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Using a Learning Management System to Promote Self-Regulated Learning in a Flipped Classroom

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Abstract: The inherent structure of the flipped classroom supports a learning environment that promotes students' self-regulated learning. In this article, we focus on how a learning management system (LMS), in this case BrightSpace D2L, plays a key role in supporting all aspects of the flipped classroom. We discuss how preclass assignments help students give their learning some forethought and plan accordingly; frequent formative assessments and feedback permit students to monitor their progress in the classroom; students control what study resources they choose to use; and students have ample opportunities to reflect regularly on their work. Further, we explore how learning logs (a form of reflective writing), with the LMS Journaling and Dropbox features, are used to keep track of students' journal entries as well as demonstrate how college instructors have used an LMS to motivate and encourage students to develop self-regulated learning. A qualitative analysis of students' writing is provided to illustrate gains in self-regulation.

Keywords: flipped learning, self-regulated learning, reflective writing, learning management system, LMS.

Background

The concept of a flipped classroom has received mixed reviews over the past several years. While various studies suggested flipped classrooms are preferred over traditional classrooms in terms of student satisfaction, motivation, and engagement (Gilboy et al., 2015; Pérez, & Collado, 2019; Tan et al., 2017; Uzunboylu & Karagozlu, 2015) and improved student grades (Morgan, 2014), other studies found no difference in student performance (Cabi, 2018; Findlay-Thompson & Mombourquette, 2014; Smallhorn, 2017; Touchton, 2015). Consequently, more research is needed regarding the effectiveness of the flipped classroom in specific disciplines (Abeysekera & Dawson, 2015).

In a flipped class, preclass preparation is an integral part of the course structure. The in-class component of the lesson might fail to be effective if students are not equipped with the baseline knowledge required before class. Yet college students lack self-regulation competence (Lai & Hwang, 2016), which undermines student learning as well as pedagogical effectiveness in a flipped classroom. Self-regulation is the self-directive process by which learners transform their mental abilities into academic skills (Zimmerman, 2002). Further, learning is not a reaction to teaching but rather an activity that students do for themselves proactively (Zimmerman, 2002).

Lai and Hwang (2016) conducted a study at the elementary-school level and reported that compared to a conventional flipped classroom, a "self-regulated flipped classroom" (i.e., a flipped classroom that incorporates self-regulated learning strategies [SRL]) improved students' self-efficacy and strategies for planning and management of time and effort, leading to improved student learning. Moos and Bonde (2016) also recommended incorporating SRL strategies in the flipped classroom for improved student learning. Additionally, Sletten (2017) argued that the effectiveness of a flipped classroom rests on the students' willingness and ability to implement a self-directed learning style. Specifically, students need to practice SRL skills to become more self-directed and effectively learn in the flipped environment (Sletten, 2017).

Technology has a critical role to play in supporting SRL in a flipped classroom, given that the current generation of learners are "digital natives," as well as the digital nature of modern learning environments. Digital natives are more familiar with digital technologies such as the use of mobile devices for both personal and instructional purposes. E-textbooks, clicker quizzes, and social media interactions are just a few of the ways technology is incorporated into the college classroom (Onodipe & Ayadi, 2020). Learning management systems (LMSs), for instance, also support student learning in various ways, such as by helping instructors create and deliver content, including instructional videos, PowerPoint (PPT) slides, and homework assignments; monitor student participation on discussion threads and learning analytics on student engagement; and assess student performance via the Gradebook feature.

The growth of flipped learning as a pedagogical approach in college classrooms over the last decade has provided instructors with opportunities to increase students' level of self-regulation. This article is intended to stimulate reflections on effective ways to utilize LMSs to promote SRL in flipped classrooms to enhance meaningful student learning.

LMSs

LMSs are web-based systems that promote both synchronous and asynchronous interactions between faculty and students. LMSs facilitate the online sharing of instructional materials, posting of class announcements, submission of course assignments, and communication between faculty and students (Lonn & Teasley, 2009). LMS tools can be placed into three categories based on their function: learning skills tools, communication tools, and productivity tools (Kasim & Khalid, 2016; see Figure 1).

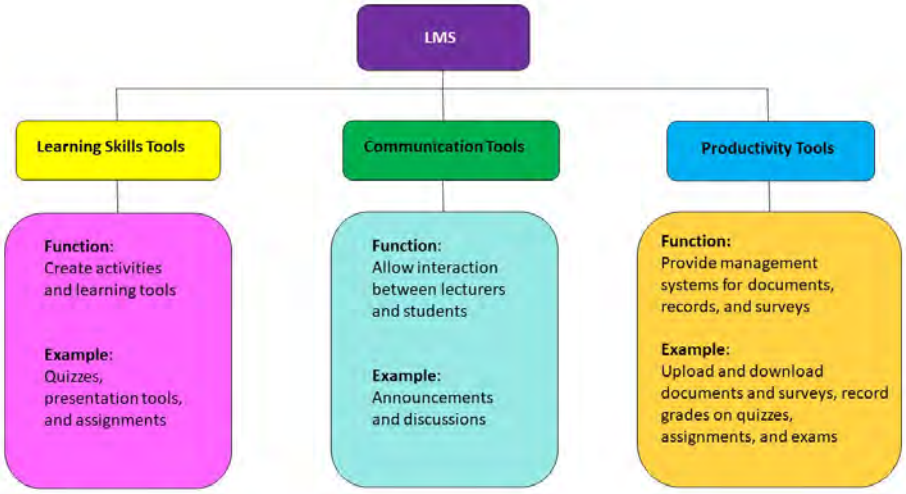


Figure 1. Learning management system (LMS) tools. Adopted from Kasim and Khalid (2016).

