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Liberating Structures as Pedagogical Innovation for Inclusive Learning:

A Pilot Study in a Norwegian University

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Abstract

Liberating Structures (LS) are simple and concrete tools that can enhance group performance in diverse organizational settings. They do so by organizing participants in different spatial arrangements and group configurations, and by distributing participation and sequencing steps. In this article, we report on a pilot implementation of LS in several classrooms of a business school in a mid-sized Norwegian University. Our research centered around four guiding research questions to gauge students' experience of LS, including their sense of inclusion, engagement, and LS' pedagogical effectiveness. A mixed methods approach was employed, including a quantitative survey, participant observation, and debriefing conversations and informal interviews with instructors and students who experienced LS. An exploratory survey instrument was employed to measure the various attributes of LS, and four dimensions were identified and validated. Our findings suggest that LS are easy to implement, help increase participation, have the potential to enhance learning, and can

represent an effective pedagogical alternative to traditional lecture-centered classrooms. Our pilot study suggests that LS hold the creative potency to enhance both the instructor pedagogical experience and the student learning experience. By identifying the limitations of our pilot study, we call for more rigorous assessments of LS in the future.

Key Words: Liberating structures, pedagogical innovation, learning outcomes, inclusion and engagement.

Liberating Structures as Pedagogical Innovation for Inclusive Learning:

A Pilot Study in a Norwegian Business School[1]

"The world is changed through small, elegant shifts in the protocols of how we meet, plan, conference, and relate to each other."

Peter Block (2013).

In a Norwegian Business School, or at in any faculty in any university anywhere in the world, when most professors enter a classroom, they are greeted by students sitting in rows of tables and chairs, or sometimes in seminar halls and auditoriums with bolted furniture. With students poised behind their laptops, the teacher enacts the role of "the sage on the stage," often on a podium with a microphone, transmitting the course's mandated content. In tens of millions of classrooms, all around the world, every single day, invariant packets of knowledge etched as pixels on a PowerPoint slide—delineated in bold headings and bullet points, are delivered with industrial efficiency. While such a top-down flow of expertise fosters a learning culture of passive acceptance, rarely are such practices questioned (Torbert, 1978; Axelrod, 2010; Lipmanowicz & McCandless, 2013; Lipmanowicz, Singhal, McCandless, & Wang, 2015). Not surprisingly, most students in most classes find the experience to be boring, frustrating, marginalizing, and excluding—a waste of time, resources, and energy (Lipmanowicz & McCandless, 2013; Singhal, 2016).

In this article, we argue that innovative pedagogical alternatives exist to the dominant lecture-style structures, and need to be investigated. We call these alternative pedagogical practices Liberating Structures (LS)—simple tools used to organize classroom interactions through different spatial arrangements and group configurations, and through distribution of participation and

sequencing of steps. The present pilot study represents the first systematic investigation of implementing two of the most common and simple LS protocols (Impromptu Networking and 1-2-4-All) in seven classes at the Faculty of Business Administration at a mid-sized Norwegian University. In this article, we describe the attributes of Liberating Structures, the theoretical and conceptual basis of LS praxis, and detail how they were introduced in seven Norwegian classrooms, interspersed in-between conventional lecture-style instruction. Our mixed methods approach and data collection processes are described, including a quantitative survey (N=127), participant observation of all seven classrooms before-during-after the LS implementation, and debriefing conversations with seven participating instructors and a dozen students who experienced LS for the first time. We conclude by pointing to the limitations of our study, calling for more rigorous assessments of LS in educational institutions.

What are Liberating Structures?

Liberating Structures (LS) are simple, concrete tools that can be used to organize classroom interactions, or for that matter any meeting in any organization, in ways to include and engage all participants. To grasp this democratic quality of liberating structure, let us contrast two classrooms. In the first classroom, students sit in fixed seats arranged in rows and columns, and the instructor stands in front, delivering a pre-prepared lecture through a PowerPoint presentation. Let us say the topic is on "Strategies for Customer Engagement." The instructor runs through a set of pre-prepared slides, projecting an expert demeanor while pausing occasionally to ask or take questions, and moved rapidly to cover the content aware of the ticking clock. In the second classroom, students sit in a circular formation with the instructor among them, and the class begins by the teacher asking the students to take two minutes and quietly reflect on their own experiences as a customer, recalling specific instances when they felt deeply engaged or disengaged. After two minutes, the instructor

rings a bell, inviting the students to discuss their observations in pairs for a few minutes, and then in groups of four (quartets) for a few more minutes. Then the instructor invites all quartets to share the gist of their conversations with the whole group, bringing attention to common patterns as also points of divergence. The instructor then broadens and deepens the insights already generated by the whole class, paying attention to inconsistencies if any, filling in the gaps as necessary.

While we are all too familiar with the first lecture-style classroom, the second type of classroom is surprisingly rare. The second classroom differs from the first in that it employs a liberating structure (LS). *Structure*—a constraint imposed on participants—comes from a clear specification of progression from self to pairs to quartets to whole group, and the time allocated to each cycle. What makes the structure *liberating* is that it provides an equal opportunity for all students to engage—as individuals, pairs, quartets—in interactions that would not happen in a one-way lecture. The teacher purposely establishes a structure so that liberation could occur within its boundaries (Lipmanowicz & McCandless, 2010). When students in pairs talk to each other, the interactional space is much safer than students speaking to the whole class. Further, quartets can widen and deepen the pairs' exchanges. With the same resources, the instructors of the two classrooms generate very different outcomes.

