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Benefits of Using Lesson Study for SoTL, Cross-Disciplinary Research, and Assessment

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Keywords

Lesson study, Pedagogy, Cross-disciplinary, SoTL, and Assessment

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Cover Page Footnote

Acknowledgments We would like to thank Laurie Bailar as the course instructor for the first-year composition class and for her participation in the research team, as well as Xiaoting Kang for her contributions as an observing team member. We would also like to thank Andrew Peplow for his thoughtful review.

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Abstract

Lesson study is a technique that helps faculty examine student learning that encourages scholarly teaching. In lesson study, faculty identify a concept and develop a lesson plan to support student learning of the concept. The opportunity to collaborate on lesson development and to examine student learning opens up a space for faculty to exchange ideas about effective teaching. Most faculty do not have opportunities to collaborate on their teaching at this deeper level, but a lesson study project provides guidance for instructors to explore student learning in-depth. This article examines how lesson study provides opportunities for college faculty to engage in cross-disciplinary Scholarship of Teaching and Learning (SoTL) projects. In addition to structuring SoTL projects, lesson study can aid faculty in the development of assessment plans to improve student learning.

INTRODUCTION

Higher education is under pressure to improve undergraduate education, but despite this increased pressure, the pedagogical processes that improve learning outcomes are largely ignored according to a report from the Academy of Arts and Sciences (Pallas, Neumann, & Campbell, 2017). In particular, Pallas, Neumann, and Campbell pointed out that universities need to provide a vision of good undergraduate teaching as well as encourage discipline-specific pedagogical practices. Greenwald (2017) argued that “when administrators leave the classroom, they can become detached from students and from the purpose of higher education.” In addition, different types of institutions reward teaching differently. Kelskey (2017) suggested that the division between the three pillars of academe vary from a 20-60-20 split at research institutions to a 60-20-20 split on teaching, research and service at teaching-focused institutions. Our college’s workload policy formally lists an 80-10-10 split for teaching, professional activities (which includes research), and service. This division illustrates the importance of teaching to our college. At our institution, we have a culture that fosters teaching innovation and reflection and rewards teaching. In institutions that place a high value on teaching and provide a nurturing environment, initiatives that improve teaching such as lesson study can be successfully implemented. Demir, Sutton-Brown, and Czerniak (2012, p. 1733) suggested that faculty need administrative support for and recognition of teaching innovation in tenure and promotion in order to implement a successful lesson study project.

Lesson study is simultaneously a venue for educators to “learn from and about their practice” and a form of action research (Runesson, 2015). Lesson study brings teams of teacher-researchers together to examine a shared concern about student learning. In the lesson study process, the team identifies a learning outcome, designs a lesson, implements the lesson while collecting data about student learning related to the lesson, analyzes data about the lesson’s effectiveness, and evaluates the lesson. Chenault (2017) argued that “lesson study opens up the lines of inquiry into and about student learning and does so in a fashion that is built upon peer support and knowledge sharing.” Examining student learning is an essential part of any Scholarship of Teaching and Learning (SoTL) project, and the team-based approach

to lesson study provides support for faculty new to systematic inquiry of learning. Lesson study is a methodology that can be used to develop SoTL projects, cross-disciplinary SoTL projects, and assessment projects across ranks and disciplines.

Lesson study originated in Japan, and the USA and the Netherlands have adopted the Japanese tradition. In the latter part of the 1990s, the USA adopted Japanese lesson study as a professional development strategy to improve K-12 teaching in learning in the mathematics discipline (Yoshida, 2012, p. 140). Yoshida observed that the quality of lesson study in the USA varies significantly but notes that many educators in the USA have used lesson study to create and implement best practices rather than focusing on creating teacher knowledge (p. 143). Furthermore, the lesson study process has often been modified to speed up the process but these modifications lead to less effective content and pedagogical learning (p. 144). In the Netherlands, the government has directed colleges and universities to support the use of lesson study to train inexperienced teachers by pairing them with experienced teachers. Coenders & Vehoeft (2019) find that both the experienced and inexperienced teachers grow in content knowledge and pedagogical content knowledge through lesson study.