LMSs, including open-source platforms such as Moodle, CourseSites by Blackboard, Sakai, and OLAT, proprietary platforms such as University of California's Electronic Educational Environment (EEE) LMS, and commercial platforms such as Blackboard, BrightSpace Desire to Learn (D2L), Canvas, and eCollege, have been used to promote student learning and enhance students' self-regulation skills in face-to-face and online classes. For instance, MacKenzie et al. (2017), in their blended introductory design studio course, used Moodle to post instructional videos and provide feedback on student assignments and noted that students who accessed the LMS more frequently (i.e., viewing previous assignment information, revisiting project information, viewing feedback) had the largest improvements in their learning. Firat (2016) investigated students' use of Blackboard and their academic performance in a face-to-face operating systems (computer science) class and found a positive correlation between the total time students spent within Blackboard and their grade point average (GPA). There was no significant correlation between student GPA and the total number of log-ins. Firat further observed that students with higher GPAs spent more time on Blackboard compared to students with lower GPAs.

Lonn and Teasley (2009) surveyed faculty and a random subpopulation of students over a 2-year period to determine their perception of using the Sakai LMS and its effectiveness in teaching and learning at a large public 4-year research university. When using the LMS, both faculty and students highly favored activities that promoted effective communication, including the transmission of course information and announcements. Specifically, faculty valued improved communication with students the most, while students valued the time saved due to improved efficiency. Lonn and Teasley found improvements in teaching and learning were not as highly valued by faculty or students, which could be linked to failure by faculty and students to recognize the LMS's interactive features that support active learning opportunities (West et al., 2007).

Alkhasawnh and Alqahtani (2019) designed an online course using Blackboard for a first-year education class to promote self-regulation skills. Compared to students in a control online education class (without embedded self-regulation skills), students in the newly designed course had more self-regulation skills (as measured with the Self-Regulated Online Learning Questionnaire, adopted from Jansen et al., 2017) and performed better on a postclass achievement assessment. Additionally, Fung et al. (2019) used an LMS to facilitate the use of weekly e-learning journals with self-reflection prompts. The Motivated Strategies for Learning Questionnaire (Pintrich, 1991) was used to measure students' pre- and postclass SRL skills; students showed a significant increase in these skills on the posttest. Further, students had significant gains in metacognitive strategies, critical thinking, elaboration, and rehearsal.

Common Features of LMSs

A variety of slightly differentiated LMS tools exist for pedagogical purposes, and vendors frequently upgrade their features with the latest innovations and improvements. However, the most common features across all LMS can be broadly categorized as content, assessment, communication and interaction, or administration (Anand & Eswaran, 2018; Garrote Jurado et al., 2014; Kats, 2010; Swart, 2016).

Content features allow for the distribution of course content via uploads and downloads of electronic documents, syllabi, PPT slides, instructional videos, textbook chapters, study guides, and handouts. *Assessment* features include tools for implementing assessments, including formative and summative assessments as well as self-assessments, in order to evaluate, survey, and track student achievement. *Communication and interaction* features include tools for fostering student–faculty and student–student interaction by means of announcements, emails, asynchronous interaction (such as discussion forums), synchronous interaction (such as video conferencing), small group forums, and

journaling features. *Administration* features include tools for monitoring and managing students, course enrollments, and course engagement analytics, as well as course calendars, due dates, and checklists.

Although we chose BrightSpace D2L as the example in this study, any LMS has essentially the same features and could be used in a self-regulated flipped classroom. Similarly, regardless of the LMS tools used, each LMS provides a place for learning and teaching activities to occur within a seamless environment (Ullman & Rabinowitz, 2004).

The LMS in the Flipped Classroom

We present our experiences with two fully flipped courses (an undergraduate economics course and an upper level microbiology course) as a case study on using an LMS to promote SRL in a flipped classroom.

Participants and Context

During the fall semester of 2019, the second author recruited participants (N = 38) from one section of an undergraduate economics course at a public 4-year college in the southeastern United States. All participants were students enrolled in Introduction to Economics, a general education course. During the spring semester of 2019, the third author recruited participants (N= 10) from one section of an upper-level Microbiology course from the same institution. Both courses were held as fully flipped classes. At the participating institution, BrightSpace Desire to Learn (D2L) is the adopted LMS. Both courses used D2L to administer learning log activities that were worth 10% towards the students' final grade. Learning logs are a form of reflective writing that promotes students' metacognition (Weimer, 2013).