From our example above, we discern that an LS specifies five interrelated structural elements (Lipmanowicz et al. 2015):

(1) The *structuring invitation* to focus attention,

(2) *spatial arrangement* that allows participants to stand, move freely, and be face-to-face,

(3) *participation distribution* to ensure everyone participates at once and equally,

(4) *group configuration* to ensure one works with pairs, quartets, and whole group, and

(5) the *sequence of steps* and *time allocation* for effectively executing the above.

Theoretical Premise and Praxis

Broadly-speaking, the theoretical premise of LS can be traced back to the Socratic method of encouraging dialogue, allowing for unpeeling ever deeper layers of insight in a sequential and iterative manner, and also be derived from the classic works of the likes of Dewey (1938/1987), Bruner (1973), Piaget (2001), Freire (1971), and Montessori (1986), who argued that collective and collaborative learning emerges not from the one-way transmission of content from an expert to a student, but rather through a process where members of a learning community can interact, dialogue, and experience self-discovery (Darling-Hammond, 2013).

The implementation of LS can also be viewed within the growing movement in higher education—the Scholarship of Teaching and Learning (SoTL)—that seeks to systematically inquire into the student learning experience and advance the practice of teaching (McCarthy, 2008). Popularized by the publication of Boyer's (1990) book, SOTL pays attention to how teachers can develop and improve their pedagogical expertise, and also serves as a cross-disciplinary heuristic for the assessment of the design and implementation of innovative pedagogical practices such as active, cooperative, or problem-based learning (DeLozier & Rhodes, 2017). SoTL scholarship favors pedagogical tools that make learning more participatory, engaging, and student-centered (Kalaf, 2018; Hannay, Kitahara, & Fretwell, 2010;).

Specifically, the praxis of LS derives directly from the science of complexity (Wheatley, 2006; Zimmerman, Lindberg, & Plsek, 1998); the theory of liberating structure (Torbert, 1978; 1991); groupware, a framework to enable the augmentation of human intelligence into collective intelligence (Engelbart, 1995; Johnston-Lenz & Johnston-Lenz, 1991); and attending to the language patterns for engagement—timing, rhythms, boundaries, containers, and procedures (Johnston-Lenz & Johnston-Lenz, 1994; Johnston, 1991; 2015).

Lipmanowicz and McCandless (2010), who codified and systematized three dozen LS protocols (see the LS menu at http://www.liberatingstructures.com/ls/), directly state that "complexity science of is the conceptual background and inspiration for LS" (p. 10). Inspired by the work of complexity scholars—like Margaret Wheatley (2006), in close collaboration with complexity practitioners—like Kimball (2011) and Zimmerman, Lindberg, and Plsek (1998), and through their own experiences in corporate and leadership circles, Lipmanowicz and McCandless came to the understanding that by changing the pattern of interactions in a complex system, LS make it possible to positively influence outcomes (Singhal, 2006). They emphasized: LS "distribute power and influence more widely by engaging everyone, invite self-organization to flourish by letting go of over-control, expand and connect networks by breaking down silos, increase transparency and the rapid reciprocal flow of information, and build new sets of feedback loops via many new forms of interaction; and increase diversity by engaging more people and perspectives (Lipmanowicz & McCandless, 2010, p. 10):

While LS praxis was deeply inspired by the science of complexity, its footprint can be traced back to the pioneering work of Torbert (1978; 1991), who drawing upon his scholarly work in organizations and leadership, formally introduced a theory of liberating structure. In his theory, Torbert questions the dominant notion that "all power corrupts" and "all structure constrains," emphasizing that an essential quality of a liberating structure is "deliberate irony"—i.e. putting the structural constraints in place to free the participants (Torbert, 1978). In carrying out studies in the educational sector, Torbert (1978) advocated for teachers to create a learning environment where active inquiry is pursued, where collaboration between participants creates a shared purpose, a place where all participants have an opportunity to develop self-awareness, other-centeredness, and relational mutuality, and a sanctuary-like space where one could practice personal integrity without

afraid of "looking foolish, inconsistent, or inarticulate" (p. 111). In essence, Torbert believed that leadership emerged in the midst of local action, in the lived present moment, in social arenas that were "fundamentally friendly and caring" (Torbert, 1978, p. 111).

Not surprisingly, Torbert's (1978; 1991) theory of liberating structure is consistent with the science of complexity and LS praxis—i.e. paying attention to the quality of relationships between participants, the value of feedback loops, and a focus on self-discovery and emergence. It is also deeply aligned with the work of David Axelrod (2010), whose work directly influenced LS praxis (Kimball, 2011). A strong believer in the use of participatory tools (such as Open Space), Axelrod (2010) advocated for leadership in organizations to widen the circle of involvement, connect a diverse group of people to each other and to their ideas, create communities of action, and embrace democratic principles such providing equal opportunity to contribute.

LS praxis also holds sacred principles of groupware, a framework that emerged from the study of machine-human interactions (Engelbart, 1995), emphasizing the value of collective intelligence that emerges when participation is distributed in networks (Johnson-Lenz & Johnson Lenz, 1991, 1994). Groupware focuses on designing interactions and interfaces that enhance participants' capacities to relate in new ways—through purposeful presence—to themselves, to others, and the task at hand. Sitting at the back of the classroom may mean one is physically present, but absent to others and the task at hand. Applying groupware principles to LS praxis in classrooms would call for the instructor to find ways to focus group energy and attention, evoke group intelligence, and synthesize patterns.