Other countries such as Hong Kong, France, and South Africa engage in their own versions of lesson studies as well that share many of the characteristics of Japanese lesson study, but the role of theory varies among the various traditions (Runesson, 2015; Coenders & Vehoeft, 2019, p. 217). The Japanese lesson study lacks a clear theoretical underpinning and focuses primarily on professional development (Runesson, 2015). Meanwhile, the Hong Kong and Swedish learning studies are solidly based on variation theory (i.e. learning is about experience differences), and the French tradition’s primary focus is to develop the didactic theory (i.e. questions about teaching and learning in a school context).

Although Japanese lesson study may appear to lack a theoretical underpinning, its focus on reviewing the literature allows teacher/researchers to draw on the theoretical underpinnings appropriate for their disciplines. At our institution, we were able to develop a lesson study project examining how students integrate sources into their writing. This project involved a cross-disciplinary team that included composition, communication, and library instructors.

PLANNING LESSON STUDY

The starting point in developing a lesson study project is to determine a concept that is challenging for students, and then identify faculty as well as individuals from related academic support areas that may be interested in participating in the curricular research project. Often the learning outcome that is the focus of the lesson study functions as threshold concepts, which are problematic or appear contradictory to students but must be understood in order to progress in their studies (Nicola-Richmond, Pépin, Larkin, & Taylor, 2018, p. 102). Some threshold concepts such as source attribution prevent students from being able to progress in more than one discipline because students must transfer this knowledge to new contexts. Threshold concepts, especially ones requiring transfer, are fertile ground for interdisciplinary lesson study teams. The team researches best practices in teaching the concept or skill that students find difficult. For our project, the integration of sources into written and oral communication exemplified a consistent area of difficulty for our students. Integrating sources and properly citing them in a research assignment or project can be challenging for students across disciplines. Our project began with this specific student challenge and an invitation from the college's composition coordinator to faculty from composition, communication, and the library. The final research team consisted of four full-time faculty, one adjunct instructor, and one visiting instructor.

The next step in developing a lesson study project is to consider which course(s) would be the best fit given the challenging concept that has been identified. For our project, we identified two courses that each had a research assignment requiring sources. English Composition 1001 (taught by the adjunct instructor team member) and Business Communication 2081 (taught by the communication faculty team member) both represented a natural fit for this project given their course research component. These selected courses also provided an opportunity to examine the challenging concept from the first- and second-year levels. Both courses met on a Tuesday/Thursday schedule for 80 minutes. As part of integrating sources into their projects, students needed to be able to find sources, know the differences between types of sources, and determine the credibility of those sources.

With the challenging concepts and course(s) determined, the next step in lesson study is to research pedagogical strategies or techniques used to teach the topic, which provides one of the two opportunities for instructor growth in the lesson study process. Instructor growth can occur during two phases of the lesson study process - the developmental phase and the class enactment phase (Coenders & Verhoef, 2019, p. 219). During the developmental phase, instructors are exposed to unfamiliar pedagogies and materials from their colleagues. This can be done by reviewing the literature to see how others have addressed this concept in their courses. For our team, we examined and discussed research on how students learn to integrate sources in their own writing. These conversations centered on student learning needs while also providing a chance to learn from each other and reflect about what we do in the classroom and in our teaching. This initial meeting also helped formulate the goal for our

lesson study group: determine an effective method for teaching students how to integrate sources responsibly as well as learning how to do this purposefully and ethically.

Once the concept and courses were selected, the lesson study team needed to consider how students would demonstrate their learning of the concept such as a homework assignment or research project. With our group's goal determined, we examined the research project required for each course. For composition, students wrote a traditional research paper using a topic of their choosing. For business communication, students wrote a formal report that presented an improvement to a business. Both projects required the use of multiple sources. Given our research team's overarching goal and the research project for each course, we developed the following framework for the lesson plan:

1. Library instruction sessions that focused on the location and evaluation of sources (taught by the library faculty member)
2. Pre-lesson study class that focused on citation formatting (taught by the course instructor)
3. Lesson study class that focused on the integration of sources (taught by the course instructor)

This framework involved a process to assess, collect, reflect, and analyze. The step-by-step process that our research team took for each class session is shown in Figure 1.

