Translating Best Practices for Student Engagement to Online STEAM Courses

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Abstract

As universities continue to offer more distance education through online courses, they face the challenge of translating onsite best practices into online courses in order to enhance student engagement, improve student persistence, and optimize student retention in STEAM (Science, Technology, Engineering, Arts, and Math) programs. This paper describes how we adapted face-to-face classroom engagement techniques related to group discussions (both synchronous and asynchronous) and labs into online courses in applied engineering and digital media design at National University.

Introduction

The past decade has witnessed more universities offering online courses and degree programs as both traditional and nontraditional students look for flexible undergraduate and graduate education options. Over 62% of US colleges and universities are now offering some sort of online programs with 6.7 million students taking online classes in 2011, up from 6.1 million the previous year.[1] One source predicts that there will be more full-time online students than the onsite students in the next few years.[2] Those courses which are not delivered entirely online are still highly likely to feature hybrid or blended online resources.

National University (NU), a non-profit, private university founded in 1971, features over 50% online delivery across its hundreds of academic programs. In total, NU offers about 100 undergraduate and graduate degrees to approximately 23,000 students, with 70 programs and 1,200 courses being online and accredited by WASC (Western Association of Schools and Colleges).[3] NU provides more master's degrees in education to minority students than any other college or university in California, as well as more master's degrees in all disciplines combined to the state's Hispanics and African Americans, according to *Diverse Issues in Higher Education*. Annually, National University also ranks in the Top 10 nationally in granting master's degrees to women.[4]

Currently, NU offers courses delivered in a single month format, using one of four synchronous and asynchronous delivery models:

(1) Onsite classes: These are the traditional face to face classes with instructors and students in one classroom at the same time. The classes are offered on nights and weekends to enable students who are employed during the day to attend classes around their work schedule.
(2) Online classes: These are asynchronous classes where students can access course content at anytime and anyplace.
(3) Web-based classes: These are synchronous classes where some students are in the onsite classroom and some are connected to the classroom at the same time via internet.
(4) Hybrid classes: In these classes students get 50% instruction from the onsite classroom and 50% from the online class website.

In 2002, National University founded what is now the School of Engineering, Technology, and Media where almost half of the students in the applied engineering department are enrolled in online courses, over half of the computer science department are enrolled in online courses, and 100% of all the media students matriculate online. The university's goal is to provide the same high standard and quality of education to all students in both onsite and online courses, no matter what delivery model is used.

This paper focuses on how we've adapted persistence techniques for improved student engagement, interaction, participation, ownership, and community to STEAM online courses in applied engineering and media at National University.

Literature Review

When STEAM (Science, Technology, Engineering, Arts, and Math) education is delivered online, student retention and persistence issues increase since online delivery combines all of the traditional challenges of race, gender and K-12 preparation with a delivery model that relies heavily on student ownership of learning and proactive engagement. Even though more students are choosing online education, the literature shows that attrition rates are higher in online courses than in onsite courses. Specifically, attrition rates for classes taught through distance education are 10–20% higher than classes taught in a face-to-face setting. One example of this was described for Tel Aviv University, where the activity of 1189 students in 1897 courses were analyzed and showed that 46% of students either decelerated or quit their online activity by the end of the course.[5]

As the number of online courses continues to increase it is critical that educators put together a proven and effective framework for engaging learners if they wish to increase student retention and persistence. Engaging students' attention early and rigorously keeping them focused on relevant curricula is the key. In order to successfully and consistently engage their students, educators must be armed with techniques and strategies adapted for teaching effective online courses.[6]

The often missed opportunity for universities moving courses from onsite to online is the chance to evaluate their practices and only transport over the ones which show the most promise of

student engagement and a robust fitness for the online delivery environment. However, initial attempts to adapt onsite teaching methods to online courses achieved little more than copying onsite practices into the digital environment. The sage remained on the stage, simply changing the performance venue. Unfortunately this does not encourage student retention or persistence in either classroom mode. Newer teaching models like the flipped classroom, peer engagement, and student-led engagement are finding favorable results and increased engagement both onsite and online.