The praxis of LS pays attention to the language patterns for engagement that includes several interrelated components—timing, rhythms, boundaries, containers, and procedures (Johnston-Lenz & Johnston-Lenz, 1994; Johnston, 1991; 2015; Kimball, 2011). As participants engage, the LS

facilitator pays attention to *timing*—beginnings, endings, and transitions; *rhythms*—patterns for periodic contact; *boundaries*, for instance, group clarity that all class participants hold personal responsibility for participating; *containers*, a physical space that holds the group's energy and identity; and procedures—instructions through which timing, rhythms, boundaries, containers are managed (Johnston-Lenz & Johnston-Lenz, 1994).

In essence, the praxis of LS derives from a strong reservoir of theoretical and conceptual work—from the Socrates to SoTL, from the science of complexity to Torbert's deliberate irony, from groupware to contained boundaries. The simple purpose of LS is to include and engage all participants in a process of collaborative discovery—something we sought to investigate in an educational setting in a Norwegian university.

To our knowledge, this investigation represents the first systematic pilot investigation of implementing LS in classrooms. Some recent documentation on the implementation of LS—mostly descriptive—exists in corporate settings (Lipmanowicz & McCandless, 2010; 2013); in the field of organizational development (Kimball, 2011); in training and development (Ferguson et. al, 2014); in research and data collection (Newton, 2017), in education (Lesser, 2013; Singhal, 2016; Lipmanowicz et al., 2015), and in healthcare (Singhal, Buscell, & Lindberg, 2010; 2014; Singhal, McCandless, Buscell, & Lindberg, 2009).

Research Questions

Our investigation on the implementation of liberating structures in Norwegian classrooms centered around *four* questions. We answered these research questions through collection and analysis of both quantitative data (for question #1) and qualitative data (for questions 2, 3, and 4).

Research Question 1. *How are the various attributes of liberating structures--inclusion, engagement, participation, learning, and pedagogical effectiveness—perceived by undergraduate students in a mid-sized Norwegian university?*

Research Question 2. *What do LS enable in a classroom? What did we observe before, during, and after LS were implemented in the seven classrooms?*

Research Question 3. *How did the instructors feel about implementing LS in their classrooms? What were their perceptions of what LS made possible? What challenges did they experience?*

Research Question 4. *How did the students perceive their experience with LS? What did they like? What did they find challenging?*

Implementing LS and Collecting Data

Implementing Liberating Structures

In January of 2017, a set of liberating structures were implemented in seven undergraduate classrooms in a Faculty of Business Administration and Social Sciences at a Norwegian university. What makes this research site particularly apt for this inquiry is that in a national student survey of 2016, the students of this faculty overwhelmingly rated their classes as being lecture-oriented.[2]

The research team comprising of the present authors designed a simple protocol that included two of the most common and simple liberating structures– (1) Impromptu Networking and (2) 1-2-4-All—to be applied across all seven classrooms. In *Impromptu Networking*, the teacher gets all students immediately involved in the subject matter. The teacher asks the students to rise, and pair up with another student, preferably someone who is a relative stranger. Each student gets a set amount of time (let us say 2 minutes) to respond to a structuring invitation: e.g., "how can you use the management principles you have just learned to design your project?" The teacher tells the students a

bell would ring after the first round, and they would have to pair up with another student in a second round, and then another student in a third round. In the second and third pairing, the question and the time allocation would be the same. As participation is distributed in *three* rounds of *two* minutes each, all students get an opportunity to provide their response and then listen to their partner. The three rounds make it possible for each student to reflect on the question more deeply and with iterative inputs from their peers. When the three rounds are completed, the teacher can ask: "Who would like to share something you heard that you thought was valuable?" The sharing of insights can go on until it naturally ended, and the teacher can capture the key points in a few minutes.

In a *1-2-4-All,* a teacher can very quickly tap the know-how and imagination that is distributed among the participants to generate a range of ideas. It has a different rhythm as it sequences steps in an ascending order of distributed participation, beginning with 1—a silent self-reflection by individuals on a structured question. For instance, what challenges do you see in applying the economic theory you just learned in your project? What ideas or actions do you recommend? After the silent reflection, the individuals get to 2—in pairs, then to 4—in quartets, sharing and developing their ideas further. From quartets, they go to All—the whole group, sharing and synthesizing the key ideas from quartets.

These two LS protocols were incorporated in all seven classrooms. For consistency, each of the seven participating instructors were paired up with one of two LS coaches to help plan and implement LS in their classroom (LS Coach1 in class 1, 3, 4 and 5; and LS Coach 2 in class 2, 6, and 7). The role of the LS coach was to work with the instructor to become familiar with the purpose of the two LS structures, and to help the instructor practice the procedures to implementing them. The instructor's role was to decide how the structures would best fit into their class session and what structuring invitations to issue to the participants.

The students were informed in advance about the purpose and process of the study, and that participation was voluntary. The written survey was anonymous only identifying the class. They could withdraw at any time.