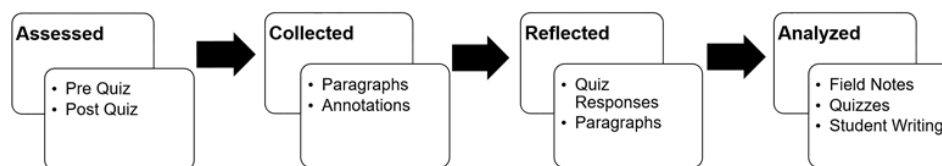


Figure 1. Step-by-step process for each class in our Lesson Study project

The research team's subsequent meetings concentrated on brainstorming and developing ideas for the lesson plan. One of the composition course outcomes is for students to be able to "quote, paraphrase, summarize, document, and cite sources accurately." In business communication, students should be able to "conduct and report business research." Given the student learning outcomes, we collectively designed a lesson plan that included pre- and post- quizzes, in-class activities, class discussion and reflection. An important component of the lesson study process is to assess what students already know and are able to do. We used the pre- and post-quizzes to evaluate what students knew before the lesson and after. We used qualitative field notes to gather data about the effectiveness of the in-class activities and discussion. Each team member observed a group of students noting their involvement in the lesson as it unfolded. The team analyzed these field notes to evaluate the effectiveness of the lesson in engaging students. The research team selected example topics as well as three sources used in the teaching of the lesson plan. The business communication course, which first implemented the lesson plan, used three articles on three topics: childhood obesity, social media, and global warming for the in-class practice. The composition class focused on three articles about social media for the in-class practice.

The library faculty member taught two library instruction sessions for each course. These sessions preceded the lesson plan on integrating sources. As part of the planning for the information literacy instruction, the library faculty member met with each instructor to discuss the course's research needs. Although the library instruction learning outcomes were the same for each course, the content and in-class activities differed given the research projects. The sessions for the second-year students included more emphasis on strengthening their foundational research skills whereas the sessions for the first-year students focused on introducing foundational research concepts. The following are the learning outcomes used in the library instruction sessions for both courses:

1st Library Instruction Session

- Construct main ideas and keywords in research topic in order to build effective search strategies
- Distinguish between different sources and their purposes in order to choose the appropriate source for the information need

2nd Library Instruction Session

- Apply currency, authority, accuracy, relevancy, and point of view criteria in order to evaluate the information and its source

For both courses, the first library instruction session focused on team-based activities where students worked with sources then presented their findings to the class for discussion. For the second-year course, students examined popular, scholarly, and trade publication articles to identify source characteristics and to determine when it is appropriate to use one versus another. For the first-year course, students developed keywords about a topic, located a specific type of source (e.g. scholarly journal article, website) and described the source's characteristics and their search process.

The second library instruction session focused on evaluating information to determine credibility using the following criteria: currency, relevancy, authority, accuracy, and point of view. For the second-year course, each student brought an article found during the first instruction session. Working in teams, students exchanged articles for an initial peer evaluation using one of the five criteria. The teams discussed their findings, determined which two articles were most appropriate for a professional business audience and presented to the class. The first-year students continued their discussion about the different source types and followed with a team-based activity to find and evaluate two sources, using the same criteria as the second-year students, and to present the better of the two sources to the class. This practical application of critically examining sources to determine credibility and considering source appropriateness provided a way for students to connect the research process with the ethical and responsible use of information in their own writing.