According to Dr. Ben Habib in his paper, Breaking the Ritual,[7] effective classroom participation requires that students be familiar with key concepts from the topic reading material. His suggestion is that effective classroom engagement works on the flipped classroom model, wherein the majority of factual content in ingested outside the class meeting and the class itself is a place to review, reinforce, troubleshoot and workshop key course concepts. The paper urges instructors to resist the sage on stage model of lecture or frontal presentation and instead focus on creating an inclusive and engaging environment for student learning. The intervention had two primary components; first, a large portion of the initial tutorial was devoted to introductory activities in which the students got to know each other [peer engagement]. Second, subsequent tutorials began with a paired warm-up activity to get the whole class talking immediately, after which each student raised a prepared question for class discussion [student led engagement]. In this way, less confident students can participate in class discussions, more confident students can be managed so they don't monopolize class discussions, and students are enabled to take responsibility for their efforts. This flipped classroom model, with a new structure and tutorial components were used in online classes in applied engineering and media at NU and will be discussed in further detail in the Results & Discussion section.

Engaging learning experiences in STEAM are challenging to design, develop, and implement; in the case of online classes, the students are not physically present which presents additional obstacles. In an online classroom, instructors must begin by building a method of communication within student groups and between students and instructor, and then fashioning the available communications in such a way that students are able to participate in the social exchange of information in a virtual environment.[5]

Typically online classes use two forms of communication between students and instructor. In the synchronous, or real-time, mode the instructor and students meet in a "live" chat session using real-time audio or video and messaging capabilities. In the asynchronous mode, students interact with course materials individually such as watching taped presentations by the instructor, contributing to discussion boards, or reading information that has been linked to the course. In Davidson and Tanner's, How Do Students Participate in Synchronous and Asynchronous Discussion,[8] developers of online learning environments suggest that asynchronous communication may have advantages over synchronous communication and are the preferred mode of discussion. A study by Piburn and Middleton compared asynchronous discussions on a listserv (used for software for managing e-mail transmissions to and from a list of subscribers) to face-to-face classroom discussions, focusing on professor and student interactions. They found that asynchronous held some advantages over the traditional classroom, such as student preferences for the listserv and noted a role reversal with students initiating the conversations

rather than teachers.[9] Noting an absence of any analysis or evaluation of online chats in the literature, Jeong found in his analysis that these types of synchronous discussions had a main advantage of promoting highly interactive discussions with a disadvantage for the group to digress from the topic to another.[10] The use of synchronous chat sessions and asynchronous threaded discussion were used in online applied engineering and media classes and will be discussed in further detail in the Results section.

When learners are able to interact with their classmates and instructor, it helps to engender a sense of participation in a true learning community. A learning community comprises individuals participating together in joint activities who have a sense of belonging to one another. Further, that sense of community (SOC) can be fostered through interaction with others who have similar interests and goals.[5] SOC appears to be related to both student-instructor interaction and student-student interaction. In a study of 1,406 students across an entire university system, Swan found a significant positive correlation between students' perceived interaction with instructors and fellow students and their satisfaction within their online courses.[11] Meanwhile, Woods found in a single course study that a significant relationship exists between student-instructor interaction and learner satisfaction. Interestingly, in Woods' study there was not, however, an increase in student satisfaction, learning, or sense of community in response to increased personal e-mails from the instructor.[12] Therefore, increased engagement doesn't seem to be a result of ongoing or frequent communication touch points throughout the course. Rather, increased student engagement in elegantly cultivated SOC settings is the product of an instructor clearly establishing the tone, expectations and interaction level for the course during its earliest meetings. Once properly established, peer interaction becomes the self-sustaining engagement mechanism. Further, this research suggests that instructors may be able to foster interactive relationships with their students, with students perceiving a high degree of instructor availability, with only a minimal amount of initial reciprocal interaction such as video lectures, occasional whole-class announcements, and prompt reply to individual student e-mails (typically within 24 hours). To build community in online classes at National University was the goal of the use of Google Jockey (an induction activity at the start of a live session wherein the students went online, searched for information on the day's discussion topics and then presented them to the class) in media classes and the use of break-out chat sessions in applied engineering, which will be discussed in further detail in the Results & Discussion section.

Results and Discussion

Building community through the application of instructor video

For synchronous portions of online classes, one obvious tool for fostering community and increasing engagement is to have the video camera active during live sessions. Students able to use body language to express themselves will be more robust communicators. While nearly all live session solutions include a live video tool, current home online bandwidths and server speeds often result in this function being disabled in order to preserve the continuity of the connection. As commercial bandwidth continues to follow Moore's law, the video tool will enjoy greater adoption.

Some very simple tools can be used to make an asynchronous online course feel more personal (and therefore more engaging for the students) while building a sense of community in the class. Posting an instructor portrait and creating a space for students to (optionally) post their own portraits can improve student's sense of community. Instructors can make a simple video of themselves introducing the course and their credentials. This allows the student to put a face to the name, while simultaneously sampling the voice they will hear in their heads when they read instructor feedback. This can go a long way to regulating the tone with which students read instructor posts.