The LS coaches and instructor co-facilitated three LS (one Impromptu Networking and two 1-2-4-Alls) during one lecture session. Although the same structures were used for each classroom, the invitation changed according to the lecture topic. With some guidance from the LS coaches, each of the instructors designed their own invitations based on what was topical. The instructor's role in designing the invitation was a way of encouraging ownership of this process. In some instances, the invitation changed during the implementation to adapt to unexpected circumstances (i.e. the students did not understand the question, or the question was related to a topic they had not fully covered).

The timeline and order of implementing the two LS were adapted to suit instructional needs. Instructors had the option to fit LS anywhere within a single class session, provided they completed all three LS (one Impromptu Networking and two 1-2-4-Alls) and left time for students to complete the survey questionnaire. Some instructors chose to introduce an LS early on, and others chose to begin with lecture and then initiate the first LS.

Instructors were invited to lead the learning debrief with students after each LS structure as they were more familiar with the subject matter and could help deepen and clarify ideas for their students. Each debrief yielded a diversity of responses from students and elicited un-planned discussions among students and instructors.

Once the LS were implemented, the LS questionnaire was administered to the student participants in each class. Finally, after each LS classroom implementation, the LS coach conducted an informal debriefing interview with the instructor to gain insight into their perception of what

changed in their classroom, and what difference that change made in their class. A similar debrief was carried out with available students who had experienced LS.

Mixed-Methods Approach

Our study employed a mixed methods approach: (1) a quantitative survey with an open-ended qualitative probe (N=127), (2) participant observation of all seven classrooms before-during-after the LS implementation, and (3) debriefing conversations with the seven participating instructors and a dozen students.

Table 1 provides the breakdown of survey respondents by classroom size and topic. Classes 1 through 6 covered topics in management while Class 7 focused on economics. Classes 2 and 5 covered the exact same lesson plan and were taught by the same instructor but were comprised of a different set of students.

Insert Table 1 Here

Piloting the LS Survey

The LS survey questionnaire comprised of 17 questions to tap into students' perceptions of experiencing liberating structures, each employing a seven-item Likert scale ranging from 1—Disagree Strongly to 7—Agree Strongly (See Table 2). These 17 items were derived from a close reading of the principles that govern the practice of LS (http://www.liberatingstructures.com/principles/), and were constructed from the point-of-view of a participant experiencing LS for the first time. Our response rate was 100 percent and completion rate was 95%. All 127 students in the seven classrooms undertook the survey, and 120 of them answered each of the 17 questions.

Insert Table 2 Here

Figure 1 depicts the mean value of each question with the standard error of the mean. For instance, question 01 "*I appreciated the opportunities to express my views and be listened to by other students*" has a mean value =5.07. This can be interpreted as saying, "the average student slightly agrees with the proposition." Questions Q04 and Q15 were formulated "negatively", in an opposite direction to eliminate response bias. In every analysis here, those questions are reversed.

Insert Figure 1 Here

Results and Findings

We report our quantitative and qualitative findings in this section.

Quantitative Findings

Research Question 1 asked: *How are the various attributes of liberating structures--inclusion, engagement, participation, learning, and pedagogical effectiveness—perceived by undergraduate students in a mid-sized Norwegian university?*

First, we carried out an exploratory principal component analysis (PCA) of the 17 LS-related survey questions. This is a dimension reduction technique to see what items are highly correlated so that a large set of variables could potentially be represented by lesser underlying dimensions (Table 3). The correlation matrix was analyzed. The four largest eigenvalues of the correlation matrix are presented.

Insert Table 3 Here

The standard analysis (number of eigenvalues greater than 1) pointed to four dimensions; the scree-plot seemed to indicate, as expected, that some of the dimensions were stronger than others.

A comparison of a PCA extraction with 2, 3 and 4 dimensions (VARIMAX) was done. Based on the component loading from the three analyses and an informed deliberation, four LS dimensions

were identified and labeled (Table 4): (1) ease of LS implementation, (2) sense of inclusion and participation, (3) enhanced learning, and (4) pedagogical effectiveness. Questions Q05, Q09, Q10 and Q14, not part of the four dimensions, were excluded from further analysis. A separate PCA was performed for each group of questions, finding one direction and one score variable for each group. An analysis of ordinary averages is presented (Table 4) to allow an easier interpretation of the *levels* of scale values.

Insert Table 4 Here

The Cronbach's Alpha between the four identified LS dimensions is 0.84, and they are positively correlated. This is in accordance with the first PCA, where the first eigenvalue explained 44% (7.5/17) of the total variation. What this tells us, generally, is that participants either were positively disposed to LS, or they were not. The grand means are positive so on average they felt positively about LS, while individual variations existed as one would expect.

Table 5 shows analysis of variance of the four extracted concepts and mean of all indicators. The ANOVA table indicated some variation across the seven classes. However, "Class" was nested with the "LS Coach" in our experimental design and so it was not possible to tease out these variations to the point of attribution.

Insert Table 5 Here

Qualitative Findings

Our qualitative findings suggest that LS led to discernible and positive changes (1) in a classroom, (2) in enhancing the instructor experience, and (3) enhancing the student learning experience.

Discernible Changes in Classroom

Research Question 2 asked: *What do LS make possible in a classroom? What did we observe before, during, and after LS were implemented in the seven classrooms?*

Detailed participant observations with note-taking were carried for each of the seven classrooms where LS were implemented. These notes were later typed out, details added, and insights highlighted. Notes were organized using the following temporal order—i.e. what was observed (1) when class began, (2) during the lecture session preceding the LS implementation, and (3) during and after the LS implementation. While there were variations across classrooms, here we focus on the common patterns that were observed.