Following the library instruction sessions, the second opportunity for instructor growth occurred during the class enactment phase. The class enactment phase takes place when the instructor observes the student learning in response to the lesson, analyzes the data collected and reflects on the effectiveness of the lesson (Coenders & Verhoef, 2019, p. 219). The lesson study lesson plan was taught for the first time in the business commu-

nication course during the third week of the spring semester. One of the research team members taught the lesson plan while the other team members observed and took extensive field notes on student engagement with the lesson. Our lesson goal was for students to integrate sources purposefully, ethically and responsibly. In the class prior to the research lesson, students took a pre-quiz on integrating sources. In addition, the course instructor asked students to read the three articles. For some students, this meant annotating the three sources beforehand, while others did not annotate. The instructor began by asking students "How do you use sources in your writing?" The discussions that followed provided an opportunity to see what students typically do with their sources and how they use them. The instructor reinforced the key concepts of source integration by writing them on the board as students mentioned them. Following the discussion, students were given a worksheet with samples of source integration. Students were instructed to label each sample as effective or ineffective. Then, the instructor led a class discussion in which she solicited the students' answers from the worksheet and discussed why the examples were or were not effective. Following this activity, students were directed to write a practice paragraph that incorporated the three sources they were asked to read for class. Students worked in small groups to evaluate the source integration in the sample paragraphs and select the best one from their group. These were shared with the class and discussed using the concepts of source integration. The class concluded with a post-quiz. As homework, students wrote a reflection on how they would better integrate their sources.

An important element of the lesson study method is the immediate reflection and discussion of the field notes taken by the research team. For our project, we immediately convened to discuss our observations and modified the lesson plan based on class observations, student reflections, pre- and post-quizzes, and practice paragraphs. We discussed the results of students' quizzes and analyzed their paragraphs to determine where students still had difficulties with the concept of integrating sources. Based on the analysis of student work in the first lesson, two adjustments were made to the lesson plan before it was taught the second time. The first modification required students to read the three example sources and annotate them in preparation for the class. The second change modified the practice paragraph work in class. Instead of students exchanging their practice paragraphs within their own group, in-class work was switched with another group. With these adjustments, the lesson plan was re-taught by the adjunct instructor team member to first-year students in the composition course in the fourth week of the same semester. As before, the research team observed the class and documented using field notes.

After the lesson plan was taught in both courses, each research team member reflected on the experience by responding to three commonly used reflection questions prior to the team meeting:

1. What are 3 big ideas that you have taken away from this cycle of lesson study?
2. What are the 2 points that you will continue to ponder?
3. What is 1 action you will take immediately?

These reflection questions helped the team to assess the effectiveness of the lesson and the value of the lesson study process to our teaching. In addition to reflecting on the experi-

ence, the research team analyzed the pre- and post-quizzes, practice paragraphs, student reflections, and the final research projects to determine the effectiveness of the lesson plan. The analysis of student responses and engagement in the lesson served as the data for our SoTL project.

LESSON STUDY AND SOTL

Although SoTL commands respect in higher education, many new instructors do not have experience or knowledge of what SoTL is or how it works. In fact, a good number of seasoned instructors are unaware of SoTL. Kern, Mettetal, Dixson, and Morgan (2015) suggest that “the intention of SoTL is to share what has been a private act with the greater academic community so that this wisdom can be shared and does not disappear. . .” (p. 7). Lesson study can be scholarly teaching as Kern et al. (2015), define it when it evaluates classroom innovations using assessment techniques and involves reflection, but it doesn’t have to be published. On the other hand, lesson study can be engaged in as a type of case study research as Cresswell (2007) notes, involves exploration of “a bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information . . ., and reports a case description and case-based themes” (p. 73). When it is used as a case study to understand student learning, it can be a type of SoTL methodology. One very effective way to develop and implement a SoTL project in a collaborative environment is through lesson study. Our cross-disciplinary research team was able to use our lesson study work to present our findings at SoTL conferences and publish the results in a SoTL journal.

Lesson Study and Cross-Disciplinary Research

The structure of a lesson study project is collaborative and participants typically belong to the same discipline. However, the lesson study can also provide the ideal venue for cross-disciplinary research. For example, a team that includes faculty members from visual arts and electronic media can work on a research lesson about abstract conceptualization. The most familiar approach is for a group of instructors who share the same course to collaborate and develop a lesson on a topic they all teach. The presence of cross-disciplinary teams suggest that the benefit of lesson study is not limited to just producing a lesson that can be used in class.