Increasing participation through the application of targeted assessment

Another general method of encouraging online live session participation is to build in assessment measures which can only be fulfilled by meaningful participation. If 10% of the courses grade relates to the live session, student risk losing a whole letter grade if they absent themselves from the sessions. Within that 10% a portion should be dedicated to attendance (showing up) and a portion to meaningful participation. So, the student who shows up but never says anything fails to earn the full 10%.

Similarly each assessment, attendance and participation, should have a clear rubric posted to the course showing students exactly what they need to do in order to be successful. An example rubric from an applied engineering course is shown below. In this case, class participation was worth 25 points for each week (12.5 points each chat session; there were two chat sessions conducted each week). The rubric specifies how the student will be graded based on Quantity of Participation and Quality of Participation as shown below.

TABLE 1: Participation Grading Rubric

Participation (Scale of 0-12.5)	**Quantity**	**Quality**
<5 points = **Low performance**	Absence = 0 points.	Little to no interaction during chat sessions. Logged on and remained silent.
5-10 points = **Moderate performance**	Attended most of the class, but either came late or left early	Some interaction with instructor/classmates during chat sessions. No verbal contribution during chat sessions.
10-12.5 points = **High performance**	Attended entire class	Good verbal contributions during chat sessions showing understanding of the knowledge and application of the topic area.

Rubrics were also developed to encourage student participation in threaded discussions, which is done asynchronously. The educational goal of threaded discussions is to give students an opportunity to reflect on the textbook material and the class discussions and synthesize this knowledge into understanding of the weekly course learning objectives. For this applied engineering course, the threaded discussion assignments were graded based on Quality of information and Delivery of Information as shown in the rubric below.

TABLE 2: Threaded Discussion Grading Rubric

Threaded Discussion (On a scale of 0-25)	**Quality of Information**	**Delivery of Information**
<10 points = **Low performance**	Response is not related to the assignment; irrelevant remarks are made; response did not answer all questions.	Poor spelling and grammar, "hasty" appearance, professional vocabulary not used, and attitude negative or indifferent.
10-20 points = **Moderate performance**	Response is related to topic; supporting details or examples are not included in sufficient breadth or depth; the author simply restates concepts made by others (textbook, instructor).	Few grammatical or spelling errors, professional vocabulary used most of the time, and positive attitude displayed frequently.
20-25 points = **High performance**	Supporting details and examples are both broad and deep; the author shows originality and does not restate the textbook or instructor; all questions are answered.	Consistent grammatically correct posts with professional vocabulary, no misspellings, and positive attitude displayed throughout.

Building participation through adaptive presentation styles in group discussions

National University's School of Engineering, Technology and Media hosts an undergraduate degree in Digital Media Design. Delivered completely online on the eCollege learning management system in one month long courses, students are asynchronously exposed to a spectrum of technologies and design principles centered on the creation of satisfying user interface. Each course holds weekly synchronous "live" sessions hosted through either the eCollege ClassLivePro or independent use of AdobeConnect. Either way, the students are expected to congregate and attend the live sessions traditionally held late in the evenings. For their capstone experience two months are devoted to MUL 420 and students are held to a rigorous program of weekly portfolio and thesis milestones. The task of aggregating the best of their 3-4 years' worth of work to a web site, assessing which pieces both represent their skills and could look attractive to employers while simultaneously generating 4,000+ words per week on their thesis is daunting. Outside feedback is essential for the optimal production of marketable work and so ensure maximum metacognition on behalf of the students who are about the begin independent monitoring of their own professional development. To that end the weekly group discussions in the flipped classroom model become even more essential for success in this high-stakes, time-locked scenario.

In group discussions, one method for engaged and fruitful student interaction involves the delicate balance of both establishing authority while simultaneously creating a safe and welcoming environment for students to take risks and brainstorm solutions. What has shown itself to be effective in MUL 420 is the instructor's adoption of the first-among-equals persona. The live session begins with a shock-and-awe review of their credentials; essentially covering how they, they instructor, have done this process successfully in the past and therefore have credibility. The three key areas to touch upon are subject matter expertise, professional industry experience and teaching credibility. Once authority has been established, the instructor makes a few calculated self-deprecating comments, shares a story of a professional mistake or error and how it was remedied can break the ice and catalyze the aforementioned goal environment. The use of each student's name when calling on them (an easy task in an online chat where everyone's name is displayed for easy reading) and even calling on the quiet ones when a question is presented to the group can heighten engagement and risk taking. One of the primary keys to this method being successful is the instructor's ability to read their students as individuals and as a group. The instructor who can detect shyness, fear, discomfort or anxiousness in a student and address it in a way that allows the student to save face will win over the group and enhance participation.