When the class began, most students had their laptops open, were leaning back, and some had phones on their laps. As the lecture began almost all of them listened passively to the lectures. The body language was of one of disengagement. The instructor flipped through the slides with a narrative accompaniment, often highlighting the bulleted points. Some students seemed to be taking notes on their computers, although it was hard to gauge whether they were using their computers for other purposes. Some instructors invited students to speak at the end of slides, or asked if they had any questions, and usually there were no takers. If the instructor insisted, the same 2-3 students (the usual suspects) responded. Most of the talking was done by instructors and there was very limited participation, and only when prodded.

During the LS implementation, students were on their feet but initially many seemed hesitant and uncertain. Some crossed their arms, a few were smiling and leaning in with anticipation. As paired conversations began, the classroom decibel rose markedly. All were participating. Some students were more animated than others, but the boundary conditions were clear: all were expected

to participate. With each succeeding round of an LS, and each succeeding LS, the conversations became louder, and the partner-switching turned smoother. A certain rhythm was in place.

After the LS, when the instructor returned to lecturing, more students volunteered participation. Some students began to ask questions of other students—i.e., not merely responding to the teacher. For them, the class container seemed to a safer place. When questions were asked of the teacher, the questions were to deepen their own understanding. This suggested self-discovery in action. In the LS debrief and harvesting sessions involving the whole group, the instructors, helped validate, clarify, and expand on student-generated ideas. This seemed like a dialogue—different than a lecture. With the passage of time, the class seemed to be more engaged, and the pattern of interactions suggested more trust and safety. A higher degree of enthusiasm was palpable. More students engaging with the professor and with other students, and less attention was paid to their gadgets.

Enhancing the Instructor Experience

Research Question 3 asked: *How did the instructors feel about implementing LS in their classrooms? What were their perceptions of what LS made possible? What challenges did they experience?*

Different instructors felt differently about their LS experience, and yet our debriefing conversations with all seven instructors yielded several discernible themes. Detailed notes were taken during these informal conversations with instructors, and these notes were later typed out, details added, and insights highlighted. The following five themes emerged from these conversations: (1) the redeeming value of structure, (2) LS as innovative pedagogical practice, (3) shared responsibility, (4) enhanced feedback and relational mutuality, and (5) role clarification.

Redeeming value of structure. All instructors pointed out the redeeming value of the structure provided by the LS, and what that enabled. As one noted: "student engagement was more structured and led to better (student) responses." Another said, as a result of LS "more answers and feedback emerged than expected."

LS as innovative pedagogical practice. Several instructor comments alluded to LS representing a "welcome variation" in pedagogical practice. One said, "it was fun." Some talked about how they may use LS in other classes to "break ice" between students and for deeper student engagement with the subject matter.

Shared responsibility. In general, instructors liked the use of LS as it relieved pressure on them to do all the talking: "It is good that the students make the connections (on the topic) themselves instead of (I) having the responsibility of making meaning for them." Almost all instructors noted that student participant went from "1-2 students talking" all the time to "everyone talks" with LS.

Enhanced Feedback and Relational Mutuality. Some instructors emphasized how during the debriefing of the 1-2-4-All, she "learned that she sometimes teaches too quickly and students struggle with understanding content," and labeled that as useful feedback for her instructional practice. She noted that such feedback would have been difficult to receive in a traditional classroom, alluding that LS helped "create a safe space" for such an expression. One instructor noted: "As my students had more opportunities to provide reflections, they even gave me some good ideas about my own research." Thus, the implementation of LS enhanced feedback loops, created a safe space for "critical" feedback, and created a container of relational mutuality where the teacher became a student.

Role clarification: Some instructors wondered if LS would go down well with students "who were reluctant or resistant" to participate, or with those who felt that the instructor's "worth lies in

their lecturing expertise." Notably, all instructors recognized that the purpose of a classroom experience is not to "please" the student but rather to create an inclusive and engaging space for learning.

Enhancing the Student Learning Experience

Research Question 4 asked: *How did the students perceive their experience with LS? What did they like? What did they find challenging?*

As one would expect, different students felt differently about their LS experience. Our debriefing sessions with a dozen students who had experienced LS, and a close reading of the answers to the qualitative probe on the survey questionnaire, yielded certain discernible themes. Again, detailed notes were taken during these informal conversations with students, and these notes were later typed out, details added, and insights highlighted.

Scary to enjoyable. For most students, "LS were 'scary' and 'uncomfortable' at first, but the discussion and engagement (that followed) was great." Some students reiterated that the inertia of passive listening is a difficult habit to overcome. Generally-speaking, students were intrigued by what LS enabled or made possible, notwithstanding their initial hesitation or wonderment. Most students liked LS, noting: "We enjoyed the LS because we did not have to listen to the lecture for a full 3-hours and got to talk to other students."

Timing and rhythm. The timing and rhythmic nature of LS—with beginnings, middles, and ends, as also transitions from pairs to quartets to whole groups, was not lost on the students. As one said: "It was like taking dance lessons—at first one feels awkward….then you become comfortable and get into the rhythm of how things work."

