Work-in-Progress: The Development and Implementation of Self-Reflection Participation Logs in an English-taught Engineering Program in China

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Key Words: Participation, Student Engagement, China, Assessment Methods, Teaching Abroad

Introduction

Active student participation has been correlated with a variety of positive outcomes including improved critical thinking, development of important professional skills (including communication and interpersonal interaction skills), increased understanding of course material, and better academic performance across diverse disciplines, including engineering [1–5]. Put simply by Weaver and Qi [6], “students who actively participate in the learning process learn more than those who do not.” In order to motivate students to take advantage of these benefits, participation has increasingly been included in course syllabi as an expected student behavior, often as a formally graded requirement [1], [2], [4], [5], [7], [8]. However, formally assessing participation requires at least an implicit decision on the part of the instructor as to what constitutes “participation” for their course.

Further complication to the process of fairly assessing participation occurs when instructors seek to encourage participation from students who are less familiar with the expectations of an active learning environment. The purpose of this work-in-progress paper is to describe a recent effort to standardize the assessment of course engagement through self-reflection logs in an English-taught engineering program in China. The objective was to encourage and reward impactful participation behaviors without creating exorbitant extra work for students or instructors. This paper focuses on the conceptualization and initial implementation of the assessment scheme and also includes preliminary analysis of student impressions of its impact on their behavior and performance.

Background

The most common mode of participation measured by instructors is in-class oral contributions, such as participating in class discussion, asking questions, or answering questions. This type of participation is overt, relatively easy for the instructor to track, and assumed to directly reflect student engagement [1], [4]–[10]. Ignoring the logistical challenges of documenting every instance a student speaks (especially in large lectures [1], [4], [11]), there are other important limitations of such an approach. The quality of each student contribution is often still subjective [1], [2], [5] and contributions a student makes during small group work, a popular active learning strategy, are often not included [11]. Furthermore, there is evidence that quantity and even quality of oral contributions are not good indicators of actual student engagement [4], [7], [12], [13]. Finally, there is no flexibility for “quiet learners,” minorities, international students, or students who, for various reasons, are less vocal [4], [7], [8], [12], [14], [15].
Lack of in-class oral contribution is often interpreted by Western-trained instructors as student apathy or disinterest at best and incomprehension or disrespect at worst [7], [8]. This interpretation has contributed to the view of Asian, especially Chinese, students as disengaged and resistant to active learning pedagogies [7], [13], [16]–[18]. Even compared to other Asian American students, students who self-identify as belonging to the Chinese ethnic-subgroup reported making fewer contributions to class discussions [3]. It is believed that this lack of in-class oral contributions by Chinese students is related to cultural differences in classroom expectations between the teacher-centered Eastern educational model and the increasingly student-focused Western educational models [7], [13], [16], [17]. However, Chinese students are very capable of adapting to innovative teaching strategies, whether as graduate students studying in a Western country or as students in an expatriate Western teacher's course, if given appropriate time and guidance [13]. Based on his work with Chinese students, Kember suggests that to successfully introduce teaching and learning methods requiring active participation by students, instructors should provide explicit explanation and initial support to help students adjust to the new expectations [13].

Beyond creating explicit and transparent rubrics to guide students [1], [14], [15], broadening the definition of participation beyond only in-class oral contributions can increase the inclusivity of participation assessment schemes [1], [2], [5]–[7], [14], [15]. Some instructors differentiate between classroom participation and course participation [14], participation and preparation [15], or participation and engagement [7] to describe in-class behaviors (beyond oral contributions) and outside-of-class behaviors. In this paper “course participation” and “course engagement” will be used interchangeably to indicate any behavior that actively engages the student with course material and contributes to their mastery of the learning objectives; this includes behaviors such as listening attentively in lecture, previewing materials to prepare for class, and seeking out help from classmates on weekends.

As a result of some of these behaviors taking place outside of the classroom, it becomes difficult for the instructor to serve as the sole source of information when assigning grades for course participation. In such cases, student self-assessments can be used to document what the instructor cannot observe [5], [14], [15]. While self-assessment of in-class behavior (often oral contributions) has been shown to differ from faculty assessment [1], [5], [19], self-assessment is the only option for documenting certain outside-of-class behaviors. Furthermore, the self-reflective learning aspects of self-assessment of participation play into a strength of Confucian learning, a dominate theme of engineering education in China [17].