Course Activities

The design of both flipped classes follows Talbert's (2017) guided practice format. A lesson begins with students completing PCW assignments, which consist of reading the textbook, reviewing PPT slides, watching short instructional videos, and completing a brief exercise. When students come to class, they take a brief quiz to assess their level of preparation for class. Any misconceptions are detected and addressed before launching into in-class activities. The in-class activities consist of problem solving in groups. Students are allowed to form their own groups of two to four students for the in-class activities. After class, students complete learning log assignments.

Using the LMS in the Flipped Classroom to Enhance Self-Regulation

Content tab. The content tab on D2L is where all content for the courses is posted. It is the one stop for students to link to resources needed for each lesson. Within the content tab, the table of contents lists the course syllabus, all preclass preparation resources such as PPT slides, instructional videos, PCW sheets, learning log materials, and in-class activity handouts. For the Economics course, sample mock tests and copies of blank scantrons are available in the test materials module. A hidden module accessible only to instructors is where resources for in-class-only viewing and answer keys are posted. In both courses, students can choose the resources for individual study that work best for them before class from the preclass preparation resources (e.g., PPT slides, instructional videos). For the economics class, the PCW module opens a link to the assigned worksheet for that day on Office 365, a tool that integrates with and adds to the scope of

the LMS. For the microbiology class, PCWs were uploaded in the Assignment tab in D2L (see section on Assignment tab). The daily PCWs train students to become self-regulated learners taking control of their own learning.

Instructional video module. Figure 2 shows a snapshot of the content tab displaying videos for Chapters 1 and 2. A click on any of the links directs the students to the Kaltura video platform, which is the source for the short video clips. Kaltura CaptureSpace recorder was used to create all the videos for the introductory economics course, or to upload all instructor created videos for the microbiology course. YouTube links can also be embedded here.

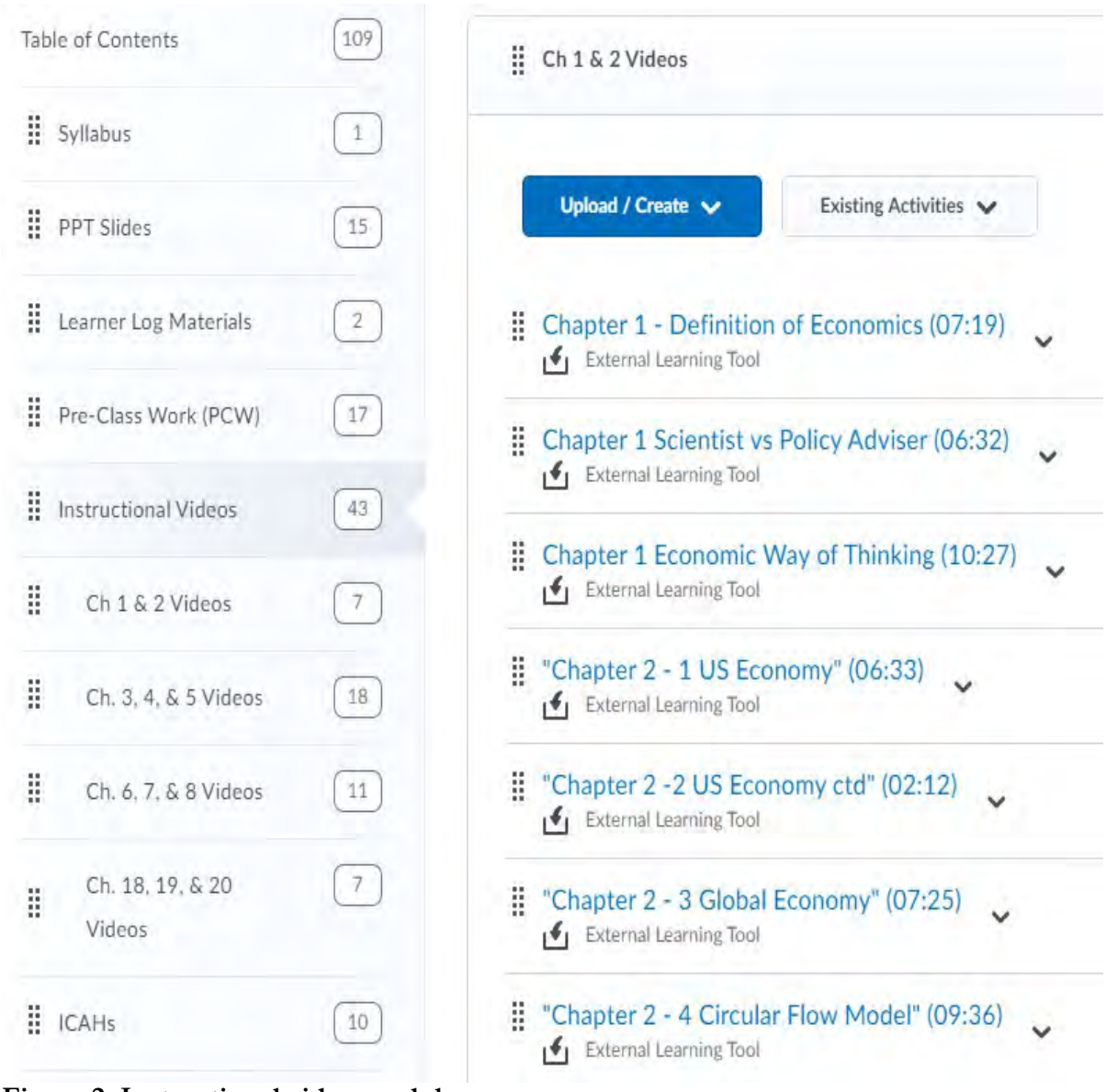


Figure 2. Instructional video module.