Engagement, inclusion, and democratic participation. Participants clearly seemed to find LS more engaging than straight lectures, experiencing a sense of inclusion and democratic

participation that is generally missing in traditional classrooms. As a student noted: "In many classes, there are people who talk a lot and some who do not talk at all. LS helped in balancing these voices." Further, two of the students in our debriefing session said that they approached their instructor at the end of class, indicating "they enjoyed the structures because they did not have to listen to lecture for the entire three hours and they enjoyed talking about the topics with other students."

Deeper learning. Several students enthusiastically pointed out that LS help provides a "deeper understanding" of the subject matter, emphasizing "We ought to do more of this—in other courses."

Actionable inquiry. The class experience with LS encouraged several students to reflect and inquire about "where else LS might be used," and with what effect. As one student noted: "I wonder if I used LS at my workplace if it would empower the quieter employees" to speak-up? Another wondered: "Might this be a good way for new employees to get to know each other?" For some students, an LS encounter helped stir some actionable inquiries.

Appropriateness of LS. Not all students were thrilled with LS and during our informal conversations with instructors and students, it came out that one student, wrote to one of the instructors a formal e-mail, questioning "the choice to conduct this research and the relevance of this kind of teaching method for adult and professional students who were taking time off to attend such lectures." This incident is especially revealing about the traditional roles and expectations on part of both students i.e., "we pay money to be lectured at" and on part of instructors that "is it appropriate for me not to lecture?" When a choice is made to implement LS by an instructor, this expectation is clearly violated—and deliberately.

Discussion and Conclusions

> "We change the culture by changing the nature of conversation. It's about choosing conversations that have the power to create the future."
>
> Peter Block (2008).

Our quantitative analyses allowed us to pilot test an LS questionnaire in seven classrooms in a faculty of business and social sciences at a Norwegian university, particularly known for its lecture-style delivery of content. This first-time piloting of an LS questionnaire led to the deciphering *four* positively correlated LS dimensions. Our findings suggest that the average participating student in our LS study generally agrees with the following four propositions:

1. *That LS are easy to implement and adopt:* Participants found the LS instructions about sequencing of steps as being easy to follow and believed that the time spent in various LS configurations was well allocated and spent.

2. *That LS helped include and engage:* Participants felt comfortable sharing their ideas and liked having an opportunity to speak and to be listened to.

3. *That LS helped enhance the learning experience*: LS expanded, and deepened participants' understanding of the subject matter, added to their curiosity, and helped create the enabling conditions for new ideas and perspectives to emerge.

4. *That LS represent effective pedagogical practice:* Participants found LS to be more enjoyable and engaging than conventional lectures, experiencing more opportunities to organize and vocalize their ideas in cooperation with others.

Our quantitative data also suggested that both "LS Coach" and the Classroom "Instructor" are possible additional causes of variation. However, the data was confounded with "Class" in our experimental design. We highly recommend that future LS studies may wish to tease out these dimensions further in their experimental design.

Our qualitative findings—based on participant observation and note-taking, and debriefing interviews with instructors and students, suggested that, overall, LS led to discernible and positive changes in a classroom, in enhancing the instructor experience, and in enhancing the student learning experience. The instructors valued what the "structure" in LS made possible (e.g. all students were expected to participate), deemed LS as an innovative pedagogical practice that allowed for teaching-learning responsibility to be shared, and felt that the nature and quality of feedback loops were enhanced. The LS experience also provoked an internal questioning of what an instructor's role is in a classroom—a sage on stage transmitting expert knowledge versus one who enables shared responsibility. The students found their experience with LS to be enjoyable, recognized its cyclical rhythms, believed strongly that LS enhanced their ability to engage, feel included, and democratically participate, and enabled deeper learning and actionable inquiries. Also, it pointed to how some students, perhaps a handful, felt "cheated" for not being lectured at—a violation of what they have come to expect.

Implications

What are the implications of our findings for educators and designers of interactions?

1. **A move toward shared responsibility for generating content and its sense-making.** All too often, in millions of classrooms around the world, instructors feel, the pressure of being the sole bearer of responsibility to deliver "content"—that the expertise vested in them needs to be transmitted, more often than not—lecture-style, to students within the

class time. Our findings suggest that educators need to move from the notion of *sole responsibility to deliver content* to adopting and adapting simple actionable tools so that there is *shared responsibility for generating content* and for the accompanying sense-making.

2. **Paying attention to the liberating aspects of structure.** Simple liberating structures (such as Impromptu Networking, 1-2-4-All, and three dozen others) can cause seismic shifts in liberating classroom interactions. While instructors know the value of classroom participation, may even attempt to implement group work, few are aware of the power of groupware—the simple software—the sequence of steps in which to implement for maximizing participation and productivity. This simple sequencing of steps for each of the three dozen LS tools (even offered as a mobile app "liberating structures") provide this groupware/software so all instructors, without ado and much training, can potentially liberate their classrooms.
3. **Small shifts in interactional patterns can lead to rippling systemic changes.** The five structuring elements of LS represent the five micro-levers that can be shifted to disturb and disrupt top-down, one-way, expert-centered knowledge transmission. Used in combination, the *structuring invitation, spatial arrangements,* the *distribution of democratic participation distribution,* varying *group configurations,* the *sequence of steps,* and *time allocation* can be transformative. Paying attention to timing, rhythms, boundary-setting, and containers in group work can lead to emergence of trust, relational mutuality, other-centeredness, self-direction, and self-discovery (Torbert, 1991; Johnson-Lenz & Johnson-Lenz, 1994). Block (2010, p. xii) said it best: Such methods represent

simple and concrete ways to "choreograph how to bring people together, not to dance or socialize, but to get the work done."