Participation in lesson study can produce additional benefits such as “careful analysis of learning goals, teaching practices, evaluation of student learning, and observation of student thinking in the classroom” (Cerbin & Kopp, 2006, p. 253). Hiebert, Gallimore and Stigler (2002) observe that “as much as they might benefit from the knowledge of their colleagues, most teachers have not accessed what others know and must start over, creating this knowledge anew” (p. 11). Even if team members represent different disciplines, they can collaborate and learn common obstacles related to developing a well-designed lesson and pedagogical skills. The skills learned as a member of the team, irrespective of discipline, can be transferred into one’s own realm of practice. Faculty participating in lesson study claim that their teaching is positively impacted since they are able to explore student learning in an unprecedented way that allows them to be objective and see beyond their habitual practices of teaching to learn new ideas for implementation (Demir et al., 2013, p. 1732).

In addition to providing an opportunity for cross-disciplinary collaboration, lesson study creates opportunities for participants drawn from all academic ranks, novice faculty and experienced, to participate and learn from each other. Faculty can learn to engage in conversation and seek social development that guides them in self-direction and helps develop skills to lead others effectively. An added advantage of lesson study is that it can serve as a way to assess, reflect and revise pedagogical practice at any point in an instructor’s career. Since it is collaborative in nature, it naturally provides for peer review, which further strengthens assessment while allowing for exchange of ideas.

The cross-disciplinary nature of lesson study provides the additional advantage of different disciplinary perspectives. In the case of our cross-disciplinary research team, three different disciplines were represented by our composition instructors, communication instructor and librarian. For our project, the challenge of integrating sources into written and oral communication was initially identified as a consistent area of difficulty in the first-year writing composition assessment at our college. The composition faculty were intrigued: If integrating sources and properly citing them into a research assignment or project were difficult for students in composition, then was it equally challenging for students across disciplines? As composition instructors, they typically taught source integration as an important part of the first-year writing curriculum and were puzzled by the poor performance of the students as demonstrated by the assessment. From their perspective, they were explicitly teaching it, yet students were not demonstrating adequate skills. The communication instructor perceived the issue from a different perspective. From her disciplinary angle, students should have been able to transfer this skill from the composition classroom to the communication classroom, so it did not need to be explicitly re-taught. Since communication is a closely related discipline, the transfer of skills should not have been difficult. As an information literacy instructor, the librarian saw her role in helping students identify, find and evaluate sources as a sufficient precursor to students using them correctly and ethically in their writing. Each discipline had a unique perspective based on their specific discipline-based practices. Coming together as a collaborative team facilitated the process of exploring a common issue from different disciplinary perspectives. Discussion of assumptions, gaps in instruction and how these could be potentially contributing to the challenge of integrating sources and properly citing them into a research assignment helped the team to synthesize ideas to identify and implement the specifics of the lesson study project. Not only does lesson study allow instructors to address student challenges but also later assess how students learn the concepts taught. Assessment is a cross-disciplinary activity at our college, so lesson study is an effective way for faculty to develop assessment plans.

Lesson Study and Assessment

During the last twenty years, higher education has experienced an increase in demand for accountability and quality management (Bendermacher, oude Egbrink, Wolfhagen, & Dolmans, 2017, p. 40). Higher education accrediting agencies not only require institutions to assess whether students are meeting the learning outcomes for general education and discipline based programs but also to develop a plan to improve student learning if the programs are not meeting their goals. We conduct college-wide assessment to help us identify whether students meet the learning outcomes

as well as develop corrective measures to improve student learning. Similarly, the goal of lesson study is to improve student learning by developing an effective lesson that addresses a specific concept or skill. Lesson study offers a systematic and scholarly method for improving the curriculum to help students meet the learning outcomes, which makes it an effective assessment tool.