Figures 3 and 4 show the level of analytics that D2L provides for instructors. Monitoring of student activities allows instructors to intervene when necessary. Learning analytics data include the names of students who watched the videos, for how long, and how many replays. This helps the instructor understand student progress in the course and provides information needed to identify

strategies that guide students to be more successful in the course. Figure 4 shows disaggregated data on the number of plays each student had, average drop-off (a measure of how long students watched a video before they stop watching) and view time, and total view times. If interpreted and used in a meaningful way, these data could provide information that helps students become successful learners in a flipped classroom.

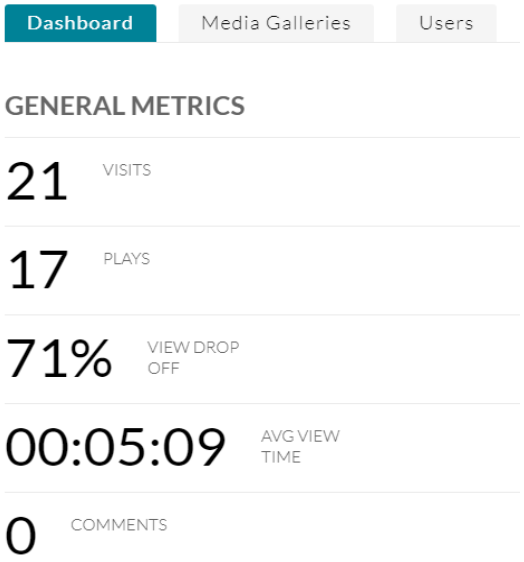


Figure 3. Screenshot of media analytics.

Plays	Visits	Plays to Visits Ratio	Avg. Drop-Off	Avg. View Time	Total View Time
3	3	100%	50%	00:03:39	00:10:58
2	1	200%	50%	00:03:39	00:07:19
2	2	100%	50%	00:03:39	00:07:19
2	3	67%	100%	00:07:19	00:14:37

Figure 4. Disaggregated data on instructional video viewing. Average Drop-off is a measure of how long students watch a video before they log off.

Announcements. On a regular basis, the LMS Announcements feature was used in both courses to remind students of what was accomplished in class and what assignments were due. Announcements keep students mindful of what they have covered so far and what is upcoming. Many of these announcements also serve as encouragement to the students and help keep the workload more manageable. Sample announcements are illustrated in Figure 5.