4. **More robust research investigations needed.** The present study represented a pilot investigation of LS implementation in an educational setting. Its research design was limited by its post-test-only measurement. However, it allowed for a pilot testing of our LS survey instrument, provided a sense of what LS items are highly inter-correlated and go together. Additionally, our mixed methods approach allowed us to triangulate our quantitative findings with the qualitative insights. That said, our experience with this pilot study leads us to call for: (1) more robust pre-post and treatment-control designs for future research, (2) more concrete learning and outcome measurements (beyond students' perceptions) carried out as a time-series across an entire course, (3) the development of an instrument centering on the five LS structuring elements to assess their relative contributions to LS-generated outcomes; and (4) systematic investigations of LS implementations in institutions, big and small, outside the educational sector, and in other country and cultural contexts.

In closing, while scholarship on the adoption and assessment of innovative pedagogical methods—such as active learning, flipped classrooms, or problem-based learning—are an ongoing scholarly exercise, the systematic study of LS tools in classrooms is in its infancy. Clearly the full potential of LS in classrooms, meetings, or wherever group work happens, is yet to be realized. The present study is offered in the hope that more investigations of the use of LS will be spurred.

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Table 1. Breakdown of Survey Respondents by Class Size, Topic, and LS Coach

Classrooms Where LS Was Implemented	Class Topic	LS Coach	Number of Students that Answered the Questionnaire N=127
1	Management	#1	20
2	Management	#2	24
3	Management	#1	24
4	Management	#1	6
5	Management	#1	29
6	Management	#2	11
7	Economics	#2	13

Table 2. Means and standard deviation of the 17 questions.

	Scale Range: 1 to 7 where 1=Disagree Strongly 4=No Opinion 7=Agree Strongly. All measures have observed min=1 and max=7	**Arithmetic Mean**	**Standard Deviation**
Q01	I appreciated the opportunities to express my views and be listened to by other students.	5.07	1.31
Q02	I felt comfortable sharing ideas with other students in this way.	4.93	1.55
Q03	I took a more active part in class today than I normally do.	5.13	1.59
Q04	I generally dislike engaging with my peer students in this way. (Scale reversed)	5.05	1.59
Q05	After today's experience, I am more likely to turn to my peer students for help, discussions and/or cooperation.	4.37	1.31
Q06	Instructions were clear and easy to understand.	5.39	1.49
Q07	The learning objective was clear and easy to understand.	4.90	1.50
Q08	I felt that my time was well spent during each activity.	4.78	1.46
Q09	The sequence of steps during each activity allowed me to refine my ideas/understanding about the topic.	5.24	1.25
Q10	My peers and I were given equal opportunities to participate.	5.77	1.13
Q11	Gave me new ideas about the topics.	5.42	1.03
Q12	Made be more curious about the topics.	5.05	1.08
Q13	Expanded my understanding of the topics and made me more confident.	5.34	1.12
Q14	I was had the opportunity to compare my own ideas/ understanding about the topic to that of my peers.	5.75	0.91
Q15	I feel that my time was wasted. (Scale reversed)	5.39	1.41
Q16	I enjoyed today's lesson more than in a typical lecture.	5.43	1.07
Q17	I had multiple opportunities (more than one) to organize/vocalize my ideas about the topics.	4.62	1.54