In the flipped classroom model, if the instructor cannot deviate from their planned agenda for the meeting, it means that they are not reading and adapting to their students and this approach will fail. In order to maximize engagement, the attending students must be made to feel safe sharing their thoughts. This is done by the instructor showing a combination of competence and vulnerability. Once students feel safe and encouraged, participation increases and the level of engagement with the material or the problem solving process rises.

Increasing participation in applied engineering laboratory courses

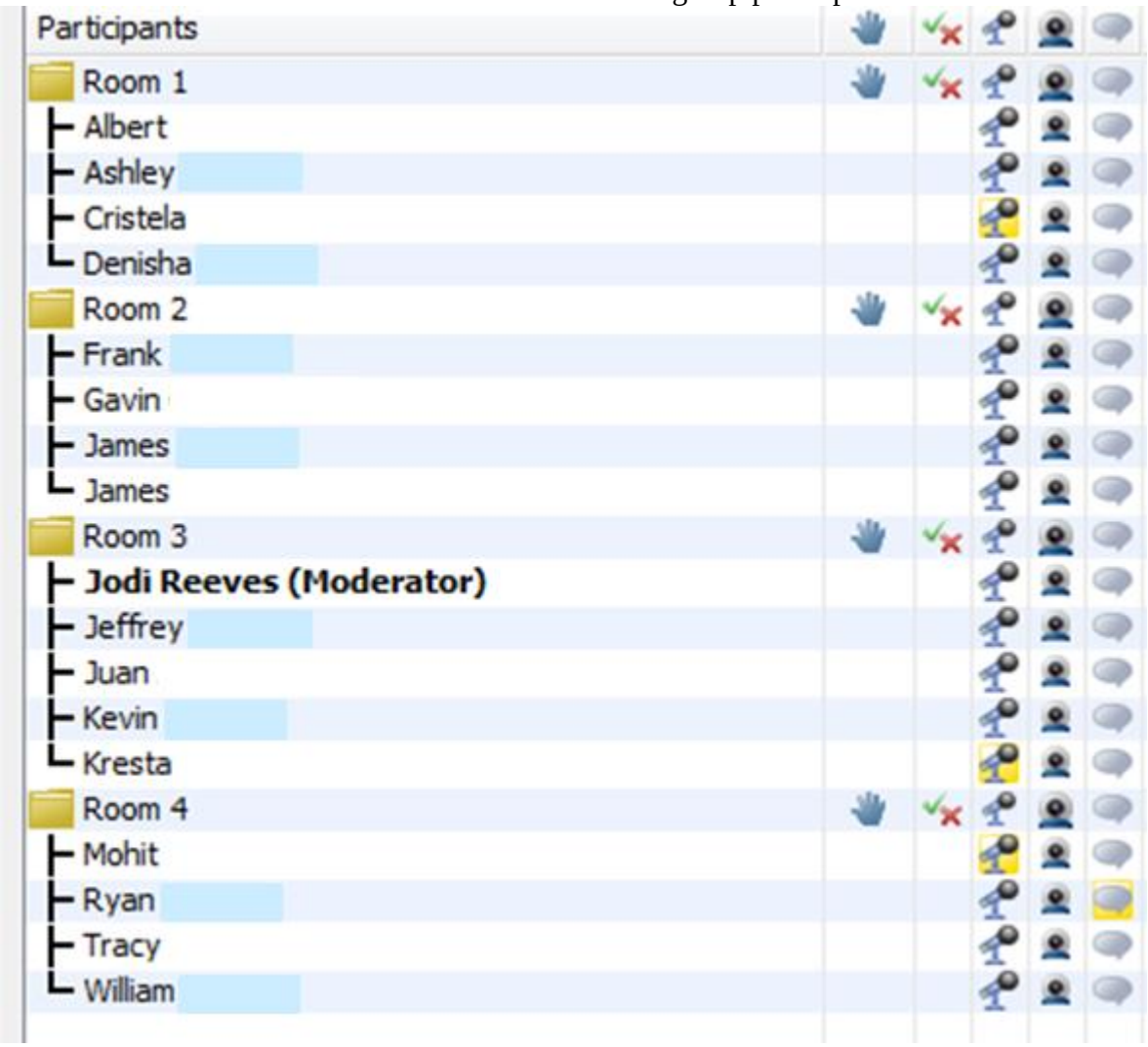
In the applied engineering department, a class in scientific problem solving (EGR 320L) was taught to 28 online students in Fall 2013 using laboratories in mechanical engineering, electrical engineering, and thermodynamics. The students were a mix of computer science and applied engineering majors; the online students took the course asynchronously from multiple locations throughout the United States plus one military student serving in Afghanistan. The online course utilized live webcam-broadcast laboratory demonstrations as well as hands-on laboratory equipment that was shipped to each student to create remote labs and adapt hands-on laboratory learning to online courses as described in other publications.[13,14] Live synchronous chat sessions, asynchronous threaded discussion questions, and other tools and technology were used with the online class to try to inspire and engage students in the challenging laboratory course material.