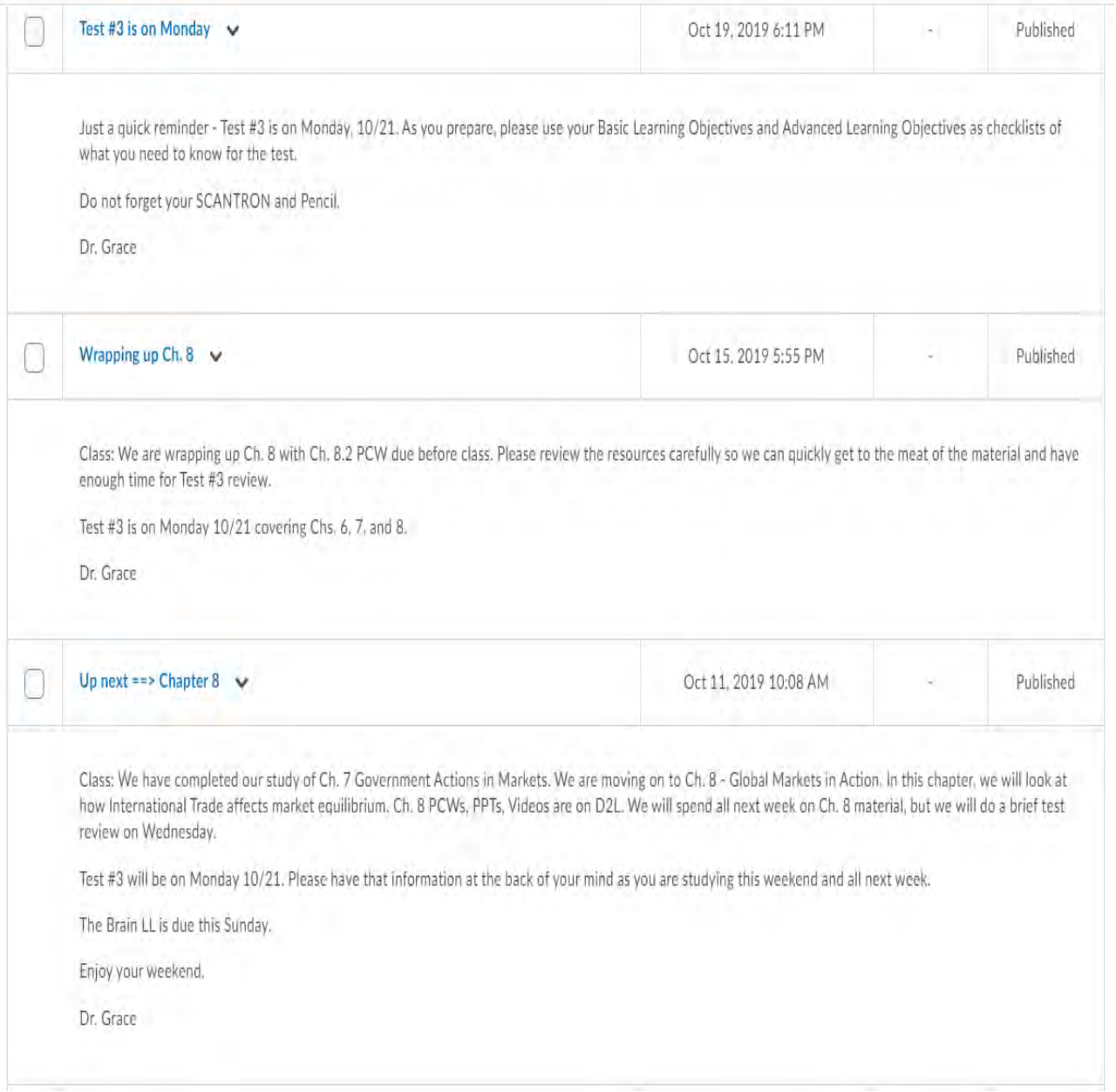
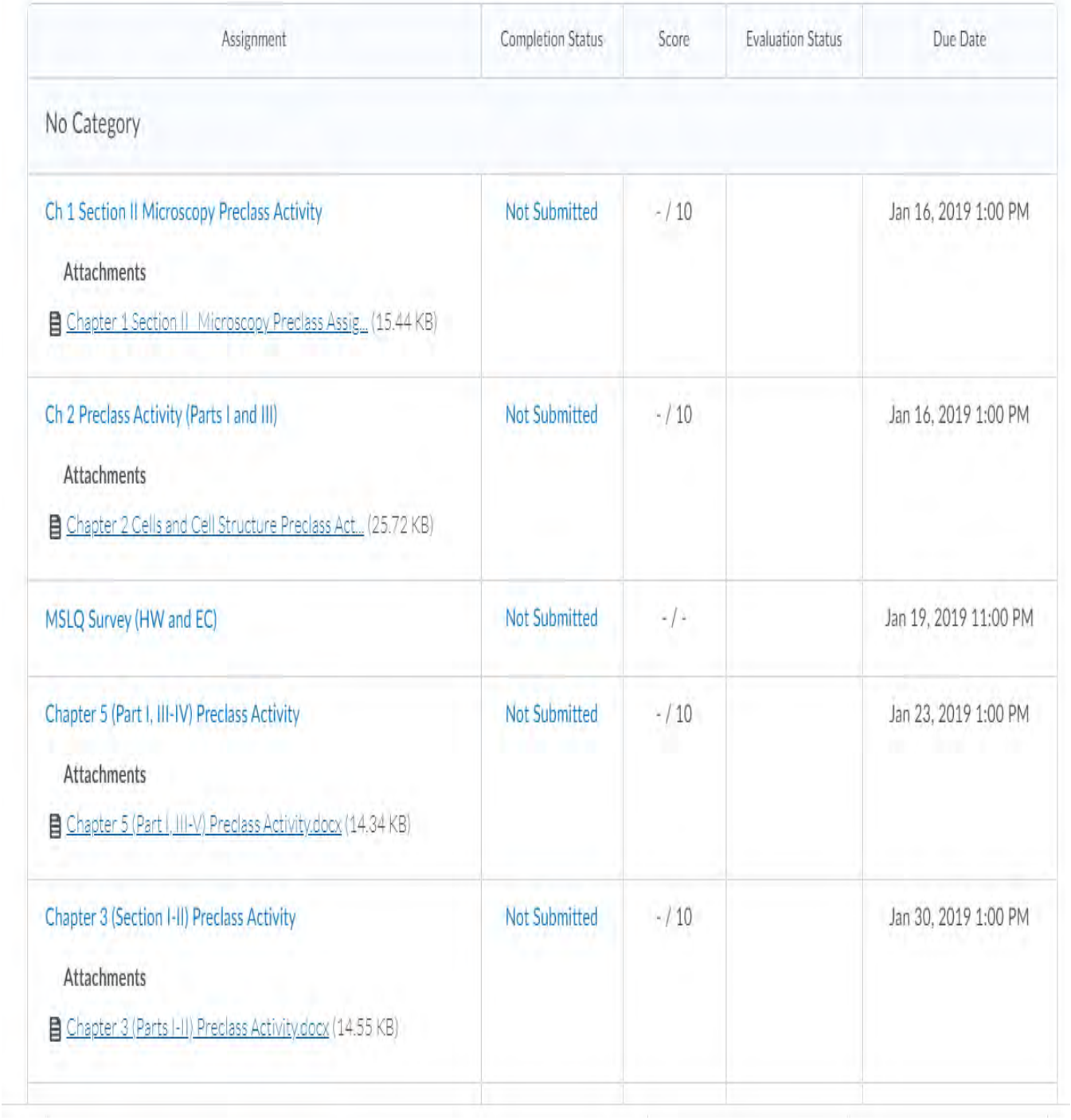


Figure 5. Snapshot of announcements.