**Methods**

**Context**

In collaboration with the University of Michigan, the English-taught Biomedical Engineering program at Shantou University (Guangdong Province, China) was launched in 2018 with the goal of implementing evidence-based, active-learning pedagogy in an educational environment largely dominated by didactic instruction. Two American expatriate instructors, authors Ramo
and Hald, were tasked with developing and delivering a second-year core course for 34 students for the fall 2019 semester. The course is content-heavy, covering key concepts of molecular biology, cellular biology, physiology, genetics, and biochemistry most relevant to biomedical engineering. The course is primarily lecture-based with two laboratory experiments and seven team-based learning / small-group discussions or activities interspersed over a 16-week semester. Exams compose 70% of the students’ final course grades; laboratory reports are 11%; and assignments related to team-based learning discussions are 4%. The remaining 15% of the final course grade is based on student participation or, more broadly, engagement with the course. The rubric used to assess the participation grade was developed with student input during Week 1 of the semester; the rubric was then updated and implemented in Weeks 2-16. Students were provided feedback on the process through in-person individual meetings and an online survey conducted in Week 9.

Development (Week 1)

Half of the first team-based learning, small-group session of the course was devoted to discussing class participation guidelines with the goal of developing a rubric for assessment of the participation grade. Students were given three days to preview a preparation document to help facilitate the discussion. This document included a list of possible examples of in-class and outside-of-class participation compiled from various literature sources and the instructors’ personal experience. The document also included an example participation log as given by Docan-Morgan [11] and an example participation rubric as given by Almagno [15].

In class, students were asked to discuss questions like “Why do you think participation is part of your grade in this class?” and “Why do you think it is important to be actively engaged in this class?” before some of the supporting educational research was shared with the class. The students then discussed the preparation document in their small groups; they were specifically tasked with coming up with additional examples of behaviors that demonstrate engagement or participation and suggesting the removal of any of the given examples. Following the reporting out of their discussion results, each student group was assigned one of the questions shown in Figure 1. Two groups were assigned question 1; two groups were assigned question 2; and one or two groups were assigned to each sub-bullet under question 3. The results of student discussions were reported out to the entire class and documented by the instructors. Students were also encouraged to directly contact the instructors with their thoughts and suggestions.
Creating Class Participation Guidelines

**Group discussion – we need to answer these questions for this course:**

1. What examples should count as engagement or participation?
2. Should some examples be worth more than others? (Relative weights)
   - Should any be required?
3. What should the grading rubric look like?
   - Quantity vs. Quality
   - In lecture vs. Team-based learning class sessions
   - Should there be a bonus for variety or improvement over time?

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**Figure 1.** The PowerPoint slide used to guide small-group discussion of the creation of the course participation rubric during the first team-based learning class session.

**Implementation (Weeks 2 – 16)**

Based on the results of the in-class discussion, the instructors created a draft self-reflection participation log rubric and again solicited student feedback. Apart from minor adjustments and clarifications, the final version of the participation log rubric given in the Appendix is very similar to the initial draft given to students two days after the in-class discussion. It includes a list of eight in-class behaviors and eight outside-of-class behaviors with a three-point scale for the quality of each behavior.

In constructing the participation log rubric, the instructors sought to provide students with the flexibility to discover and utilize the methods of engagement that worked best for their individual learning while still encouraging and rewarding behaviors that may be more challenging. For example, based on previous experience with the students, they were very hesitant to attend office hours, instead relying on private WeChat messages to the instructors (WeChat is a messaging platform used extensively in China for both personal and professional purposes). It is assumed that this discrepancy can be attributed, at least in part, to comfort level with communicating in English since electronic messaging allows students more time to formulate responses and WeChat provides automatic translation of instructor responses into Chinese. Therefore, attending office hours was given a relatively high multiplier (i.e., weight) while WeChat messages were only counted if they were posted to the course WeChat channel (a group channel including all students and the instructors). Students were not required to do any specific behavior listed on the log, but each example letter could only be used once per day. Therefore, students could choose many low-multiplier behaviors or fewer high-multiplier behaviors to get full credit for the assignment. This system encouraged answering questions out loud in class, but avoided penalizing students who found doing so to be more stressful than beneficial.
The students were also given a completed log based on a fictitious narrative of possible student behavior to demonstrate how in-class and outside-of-class behavior should map to the log rubric. At the beginning of Week 3, the students submitted their first personal logs which recorded behaviors they engaged in during Week 2; the submitted logs were graded based on completion. These logs served as a way to calibrate the conversion of participation log point total to course participation grade. It also identified misunderstandings in the examples and use of the log rubric. Following this “practice” week, a guidance document was posted including the assessment method. Along with reminders and more explanation to address the misunderstandings, the guidance document included the following passage:

“Every week, your engagement and participation will be assessed out of 10 points in the Moodle gradebook. For each point recorded on your participation log you will earn 0.25 points in the assignment. For example, if your week total in your participation log is 10, you would get a score of 2.5/10 in the gradebook.

Therefore, to receive the full 10 points in the gradebook you must have 40 or more as the weekly total in your participation log. This may seem high, but this course has no formal homework. We hope that your engagement and participation in the class serves the same purposes as homework, but gives you the flexibility to use the methods that work best for your learning. To put the 40 points into perspective, if you did the following you would already be at 27 points:

- Attend class and actively listen 3 days/week: example A = 1 multiplier*3 quality*3 days/week = 9 points
- Answer questions quietly to yourself or answer a question your neighbor had 3 days/week: Example E = 2*1*3 = 6 points
- Pre-view the materials before class but not look up any unfamiliar terms (in-between) 3 days/week: Example I = 1*2*3 = 6 points
- Quickly review the previous content 3 days/week: Example J = 2*1*3 = 6 points”

The resulting self-reflection participation log assignment scheme required students to document, reflect on, and evaluate their own weekly engagement and participation in the course, allowing them to discover which behaviors best complimented their learning. Participation logs were due before the start of the first class session of each subsequent week and were graded as described above. However, in order to encourage creativity and deeper self-reflection, students lost points for directly copying the example descriptions in the rubric or not giving enough detail to support their assigned quality mark.

Mid-Semester Consultation Meeting (Week 9)

At the midpoint of the semester, each student met individually with the instructors to review their participation/engagement in the course. Prior to each meeting, the instructors reviewed that student’s previous logs to look for any concerning patterns to be discussed with the student. Examples of such patterns included severe imbalance of logged in-class and outside-of-class
behaviors and/or entries only for days the class met. During the meeting, students were asked to describe how they utilized the participation logs and if they thought completing them was beneficial for their learning. After the in-person meetings, students were asked to complete an online Qualtrics survey which included more detailed questions on the use and perceived impact of using the participation logs.

Proposed Research Questions

The authors seek to explore the following research questions using the data collected from the weekly student participation logs and mid-semester student survey responses:

1) What types of participation are most common (both on a weekly and overall semester level)?
2) How does participation change over time (both on an individual and aggregate-class level)?
3) What is the balance of in-class versus outside-of-class participation (both at an individual and aggregate level)? Does this change over time?
4) Is there any correlation between specific types or patterns of participation and summative assessment (e.g., exam) scores?
5) How do students perceive the impact of the participation logs on their engagement and learning? Do they believe it affected their engagement or success in the course?

Preliminary Results (Mid-semester Survey Responses)

The data entry and analysis of the individual student logs for the second half of the semester remains on-going at the time of this submission which precludes answering the first four research questions. However preliminary analysis of survey responses (n=30) can provide some insights into the final research question.

Eighty percent of the students indicated that they thought using the participation logs impacted their behavior somewhat, moderately, or a lot (Figure 2). Of these students, almost half (48.3%) reported that both their in-class behavior and outside-of-class behavior was affected by the participation logs, while another large portion (41.4%) thought only their outside-of-class engagement had been affected. The survey then asked students to elaborate on how their engagement had changed; a selection of student responses to this prompt are given in Table 1.