In lesson study, the concept or skill to be addressed can be identified through several different methods including observation, student performance, and disciplinary trends. The assessment process uses student performance to help identify the concept or skill that could be addressed with lesson study. Next, the lesson study process requires the investigators to review the literature on the identified concept or skill. Although not always included as part of the assessment process, programs can benefit from reviewing the literature when deciding what corrective measures to take because it helps the faculty build upon the experience and knowledge of their peers. As part of the lesson study process, investigators identify threshold concepts students need to master the material (Nicola-Richmond et al., 2018, p. 102). Investigators assess if their students have these required skills and knowledge. If not, the lesson study team must first work to ensure that students gain these skills and knowledge prior to their lesson. Corrective measures in the assessment process are more effective when faculty identify these same required skills and knowledge sets and take steps to provide them in the curriculum. This allows institutions to tailor the intervention to their specific student population and increase the likelihood of success.

As a result of our project, we realized that our approach did aid students in recognizing when source attribution was done correctly and identifying what aspects needed improvement. Despite the growth in these areas, students often still found it challenging to actually engage in source attribution in their writing. Students need further opportunities to practice source attribution in order to incorporate it successfully into their writing.

In addition to tailoring the corrective action to the specific population, the lesson study process provides feedback on the intervention's efficacy more quickly than the typical assessment cycle and allows corrective action to be tweaked to improve student learning outcomes. Investigators test the lesson by collecting and analyzing data on student learning. The investigators observe the instruction and take field notes of the student response to the lesson. Additionally, researchers can use pre- and post-tests to help illuminate the success of the lesson. Based on the data collected, researchers then make changes to the lesson and test it again. They repeat this process until they have found an effective intervention to improve student learning outcomes. Unlike most assessment cycles, which take a year, or longer to assess student learning and make changes to the curriculum, lesson study is a recursive process that makes changes to the intervention on a shorter feedback cycle.

The lesson study process can increase faculty buy-in to the assessment process. First, reviewing the literature helps the faculty members involved to see the rationale and justification for the actions suggested. In addition, testing the lesson twice provides a "proof of concept" that can help convince faculty that the effort to make the intervention is worthwhile. Moreover, the collaborative nature of the decision-making in lesson study will increase faculty engagement.

CONCLUSION

Lesson study provides faculty an effective framework for SoTL projects, cross-disciplinary SoTL projects and assessment projects. Lesson study can be used as a form of scholarly teaching to collect data, reflect and adjust teaching strategies. With robust collection of data, the project can progress to conference presentations and/or publications. The collaborative nature of lesson study lends itself to the potential for cross-disciplinary collaboration. Although the majority of lesson study participants share the same discipline with their collaborators, topics that are transferred across disciplines such as writing and speaking skills provide an opportunity for cross-disciplinary work. By approaching these topics from a cross-disciplinary perspective, faculty can identify gaps and differences in instruction across the curriculum. In addition, faculty find that the cross-disciplinary SoTL projects benefit them by exposing them to new approaches, different perspectives and peer review. Finally, lesson study provides a focused and systematic framework for correcting problems identified in the assessment process. The assessment process benefits from the shortened feedback loops found in lesson study compared to common assessment cycles.

The lesson study methodology worked well for our project because it used a collaborative approach to investigate a curricular issue. The core components of this method provide a way to scaffold the curricular issue so faculty can examine it from multiple angles and make appropriate changes that can be observed and immediately assessed. With the goal of helping students succeed, the lesson study methodology utilizes a structured framework that allows for innovation and reflection.

The culture of the institution and the structure of tenure process can help facilitate interdisciplinary lesson study. In our college, the reappointment, promotion, and tenure process is structured in a manner that rewards faculty for taking risks and trying innovations in the classroom. The culture emphasizes making informed changes to pedagogical practices, reflecting on these changes, and making appropriate adjustments. Moreover, teaching is evaluated on more than just student evaluations. Peer observation, self-reflection, and innovations are also considered in the evaluation of teaching. Not all colleges in our institution use this same method for evaluating good teaching, but these colleges do not define their workload nearly as heavily as we do on teaching. Because teaching is our focus, we are actively engaged in sharing and discussing pedagogy with our colleagues in formal structures, such as workshops and faculty learning communities, and in informal settings as well. These discussions help create an awareness of what faculty are doing in their classrooms, the issues they face, and potential for collaboration on SoTL projects. For these reasons, we find that this culture that privileges teaching is particularly conducive to the type of collaboration and focus on learning on which interdisciplinary lesson study thrives.

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