Scheduling live synchronous group discussions in an online environment provides unique challenges, but it is possible through the use of National University's use of eCollege hosted ClassLivePro (CLP) technology, part of the eCollege learning management system that allows instructors to gather students into a large virtual chat room or divide them into smaller groups in separate chat rooms. Within these smaller group chat rooms, each student has audio, video, and whiteboard access to discuss ideas and document notes during the session. The instructor can

jump in and out of each group's concurrent chat room sessions in order to encourage and guide students during the discussion. Once complete, the instructor can pull the whiteboard notes back to the main online chat room and reconvene the whole class for individual group reports. The use of this technology tries to closely emulate the onsite interaction between one instructor and several small groups of students in an online laboratory.

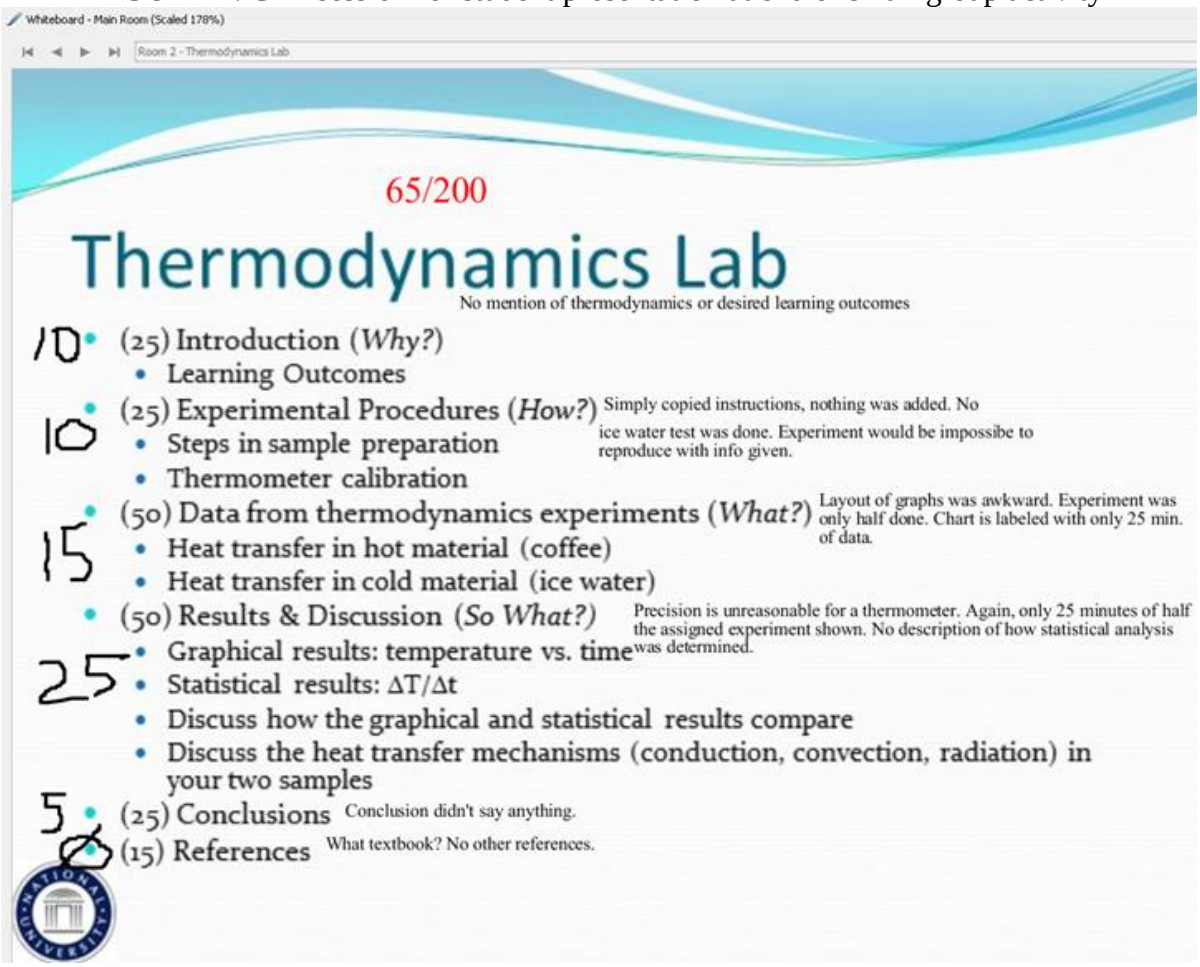
In one thermodynamics laboratory preparation, the instructor emailed a sample lab report to the class with instructions to analyze the strengths and weaknesses of the lab report. During the synchronous chat session, the instructor then divided the online students into small groups and placed them in an individual chat session where their task was to grade the lab report using the rubrics that the instructor usually uses. Using the CLP technology described in the previous paragraph, the instructor could then visit the individual chat rooms (shown as Room 1, Room 2, etc. in Figure 1). The instructor could see who was using the microphone when it was highlighted in yellow (the microphone icon in the 4th column in Figure 1) or who was typing in the chat window (the balloon icon in the 6th column in Figure 1).