Assignments tab. The assignment tab feature in D2L allows for the uploading and downloading of documents within an LMS. It also provides a way for instructors to give and for students to receive feedback on assignments. It is considered a productivity tool as it facilitates the efficient transfer of documents between faculty and students. Author 3 used the assignment tab to upload PCWs and learning logs. Each assignment had a Dropbox feature that was used by students

to upload their completed PCWs (Figure 6) and learning log prompts (not shown). The Dropbox feature shows as a link within each assignment category. The instructor used the assignment tab to provide students with feedback, and students could view their feedback under Evaluation Status. The feedback students received within the assignments tab helped guide their learning and preparation for their in-class activities.



Assignment	Completion Status	Score	Evaluation Status	Due Date
No Category				
Ch 1 Section II Microscopy Preclass Activity Attachments Chapter 1 Section II_Microscopy Preclass Assig... (15.44 KB)	Not Submitted	- / 10		Jan 16, 2019 1:00 PM
Ch 2 Preclass Activity (Parts I and III) Attachments Chapter 2 Cells and Cell Structure Preclass Act... (25.72 KB)	Not Submitted	- / 10		Jan 16, 2019 1:00 PM
MSLQ Survey (HW and EC)	Not Submitted	- / -		Jan 19, 2019 11:00 PM
Chapter 5 (Part I, III-IV) Preclass Activity Attachments Chapter 5 (Part I, III-V) Preclass Activity.docx (14.34 KB)	Not Submitted	- / 10		Jan 23, 2019 1:00 PM
Chapter 3 (Section I-II) Preclass Activity Attachments Chapter 3 (Parts I-II) Preclass Activity.docx (14.55 KB)	Not Submitted	- / 10		Jan 30, 2019 1:00 PM

Figure 6. Snapshot of assignments tab in D2L.

Emails. Emails serve as an effective communication tool. Upon reviewing the gradebook and noticing missing and low grades, both instructors sent emails to specific students reminding them of the importance of coming to class and completing PCWs or suggesting study strategies for upcoming tests, depending on the situation. For the Economics class, all students within the same category would receive blind copied emails addressing their specific issue. Again, the LMS makes this easy to accomplish as the emails are generated directly from the Gradebook feature. Sample emails to students are provided below.

Email Sample 1

> Hello Student: Hope you are doing well. I know it is still very early in the semester, but I am concerned about your grades thus far. We have only covered a couple of chapters but those are the easier chapters. I hope that you are able to pull up your grades in the next test and upcoming assignments. Coming to class fully prepared with PCW done and notes in hand is critical. That way you are able to follow along with the pace of the class and fill in any blanks that you had while studying at home. If you are unclear about the structure of the class, please ask asap.
>
> If you have any questions that are not yet answered, please contact me asap. I am here to help you get through this class successfully, but you have to put in the effort.

Email Sample 2

> Dear Student: Hope you had a great weekend. I am following up with you because I am just reviewing Ch. 7.1 PCW and I see that you missed the deadline. Ch. 7.2. PCW is due one hour before tomorrow's class! I hope you do not miss this one. We will be going over this material very briefly and then moving on to more difficult concepts. If you don't understand Ch. 7.1. and 7.2, you will struggle in class. Please I urge you to come to class prepared. Please let me know if you have any questions.

Learning logs. One strategy to promote SRL is the use of learning logs (Weimer, 2013). Learning logs are a form of reflective writing used across disciplines, in science, technology, engineering, and mathematics (STEM) courses (Maharaj & Banta, 2000) as well as non-STEM courses (Babcock, 2007), to enhance students' self-regulation. The LMS Journaling feature allows students to keep track of their journal entries—students post their responses to prompts that only the instructor and the student can view in the discussion thread. A total of 10 learning log prompts were assigned to students during the semester. A 400- to 600-word response was required. Examples of learning log prompts are provided below.

Learning Log Prompt Example 1

Test Reflection Prompt

> By now you have the results of your first test. How did your actual grade on this test compare with the grade you expected? How do you explain the difference, if any? How do you feel about your test grade? Are you surprised, pleased, relieved, disappointed, or what?
>
> How many hours did you study for the test? Was this enough time to get the grade you wanted, or should you have spent more time preparing? How did you spend your time preparing for the test? How effective were these study strategies? Examine the questions[on] which you lost points and look for patterns.