An even higher percentage of students (83.3%) indicated that they thought using the participation logs improved their learning or performance in the course somewhat, moderately, or a lot with over 40% choosing the highest two levels (Figure 2). When asked to explain their answer by describing how their performance changed or why their thought their learning had improved, some students gave the responses shown in Table 2.
Figure 2. All of the survey respondents (n=30) indicated that the use of the participation logs changed their engagement with the course and influenced their performance in the course.

Table 1. Select student responses to an open-ended survey question regarding changes in student engagement because of the participation logs (all responses are given as they were submitted by the students; underlining is added for emphasis).

<table>
<thead>
<tr>
<th>Explain your answer - How has your engagement changed? What have you done differently because of the logs? Have you tried anything new because of the logs?</th>
</tr>
</thead>
<tbody>
<tr>
<td>I try to answer the question instead of waiting for the answer even I speak in a low voice. And I will ask other classmates questions I don't understand after class and watch some relevant videos sometimes.</td>
</tr>
<tr>
<td>After I need to finish the log, I will use the options on the log to plan what I will do in class or after class. For journaling reasons, I tried something I hadn't done before.</td>
</tr>
<tr>
<td>Because of the participation log, I began to take notes in class and communicate with my classmates about the question that I have.</td>
</tr>
<tr>
<td>I become more engaged especially out-of-class because I should pay more efforts and time to the course to earn the points for participation log.</td>
</tr>
<tr>
<td>I have tried to answer the questions asked by teachers in class and as I listened more attentively I could give much deeper thinking, instead of just absorbing what teachers said.</td>
</tr>
<tr>
<td>I start to make a conscious effort to ask questions when I don't understand.</td>
</tr>
</tbody>
</table>
(Table 1 Continued)

| I [was] concerned more about my in-class and out-of-class behaviours, considering the logs as reminders to notice myself...
| To arrive 40 points I will try my best to finish some choices like preparing materials before class, asking teacher for figure out my confusion in class, answering questions in class and so on...

Table 2. Select student responses to an open-ended survey question regarding changes in performance and improvements in learning because of the participation logs (all responses are given as they were submitted by the students; underlining is added for emphasis).

**Explain your answer - How has your performance changed? Why do you think your learning has been improved?**

| I listen with more concentration. My points in the log is increasing. |
| I will control myself not to play on the phone. |
| I'll try being focus on the lecture in order to get the points honestly. |
| I became more active in class and I preferred to ask questions in class and help my partners to solve problems. |
| My performance doesn't change a lot, but I think it's helpful for other students. |
| By spending more time on the course, I do have a better understanding of the contents. |
| I will try to think of the class content instead of just sit there and listening. |
| Because I would encourage myself to participate in the classes more actively by understanding more contents of the classes, answering questions more loudly, taking more notes and so on. |
| I don't want to be dishonest but I want to get 3 points of attending class. So I force myself don't be sleepy in class. |
| I feel different way from last fall. I never reviewed the concepts after class [as] frequently [as] this semester. |

Discussion

Acknowledging the importance of active student engagement for learning and personal development [1]–[6], instructors often feel compelled to include some assessment of student participation in the calculation of final course grades [1], [2], [4], [5], [7], [8]. While the seemingly easiest option is to track the frequency of oral contributions during class, there are concerns about the transparency, inclusivity, and accuracy of such a measure of student
engagement [4], [7], [8], [12]–[15]. The authors of this study adopted a broader definition of “course participation” which includes any behavior that actively engages the student with course material and contributes to their mastery of the learning objectives. As these behaviors could occur both inside and outside of the classroom, instructor observations could not serve as the only source of information for participation assessment.

In introducing self-reflection participation logs to a class of Chinese students in an English-taught engineering program, the authors aimed to follow the advice given by Kember [13] and the insights provided by Zhu [17]. Conversations about participation examples and expectations at the beginning of the semester helped the students adapt to a more active learning environment. The use of self-reflection participation logs allowed for a more inclusive definition of course engagement and leveraged a reflective-learning strength of the Confucian learning. The accompanying explicit and detailed rubric (Appendix) provided explanation and guidance, while mid-semester meetings with the instructors provided additional student support. Another motivation of adopting this approach to assess participation was to give students a resource list of behaviors that could benefit their future learning. As students transition from a teacher-centered classroom environment to the student-centered, active-learning expectations of Shantou University’s Biomedical Engineering program, they may have to adjust their study approaches and habits. Introducing the students to methods they may not have considered previously provides them with more opportunities to explore what works best for their learning. Based on the written survey responses, at least a few of the students reported trying a new technique as a result of using the participation logs (Tables 1 and 2).