FIGURE 1: CLP session for small group participation



At the end of the activity, the whiteboard notes from each small chat room were brought into the main chat room for student presentation. Then a spokesperson from each small group described their group results to the whole class. An example of the student-graded lab report is shown in Figure 2, which is the Whiteboard output of the main chat room in the CLP session.

FIGURE 2: CLP session for student presentation at end of small group activity



Student self-assessment of this synchronous small group activity was overall positive, with many suggestions for improvement in the future. The biggest hurdle that needed to be overcome was the fear of trying something new, from both the instructor and the students. Even though over half of the students had taken at least five online courses previously, none had been in a class that used this small group chat function of CLP. The CLP technology enabled a smooth transition of almost 30 online students being moved into small group chat sessions. Some students immediately started to dominate the discussion in their own group, and the instructor had to intervene appropriately. In other groups, participation was sluggish at first with only a few text messages appearing in the chat window, rather than students taking the microphone to discuss the assignment with their classmates. Rapid and appropriate instructor response was key

to guiding and motivating the student participation in the CLP chat sessions, just as instructor intervention is needed in onsite classes to keep students on task and participating in the activity.

Building student ownership through the application of Google Jockey

Google has a host of tools to facilitate online participation and engagement, from Google Hangouts (a dynamic discussion space) to Google Docs (an interactive document sharing platform). At heart though, Google itself can be harnessed to stimulate robust participation in live online chat sessions, which is known as Google Jockeying. A Google Jockey is a participant in a presentation or class who surfs the Internet for terms, ideas, web sites, or resources mentioned by the presenter or related to the topic. The Jockey's searches are displayed simultaneously during the presentation, helping to clarify the main topic and extend learning opportunities.[15]

The value in synchronous live chat sessions with a Google Jockey is that it both acknowledges that the participants are online and probably surfing during the session while redirecting that activity away from Facebook and sports scores in to course related content. The target of their search should be one to three examples of a key concept or idea covered in the session. By having the students find and deliver the information to the class, the sage on the stage atmosphere transforms into a student driven presentation while also serving as an induction activity that fosters risk taking, participation and community. If any student-presented information is incomplete (or wrong), the instructor can step in and redirect the focus. The presentation of student found facts, by the students themselves, can quickly become an organic discussion about both the real world application of these facts (relevance) and a higher order analysis of concepts and meaning. Attributes of a good Google Jockey include having a focus on the topic at hand, the drive to explore key concepts, and the goal of stimulating peer feedback. In summary, this method allows the students to present the main ideas, thereby adding a sense of ownership to their learning while fostering participation and community.

Increasing communication quality within asynchronous threaded discussions

The asynchronous threaded discussion is a text-based interaction that can be often sterile at best and can be rife with misunderstood tone, meaning and intentions at the worst. Because this form of interaction lacks body language and tone of voice, much of natural communication requires simulation or replacement in order to achieve robust discussion without misunderstandings.