> To what extent did these items come from a specific set of class materials (readings, lectures, class activities, etc.)? To what extent did they focus on certain topics? Did you tend to misread the questions? Were you careless? Did you run out of time? Set a goal to get a certain percentage correct in the next test. What study strategies and schedule will enable you to earn that score?

Learning Log Prompt Example 2

Different Course Format Prompt

> As you know already, the format of this course is quite different from what you may be used to. A rough way to describe this class is that the classwork occurs at home and the homework occurs in class. What advantages and disadvantages do you see to having the teacher and your fellow students available during the time devoted to the more advanced concepts, problems, and applications? In what ways will this class be better than a more traditional course? Why do you think a teacher might design a course in this format?

Learning logs were also used in one section of Author's 3 microbiology course. Students in that section accessed monthly learning log prompts under the Assignments tab within D2L and submitted their responses using the Dropbox feature. Author 3 read all submitted learning logs and provided feedback to all students within D2L. Examples of learning log prompts with sample student responses and Author 3's feedback is provided below.

Learning Log Prompt Example 3

Learning Log Reflection Prompt

> How are you taking advantage of the at-home readings, videos, or pre-class work? Are you pausing and rewinding? Using a note-taking system such as Cornell notes? Writing down questions in the margins or in your notes? Summarizing the content? Self-testing? Reviewing your notes before class? In what ways can you make the at-home portion of class more interactive? Also, this work requires you to develop time management skills. How is that going for you right now? If it is not going well, then what can you do to better budget your time?

Excerpt From Student Response

> Time management has always been a weakness of mine, but I somehow find myself trying to give this class more time than normal because I know this class is of a higher level. It can be a difficult class, but when I spend enough time on it I understand more of the material. However, I know I can always improve my time management skills. Giving myself enough motivation is easier said than done, but it is crucial when preparing for an exam. I find having peers that can support and push you to do better has been a big impact in increasing my motivation, and it pushes me to better manage my time.

Author 3's Feedback (read by student)

> I am glad you have a very good support system to help motivate you to prepare for this class. Yes, I agree this class takes a lot of preparation to do well, but as you stated, this is a higher level course, so more preparation is key. After class, do you

> ever go back to the Guided Practice and complete the Advanced Learning Objectives, which are the concepts learned during class? You can do this with your study partner to make the at-home study more interactive.

Learning Log Prompt Example 4

Test Reflection Learning Log Prompt

> By now you have the results of your first exam. How did your study game plan work for you? What, if anything, would you change for the next exam? Were you faithful to the game plan? Did you learn anything about your own learning preferences, or what works best for you? Finally, reflect on your study strategy in light of the following quote: "*In college, the bulk of the learning should take place outside the classroom."*

Excerpt from Student Response

> To be honest, after I turned my exam in, I was worried because I get test anxiety and go through questions very fast to get out of the room faster. I leave multiple choice for last so I can focus more on the short answer at the beginning of the exam. I thought I got a 70-75, but to my surprise I received an 89. For the next exam, I will probably focus more on details like remember enzyme names and important molecules so I can receive more points on the short answer questions. I am not sure what faithful to the game plan means, but I think I was; I studied what I planned on studying and received a passing grade. I think what works best for me is taking good notes during lecture and while watching the videos because that makes me understand the concepts more than just going through each objective. The quote is accurate; I feel like most of the learning process is not inside the classroom. In class, we reinforce what we already know, or go in with questions. While outside of class we should pre-view and review the material.

Author 3's Feedback (read by student)

> I am so happy that you actually exceeded your exam grade prediction. I believe it is partly due to the flipped nature of our course. Being faithful to your game plan means did you stick with the study techniques you planned on using. In the future I should give out the study game plan earlier in the semester. I like that you are taking notes both at home while watching the videos and during lecture. Do you compare the at-home notes with the in-class notes to see if there are certain things I repeated several times? Also, what are some techniques from the study game plan you can add that might improve your exam scores?

Student feedback. Students in this flipped class were asked to complete several reflective writing assignments and their responses suggest an improvement in self-regulation. One prompt read:

> Write a letter to the new students who will be in this course next semester. I want you to tell them—in as helpful and specific a way as possible—what you think they should know about how to survive and flourish in the class. Some themes you may consider writing about are as follows:
>
> - What I know now about this course that I wish I'd known when I came in

- The most important things you need to do to keep your sanity in this class
- The most common and avoidable mistakes that I and others made in this class
- The words that should be on your screen saver telling you how to make it through this class
- What I did to earn an A in this class (or a B or C, D or F) or Why I did not earn an A in this class.
    - Feel free to discard these themes and just write about whatever comes into your head around the theme of survival.

Students' responses reveal improvements in SRL. Specific quotes on how the LMS supported this improvement are discussed here.

> If you wish to do well in this class, it will require time outside of class. Time where you actually work hard and attempt to understand the information. One of the biggest things that helped me was reading the book and then, the next morning, looking over the PowerPoint slides before I went to class. The PowerPoint slides are a distilled version of the textbook and a preview of what you were going to be doing in class. If you look at it before class then your brain has already gotten a small understanding of the material done. Then while you're in class it makes understanding the material much easier to understand.

