignment Personal blog entry

Figure 1. General template for course session activities and deadlines.

Example Implementation of the Framework

The following is an example of using the framework to plan a single session of a course. Figure 2 provides a sample representing a single class session, filled in with an example of the type of activities and collaborations expected from the students in the session.

Description of the course

The course used in this example is offered at a school of professional studies, situated in a large urban university. The students are a mix of professionals who are pursuing degrees as they work full-time. The topic is an entry level database design course. Previous knowledge of programming languages or database use is not expected, and all students with some interest in the topic of the course are welcome to attend, many students have not taken an online course prior to joining.

The course takes place over a 15-week semester, and a typical session of the course is contained within a week. The only exception to this is when a holiday or some other scheduling anomaly takes place. A typical weekly session includes a lesson, a reading assignment, a personal assignment, a small group project, and a personal blog entry. In addition, there are two major assessments: a mid-term exam taken by each student and a final group project. The course is sequenced so that the students learn basic database operations, including the SQL language, and then progresses into database design.

Application to a Course Session

Each session begins with an email that introduces the week's topic, the email then links to the lesson in the LMS. The lesson, which may contain readings, hands-on activities, videos, and so on, is then followed by a link to the assignments for the session. The assignments typically consist of an individual assignment (called a "lab"), a small group activity, and prompt for an entry in the personal blog.

Figure 2 demonstrates a session of the course dedicated to basic database operations. The left-most column indicates the deadlines, starting with Monday, the deadline for the session to begin. The next deadline is set for Thursday, when the designated small group leader is expected to kick off the group activity. This is followed the Friday/Saturday deadline, which represents when all the students should be active in the small group forums. The final deadline is Sunday, when the group leader is expected to supply a short summary of the group's activity and all of the students upload their personal assignment and make their blog entry.

Session #2: Lesson 2: SQL Syntax, Data types, Basic Queries		
Deadline	**Collaborative Activities**	**Individual Activities**
Monday (session begins)		Email is sent out via the LMS to the students indicating that the session is now online. Students are encouraged to sign on and begin reading through the lesson.
Thursday	The assigned group leader kicks off collaborative activity via a post a forum set up for the group by the instructor. This session's group work is explained: they are to extend a data table, with each member is to add additional fields and datatypes.	
Friday/Saturday	Students are asked to contribute to the group activity starting Friday.	
Sunday (session ends)	Group lead wraps up the collaborative work with a summary posting in group work area.	Individual "lab" assignment to create several SQL statements for a supplied data table. The personal blog entry is a prompt on discussing any challenges or surprises they have encountered so far in the class, both technically and topically.

Figure 2. Sample of a course session's learning activities and activities.

The typical session is structured to keep students motivated and progressing through the class sequence. The use of deadlines is to assist students in developing the self-regulation required

to be an online learner. At the beginning of the course, the instructor discusses the deadlines and follows up with students. During the semester, the instructor can slowly lessen the oversight, or remove scaffolding, as the course proceeds. For example, in early sessions, the instructor may monitor the group work areas and on the day after the collaborative activity should begin, send reminders to groups that are slow to get started and monitor for students who are not participating. This can be adjusted as necessary. If students are performing well, reminders can be dropped entirely, or vice-versus, as the deadlines are a mechanism that can be used to reinforce when needed.

Conclusion

This practical framework is developed around three main components, *scaffolding* via "mini-deadlines," *collaboration* via small group activities, and *reflection* on the activities and class experience. It acts as an organizational device for the instructor as well as the students, giving the instructor a structured way to develop and manage individual and group activities, and providing students with consistent deadlines to help them ultimately regulate and manage their time. The deadlines also help set the general expectations for working and learning together online.

The framework is highly flexible, and the instructor can determine his or her use of deadline reminders to set the expectations for the students, and when appropriate, scale them back. The use of reminders and multiple deadlines and their removal help scaffold the students in their progression through the course. In terms of collaboration, the deadlines encourage the students to be responsive to each other and to work together solving problems. As the students' level of understanding of the materials becomes more transparent, the instructor can organize the students into small collaborative groups in ways that ensure a mix of strengths. The reflective blogging component serves as a way for students to both think about and synthesize their learning. The blog entries also can provide feedback that the instructor can use to ensure that the class is running well and provide any sort of additional instruction or change in the course pace as necessary. While the framework has, to date, been used for technology-related courses, it is not considered as being limited to only technological subjects.

Student feedback

Student response to the courses built using the framework has been generally positive and constructive, and in return, has had an impact on how the framework has developed. Students generally have found the group activities to be helpful with understanding the material better, while others have formed their study groups based on their experiences in the instructor-formed groups. Of course, some students do not participate in group activities, causing the other group members undue stress or concern. However, the use of blogs and being able to gauge the students not participating regularly quickly allows the instructor to plan for this and react accordingly.

Limitations of the Framework

As the framework is primarily an organizational tool, it requires the instructor to develop an appropriate curriculum and activities to fit. The framework does not include or suggest the specifics of assignments or assessments, and it is also not tied to specific technologies or subject matters.

The framework also does not determine the times and amount of communication required during the operation of the class, and the amount of feedback required by the students is also quite variable, as some will require additional scaffolding, while others do not. This requires careful attention to detail by the instructor. However, the "mini-deadlines" offer the instructor many opportunities to contact students, send reminders, and offer general guidance.

Also, the framework has not been used for classes with more than 18 students enrolled and it is not yet known how scalable it is for more substantial courses. However, as it breaks the participants into smaller working groups, the framework may be used without much in the way of modification for more extensive courses. The amount of oversight and facilitation will expand as there are larger enrollments and it can be conceived that a component for coordination of the groups is added.

Suggestions for Future Research

This framework has been used practically but has yet to be thoroughly researched. Formal evaluations of courses designed using this high-level framework can be conducted, as well as research with the participants. Information already collected in terms of student blog posts and questions in the forum can also provide a basis for further study and adaptations.

Developed in response to a need to have a simple, straightforward approach to integrating collaborative work into the online classroom and to support students as they progress through the course, this framework has been used in the development of several online courses to date. Its development has been iterative, based on the author's observations of how students engage online and have been adapted in response to problems that came up while facilitating the courses. It takes cues from prominent educational theories and is a practical tool that faculty can use to sequence and structure their specific course sessions. While there is certainly room for improvement and expansion, the framework may be of use to other educators seeking to add collaboration and scaffolded structure in their online course development.

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