To begin, the threaded discussion question should be an open ended question, promoting debate, discussion, investigation and inquiry. In EGR 320L, Scientific Problem Solving Lab, examples are shown below for mechanical engineering threaded discussion questions:

- You are walking down the road, listening to your iPod with your earbuds. You trip and your iPod tumbles out of your pocket but is caught by the cable connecting it to your earbuds. How would you calculate the stress in the cable? What assumptions would you have to make? What equations and data would you use?

- For the iPod tripping scenario above, how would you calculate the elongation in the cable? What assumptions would you have to make? What equations and data would you use?
- You were lucky when you tripped - the cable was strong enough to support the weight of the iPod when it flew out of your pocket. What's the maximum weight that can be supported by the cable attached to the earbuds? How could you test this experimentally?

Examples for electrical engineering threaded discussion questions used in EGR 320L are also shown below:

- If you had a meter to investigate the electric power system in your home, what would voltage would you measure for the electricity coming into your home? What frequency is the power coming into your home? Do all devices in your home operate at this voltage and frequency? How do you know?
- Appliances A, B, and C consume 250, 480 and 1450 watts of power, respectively. The system voltage is 120V, and the circuit breaker is rated at 15 amps. Which combinations of the three appliances can be on at the same time, and which combinations will trip the circuit breaker? What assumptions would you have to make? What equations and data would you use?
- Look around your home at some common appliances - a toaster, fan, space heater, television, computer, etc. Which appliances would you predict draw a lot of current to operate? Which appliances would you predict take a lot of power to operate? Extra credit project: if you would like to investigate this, there is a device called Kill-A-Watt that can measure current, voltage, and power when electrical devices are plugged into them. Measure 10-15 devices in your home and write a mini lab report describing your data and lessons learned by taking these measurements.

And finally, the examples below are for thermodynamics and fluid dynamics threaded discussion questions in EGR 320L:

- Thermodynamics at home: The textbook states, "Common household appliances such as dishwashers, microwave ovens, refrigerators, humidifiers, clothes dryers, toasters, water heaters, irons, and pressure cookers rely on principles of thermodynamics for their operation." Choose one of these, or another household appliance, and describe what thermodynamic principles are at work.
- Heat transfer and hot coffee: You are going on a long road trip and want to take a mug of coffee with you. You would like the coffee to stay as warm as possible for the longest amount of time. What kind of coffee mug would you take with you? Discuss the mug material, size, and other factors that would affect heat transfer (which can occur by conduction, convection, and radiation).
- Fluid mechanics and transportation: The textbook states, "The analysis and design of virtually every type of transportation system involves the use of fluid mechanics. Aircraft, surface ships, submarines, rockets, and automobiles require the application of fluid mechanics in their design." Explain what principles of fluid mechanics are at work in one of these transportation systems.

Once a clear and thought provoking question is posted in the discussion thread, the instructor's next step for engaging the students is to make sure that the discussion is both meaningful and vibrant. Students often post comments in a stream of consciousness format, neglecting to check for homonymic errors, let alone tone and meaning. As an instructor, there are methods for setting the tone and controlling it as the discussion threads evolve. The choice of language for the question itself suggests the manner in which students will respond. A sloppily spelled, grammatically egregious, or poorly constructed question will likely elicit mirrored attributes in the discussion response. Therefore clear, direct and professional language is essential.

If student responses are terse or lack detail, the instructor should prompt them for more detail or ask a new, leading question. For example, this is one threaded discussion question from MUL 300 Convergence Media:

> *What is Interactivity? This is a term casually tossed about in the digital media sphere, but we often fail to consider what it really means. When a client asks for "interactivity" on their web site, it could mean a dozen things. How would you articulate your definition to a client?*

A student response might be, "Interactivity means that the user can interact with it." An instructor response designed to enhance the threaded discussion might be, "That is a good start, and would you expand on that idea and strive for a definition which does not contain the word itself? List a few specific examples which help illustrate your point." By acknowledging the value of the student's initial post and then suggesting areas for improvement the student can enhance their answer without losing face.

There are times when the delivery of feedback becomes a delicate act of diplomacy and there are many symbols and phrases which can not only soften the blow of unpleasant news, but give it the tone intended by the instructor. Questions which can soften the blow of pointing out an error or clarify meaning are listed below:

1. Have you considered…
2. Would you please elaborate…
3. Please provide more examples…
4. Help us to better understand what you mean by…
5. What I am hearing [reading] you say is…

In the online Media Storytelling course BRO305, we use Alt-code symbols and persuasive punctuation as ways to increase communication in asynchronous threaded discussions by simulating tone and body language. These techniques are most effective when the students are made aware that they are participating in a formal space and the use of these tools is not to simulate texting, emails or other informal modes of communication, but rather to clarify text based tone and meaning. The goal of clarifying meaning serves to enhance communication and serve as a tool for engaging students who feel comfortable taking risks and participating in rich dialog in the threaded discussions.