In this study of a sophomore level course, the self-reflection participation logs were used in lieu of homework; therefore, one of the goals of the authors was consistent student engagement with course content throughout the semester. As this goal could be accomplished in ways other than in-class oral contributions to lectures, the participation logs provided students many opportunities/routes to engage with course content and achieve mastery of learning objectives. However, the incorporation of multipliers allowed instructors to still encourage, but not require, specific behaviors such as asking or answering questions out loud during lectures.

Conclusions & Future Work

The preliminary results of this study support the continued use of self-reflection participation logs, possibly in lieu of formalized homework, depending on course and instructor goals. All students in the study reported that completing the logs influenced their behavior (especially outside of class) and improved their learning to some degree. However, additional analysis is needed. In the future, research questions 1-4 will be addressed using the weekly student participation logs and actual course performance. The results of this analysis will provide insights into the transition of study habits of the students over the semester and identify any possible high-impact course engagement behaviors.

Limitations

The main limitation of this study, and the self-reflection participation logs in general, is the reliance on self-reporting and accurate self-evaluation. It has been shown that self-assessment
and instructor-assessment of in-class participation are often not in agreement [1], [5], [19]. Some authors have discussed combining self- or peer-assessment scores with instructor-assessment scores to avoid inflation [2], [19], but this assumes that all behaviors of value are done in the classroom and are observable to and recordable by the instructor. Furthermore, by examining the responses of students in Table 2, it is clear that at least some students were cognizant of being fair and honest in their self-assessment. Docan-Morgan, who also utilizes a self-assessment participation log, reports “rarely” being confronted with an obviously “fudged” participation log [11]. Although not necessarily a limitation, the submission of self-reflection participation logs in this study was more frequent than in other reports of similar strategies. For example, Almagno has students fill out a simple “Engagement Rubric” for their in-class and outside-of-class engagement once a month [15]. More writing intensive reflections and justifications for self-assessment scores are typically submitted twice over the semester [11], [14]. However, as the goal was to motivate consistent (i.e., week-to-week) engagement with the course content, the authors thought more frequent submission was warranted.

**Recommendations for Development and Implementation**

The authors hope that the information presented in this paper and the accompanying participation log rubric (Appendix) will allow others to modify and use these rubrics in their own classes. If anyone desires to implement a similar self-reflection participation assessment scheme, the authors provide the following advice: First, structure the initial discussion class period such that there are specific deliverables for the students. For example, give students the list of possible behaviors but have them brainstorm what would be appropriate multipliers and/or quality mark descriptions. Second, provide more direct support as the authors found that the provided guidance documents and example logs did not address all student confusion. Some of the most common errors observed were using category E for asking questions to a neighbor and assigning a quality mark of 3 for categories D, E, or G when it was not shared with the whole class. Third, transition the logs from Word document-based to an online system (e.g., Google Form or as a quiz in the course learning management software) to assist data organization and analysis.

**Acknowledgements**

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References


[17] Q. Zhu, “Toward a Globalized Engineering Education: Comparing Dominant Images of


Appendix – Final Version of the Participation Log Rubric Document

<table>
<thead>
<tr>
<th>Day of the Week</th>
<th>Category</th>
<th>Example Letter (A-O)</th>
<th>Multiplier (1-5)</th>
<th>Quality Description &amp; Explanation</th>
<th>Quality Mark (1-3)</th>
<th>Total (1-15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Class</td>
<td>Outside of Class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week Total:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Directions:

1. Day of the Week (e.g., Tuesday)
2. Category: Enter an “X” in the appropriate column
3. Example Letter: Enter the letter code of the example (e.g., “C” for taking notes)
4. Multiplier: Enter the multiplier for that letter (e.g., 4 for attending office hours)
5. Quality Mark: Score the quality of your activity 1, 2, or 3 according to the descriptions
6. Quality Description & Explanation:
   - Describe what you did – be detailed, specific, and personal
   - Explain why you chose the quality mark you entered – should answer why you gave yourself a 1, 2, or 3 quality mark
7. Total: Enter the product of the quality mark and the multiplier
In Class Examples