Figure 1. Mean Values for each of the 17 LS Questions

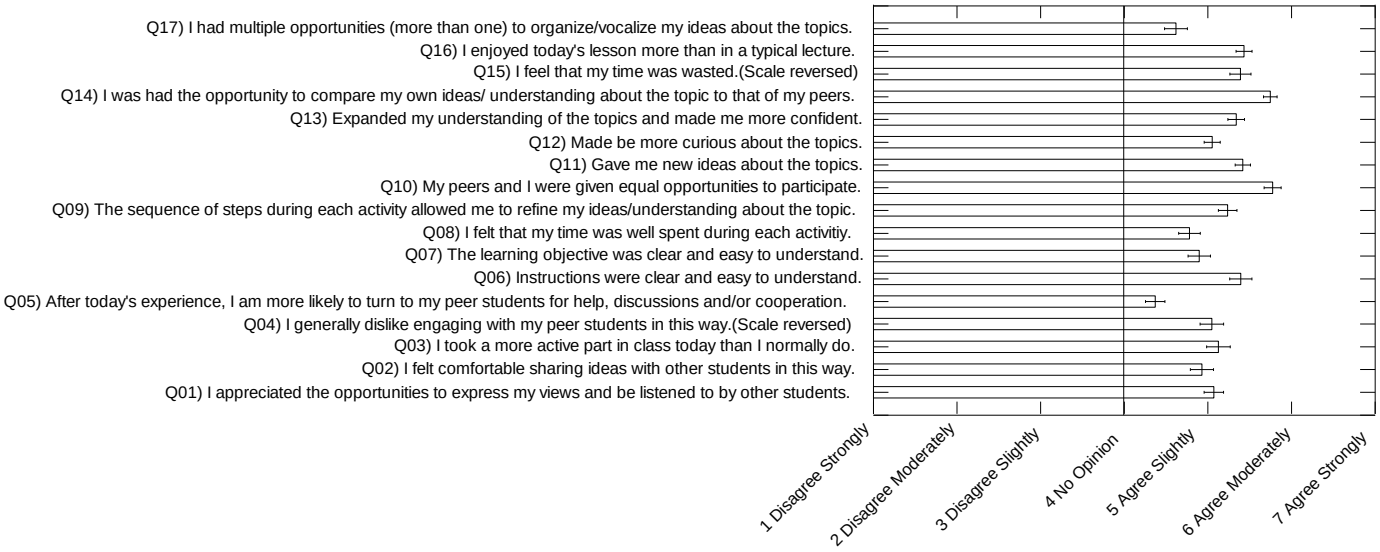

Table 3. Summary of first PCA analysis.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.883		
Bartlett's Test of Sphericity	Approx. Chi-Square	1085.260		
	df	136		
	Sig.	0.000		
Cronbach's Alpha		0.914		
N of Items		17		
Component	1	2	3	4
Varimax Rotated % of variance explained	21.111	19.861	13.892	11.291
PCA loading matrix. Varimax with Kaiser Normalization.				
Q01 I appreciated the opportunities to express my views and be listened to by other students.	0.253	0.731	0.050	0.262
Q02 I felt comfortable sharing ideas with other students in this way.	0.052	0.834	0.301	0.041
Q03 I took a more active part in class today than I normally do.	0.237	0.472	0.457	0.102
Q04 I generally dislike engaging with my peer students in this way. (Scale reversed)	0.095	0.689	0.334	-0.121
Q05 After today's experience, I am more likely to turn to my peer students for help, discussions and/or cooperation.	0.300	0.184	0.651	-0.056
Q06 Instructions were clear and easy to understand.	0.106	0.019	0.104	0.878
Q07 The learning objective was clear and easy to understand.	0.520	0.130	0.092	0.578
Q08 I felt that my time was well spent during each activity.	0.497	0.547	0.040	0.420
Q09. The sequence of steps during each activity allowed me to refine my ideas/understanding about the topic.	0.754	0.260	0.314	0.042
Q10. My peers and I were given equal opportunities to participate.	0.235	0.107	0.486	0.406
Q11. Gave me new ideas about the topics.	0.752	0.160	0.193	0.221
Q12. Made be more curious about the topics.	0.750	0.170	0.166	0.151
Q13. Expanded my understanding of the topics and made me more confident.	0.686	0.178	0.483	0.051
Q14. I had the opportunity to compare my own ideas/ understanding about the topic to that of my peers.	0.036	0.251	0.582	0.478
Q15. I feel that my time was wasted. (Scale reversed)	0.581	0.598	0.149	0.199
Q16. I had multiple opportunities (more than one) to organize/vocalize my ideas about the topics.	0.258	0.264	0.691	0.166
Q17. I enjoyed today's lesson more than in a typical lecture.	0.459	0.666	0.178	0.067

Table 4. The four LS Concept averages extracted from the 17 questions.

LS Concept Name	Average of Question	Minimum	Maximum	Mean	Standard Deviation
Ease of LS implementation	Q06, Q07, Q08	1.67	7.00	5.02	1.20
Sense of inclusion and participation	Q01, Q02, Q03, Q04 (Scale reversed)	1.50	7.00	5.04	1.17
Enhanced learning	Q11, Q12, Q13	2.67	7.00	5.27	0.91
Pedagogical effectiveness	Q15(Scale reversed), Q16, Q17	1.67	7.00	5.14	1.12

Table 5. Analysis of Variance for the four extracted concepts.

Ease of LS implementation	R^2=	0.28			
Source	Type III SS	df	Mean Squares	F-Ratio	p-Value
LS COACH	2.03	1	2.03	1.87	0.17
CLASS (LS COACH)	47.98	5	9.60	8.87	0.00
Error	129.78	120	1.08		
Sense of inclusion and participation	R^2=	0.11			
Source	Type III SS	df	Mean Squares	F-Ratio	p-Value
LS COACH	7.81	1	7.81	6.14	0.01
CLASS (LS COACH)	14.03	5	2.81	2.21	0.06
Error	152.64	120	1.27		
Enhanced learning	R^2=	0.09			
Source	Type III SS	df	Mean Squares	F-Ratio	p-Value
LS COACH	0.09	1	0.09	0.11	0.74
CLASS (LS COACH))	9.17	5	1.83	2.29	0.05
Error	96.05	120	0.80		
Pedagogical effectiveness	R^2=	0.11			
Source	Type III SS	df	Mean Squares	F-Ratio	p-Value
LS COACH	0.53	1	0.53	0.46	0.50
CLASS (LS COACH)	17.48	5	3.50	3.00	0.01
Error	139.63	120	1.16		
Mean of all 17 indicators	R^2=	0.13			
Source	Type III SS	df	Mean Squares	F-Ratio	p-Value
LS COACH	1.41	1	1.41	2.10	0.15
CLASS (LS COACH)	10.60	5	2.12	3.16	0.01
Error	80.48	120	0.67		

Endnotes

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[2] This information was compiled through Studiebarometeret, an annual national student survey distributed to all bachelors and masters students in Norway. In 2016, when the students of the present Faculty of Business and Social Sciences were asked about teaching methods, 83% of them pointed to the preponderance of the lecture method (NOKUT, 2017).

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