Persuasive punctuation is also a handy tool for achieving tone in a threaded post! The judicious use of punctuation and icons (emoticons) can turn a sentence with multiple meanings into a singular directive. For example, the feedback "Nice job" can be read sincerely, enthusiastically,

or dripping with irony and scorn. “Nice job!” drastically narrows down the range of possible misinterpretations.

Online text based interactions create opportunities for miscommunication which hurt feelings and often lead to students distancing themselves from the discussion or even the entire course. The unique source of these miscommunications in threaded discussions is the fact that unlike face-to-face interactions, text based interactions lack both body language and tone of voice, two primary methods of communicating. To offset this deficit in written communication, Digital Media Design course instructors have experimented with the application of ALT code icons to offset the lack of tone in the written word. While it is possible for the instructor to simply type “Just kidding.” or “Ha-ha!” the insertion of a ☺at the end of sentence makes it clear that the statement is meant to be delivered by a smiling speaker. Feedback is much easier for students to digest when delivered by a friendly and empathic evaluator. ALT Code icons can help to reinforce that perception on the part of the student.

Icons can easily be integrated into instructor responses if they have either memorized or have access to a translation of alt-codes. Standard ALT codes can liven up and clarity text. To use them simply hold down the ALT key (works best on the 10 key pad to the right on a standard QWERTY keyboard) and type in the indicated number on the number pad. The Smiley face ☺ is ALT-1, the upward arrow ↑ is ALT-24. It requires a few moments practice, then empowers the instructor to give more precise meaning to their feedback. Figure 3 shows a variety of useful ALT Code symbols which may enhance tone in asynchronous threaded discussions.

FIGURE 3: ALT Codes with number and related symbol

NUMBER	1	2	3	13	14	15	24	25	26	27
SYMBOL	☺	☻	♥	♪	♫	☼	↑	↓	→	←

The introduction of emotive elements which correlate to the arenas of texting, emails, chat rooms, and informal conversation require that an equal and diplomatically offered counter element be introduced: namely the explicit delineation between formal and informal spaces. The course structure and instructor must make it explicitly clear that the classroom live sessions and discussion threads are formal spaces requiring formal grammar, punctuation and professional conduct. A smiley face emoticon may signal informality to some, but is must be made clear that it does not grant permission for absent punctuation, incomplete sentences, or inappropriate discourse. Encouraging participants to choose text color during a live chat also heighten ownership while serving as an innocuous ice breaker.

In summary, student creativity arises when students feel comfortable taking risks. The ideal environment for student participation is relaxed and safe, but not informal. The air of professionalism must prevail for these communication tools to yield positive results. The tone is set, modeled, and maintained by the instructor. The delicate balance between formal and informal is established by clearly establishing hierarchy, credentials, and assessment criteria for the course. During discussions, the instructor is still the subject matter expert, but they can allow expression of dissenting ideas, methods, and questions in pursuit of the course goals. By maintaining a first-among-equals status in the discussion, the students can hold to the formal

standards of discussion, trusting that there is authority-at-rest watching over the process. The goal of borrowing these conversational tools from casual communication and applying them to asynchronous threaded discussions is to increase the accuracy of formal communication, supplementing the missing body language and tone, and yet not compromise content or behavioral integrity.

Summary & Conclusions

Overall, including approximations of onsite social norms into the online environment can help improve student engagement, learning, and persistence in both synchronous and asynchronous learning modes. These techniques and tools can be as simple as the use of emoticons from ALT codes and persuasive punctuation or as personal as posting instructor portraits and using real-time videos as a way to connect students to the instructor in online classes. The inclusion of induction activities like Google Jockey at the start of synchronous, live online chat sessions can increase student engagement, sense of ownership and risk-taking potential, thus allowing for a closer approximation of the rich interplay afforded in face to face learning while leveraging the endless resources of an online setting. Flipping the classroom, designing open-ended threaded discussion questions, implementing clear participation grading rubrics, utilizing adaptive presentation styles, and including new technologies like the CLP small group chat sessions into online classes help improve student participation, sense of community, and persistence.

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