A. Attend class: multiplier = 1
   1. I was distracted most of the time (I used my computer or phone for unrelated things)
   2. In-between
   3. I listened actively/attentively the whole time

B. Engage in class activities (i.e., anything the instructor asked you to do – could be doing a worksheet, completing feedback card, etc.): multiplier = 1
   1. I completed activity with minimal effort; I did not really try
   2. In-between
   3. I thought deeply about the activity and completed it as best as I could

C. Take notes: multiplier = 1
   1. I only took a few notes; my notes were not organized very well
   2. In-between
   3. I took detailed notes that helped me organize my thoughts; the notes I took will help me study in the future

D. Participate in small group discussions/activities (e.g., Think-Pair-Share): multiplier = 2
   1. I did not talk to my neighbor or I did not talk about the question (I only did the “think” part)
   2. In-between (e.g., I discussed the course content with a neighbor during a pause)
   3. I thought deeply about the question, discussed it with my neighbor, and shared our thoughts with the whole class

E. Answer questions: multiplier = 2
   1. I quietly answered questions asked by the teacher (only I could hear my answer)
   2. In-between (e.g., I answered a question my neighbor had during a pause)
   3. I shared my answer with the entire class (e.g., I raised my hand and was called on)

F. Make an observation or comment about the content; Respond to something said by another student; Share an opinion, personal example, or experience; Contribute to class discussions: multiplier = 2 – This involves comments shared with the whole class
   1. My comment was not helpful or was incorrect
   2. In-between
   3. My comment was relevant to the content and contributed significantly to the lecture or discussion; I made an important addition

G. Ask the teacher a question: multiplier = 3
   1. I asked an “easy” question that the whole class could hear (e.g., ask about due dates)
   2. In-between (e.g., I privately asked the teacher about something I did not understand)
   3. I asked a question when I did not understand something; my question could be heard by the whole class

H. Show your work on the board; demonstrate how you solved a problem: multiplier = 4
   1. I volunteered to show my work but was not selected
   2. In-between
   3. I wrote my answer on the board and clearly explained to my classmates how I solved the problem
Outside of Class Examples

I. Read and preview assigned materials to prepare for class: multiplier = 1
   1. I “skimmed” the readings or materials before class
   2. In-between
   3. I carefully read all of the materials and did my own research on words/topics I did not understand

J. Quiz yourself to assess how well you know the material: multiplier = 2
   1. I quickly reviewed the content covered in class
   2. In-between
   3. I used the learning objectives from the lecture to verify my understanding; I reviewed the material related to the objectives I was not confident in

K. Discuss course content with other students; teach other students: multiplier = 2
   1. I talked about the class with a 1 or 2 of my classmates
   2. In-between
   3. I organized or participated in a study group were students help each other understand course content

L. Ask or answer questions in the course WeChat: multiplier = 3
   1. I asked or answered an “easy” question in the course WeChat (e.g., when an assignment was due or a yes/no question)
   2. In-between
   3. I asked a question when I did not understand something or I answered a question about the course content to help another student understand

M. Attend office hours: multiplier = 4
   1. I stopped by the teacher’s office to say “hi”
   2. In-between
   3. I went to office hours with a specific question about something I did not understand

N. Post links related to course content in course WeChat group: multiplier = 4
   1. My post was related to the course, but was not helpful
   2. In-between
   3. My post contributed significantly my classmates’ interest or understanding of the course content; I made an important addition

O. Create audio or video recordings of summaries of lecture content or assigned reading materials; practicing the terminology of the course: multiplier = 5
   1. I recorded myself talking about the course content and sent it to the teacher
   2. In-between
   3. I recorded myself talking about the course content and shared it with classmates to help them study

P. Re-write or organize notes after class multiplier = 1
   1. I wrote down what I remembered from a previous class or re-wrote the notes I took in class
   2. In-between
   3. I used the learning objectives to organize notes from a previous class; I tried to make connections between what I already knew and the new content