In response to the Test #1 Reflection discussion thread, we noted SRL on display. For instance, regarding help-seeking behavior, one student wrote:

> I can say that I may have waited too long to study for my first exam and it turned out really bad. I did make plans to study with a friend almost every afternoon to motivate me to study more throughout the day because it is not easy trying to get things done by yourself sometimes. I hope that this will help me boost my next test grade up.

Students also made attempts to set goals for improvements on future tests. For example, one student wrote:

> Next time, I'm going to study for 5 hours (one hour per day). I am going to read the textbook, take notes, rewrite the notes, and also review with the videos and power points. I am hoping for a 90% on the next test.

Students learned organization and how to take notes as they completed PCWs each week. For example, one student wrote:

> You have to be ready to know what you're going to be talking about in class and what is expected for you to know. If you're not well at self-teaching yourself and how to conduct your own notes then in this class you will most definitely learn how to. In order for you to receive a good grade in this class then you have to take notes and ask questions.

Another wrote, "Take notes from the power points or the book. It is highly recommended to read the textbook and read the notes."

Because of the course structure, students were able to learn to manage their time and study environment. In their reflections, students talked about setting aside time to study and prepare for class: "Next test administered, I will be making a 90 percent or above. I will accomplish this by doubling my study time to 1-2 hours per day rather than 30 minutes."

Students learned to regulate their effort in this class. Pintrich (1991) noted that self-regulation includes students' ability to control their effort and attention in the face of distractions and uninteresting tasks. Students commented:

> Another statement that could be your screensaver is "I am responsible for my choices". It is important not to wait [until] the last minute to do anything in the class because getting behind at the beginning really affects what you learn because everything is tied together. I recommend that you choose people in your class that will not distract you and also that are willing to help you if you need it and they should be great at communicating like if you want to meet up and study.
>
> Another student pointed out, "Phones only are going to distract you from important things you need to know."

For PCW, students were asked the following questions each week:

1. Are you ready for class?
2. Look back at the Basic Learning Objectives. What questions do you have?
3. How did you prepare for class?
    a. I watched Ch. *x* instructional videos
    b. I read Ch. *x* of the textbook
    c. I reviewed relevant PPT slides from Ch. *x*
    d. I can recall this material from previous economics courses
    e. Other — please specify

Over 90% of the students came to class prepared and reported having used a combination of textbook, instructional videos, and PPT slides to prepare for class. An in-class prequiz given at the beginning of class confirmed students' high level of preparation for class. The prequiz also gave students the opportunity to ask specific questions about what they did not understand. This helped them be more intentional in their learning and better prepared for the class.

Instructor Lessons Learned

In this section, we discuss the lessons we learned from using an LMS to teach flipped courses and the SRL that ensued. Using the D2L LMS helped us better manage course activities and facilitate asynchronous teaching for the flipped class and online communication with students. According to Lonn and Teasley (2009), LMS activities can be separated into two main categories based on functionality: (a) effective communication and (b) teaching and learning. Besides posting syllabi and student grades, we could use the D2L LMS to enhance communication in the flipped courses, for

instance, posting announcements online, saving class time. Specific feedback was returned to students on submitted assignments using the Journaling and Assignment features.

Feedback on PCWs was easy to facilitate as we could copy and paste similar corrective comments to different students. However, specific feedback on learning logs took more time, as we had to read each learning log and provide specific feedback based on the student's reflection. Our guided practices, which helped students in their before-class learning activities, and the feedback provided on PCWs and learning logs also fall in the category of teaching and learning. The feedback provided on students' PCWs also guided our teaching. In particular, the answers provided on students' PCWs helped us see student misunderstandings before lectures. This knowledge helped us better tailor our in-class teaching to address student misunderstandings, as prescribed in "just-in-time teaching" (Novak et al., 1999). In spring 2019, the third author did not post practice quizzes for students to assess their learning but began in fall 2019 to do so. Incorporating the use of discussion boards for students to post questions before/after lectures would be another way that teaching and learning could be promoted with the LMS and would enhance flipped teaching.

Discussion

To be successful in a flipped classroom, students need to have or cultivate a certain level of self-regulation in learning. The LMS, when used effectively, promotes and supports this skill. With the use of an LMS, the professor can very easily monitor students' progress in the class using analytics and encourage those who are falling behind using the LMS features. Learning log assignments are a great way for students to think about their learning, develop strategies to improve their performance, and receive feedback from the professor during the semester. In terms of SRL, feedback on students' PCWs can lead to improvement on in-class quizzes. Feedback on students' learning logs help them plan, set goals, and lay out strategies to be successful in the class. Learning logs also help students reflect on their performance and make any necessary adjustments. Instructors can use the LMS to facilitate the necessary feedback to help guide students' SRL.

Recommendations

The features of LMSs are very powerful and require continuous probing to discover their full benefits. Instructors are therefore encouraged to obtain the training required to learn all what their LMS offers so they can use it effectively and save time. On the basis of the comments generated from the learning logs, the authors recommend that instructors (in either flipped or traditional classes) incorporate reflective writing prompts to encourage students to think about their own learning process, thereby becoming more self-regulated in learning.

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