

Enhancing Collaborative Learning in Research-Based Teaching and Supervision

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Introduction and rationale

Research in higher education has shown that students learn more effectively when they actively engage with ideas, explain their reasoning to others, and take part in structured discussion, rather than only listening to presentations (Johnson & Johnson, 1994; Prince, 2004). Such collaborative forms of learning are particularly relevant in research-based education, where scientific understanding develops through questioning, comparison of interpretations, and critical dialogue. At the same time, studies also show that group-based learning does not automatically lead to broad participation. In settings with clear hierarchies or strong expert roles, junior participants may hesitate to speak, even when they are well prepared (Edmondson, 1999). Without clear structure and explicit expectations, discussions can easily be dominated by a few voices, limiting learning opportunities for the rest of the group (Lave & Wenger, 1991). These challenges are common in academic environments such as research group journal clubs and supervision of students. Although these settings play a central role in scientific training, they are often organised around content delivery or expert feedback rather than being intentionally designed as learning situations. As a result, opportunities for shared analysis, questioning, and learner ownership may be underused.

The present project addresses this issue by examining how simple, structured changes, such as guided peer discussion, shared written input, and planned reflection, can support broader participation and stronger ownership of learning in research-based teaching contexts. By focusing

on two everyday academic settings, the project aims to explore how collaborative learning can be strengthened in practice, in line with the broader goal of supporting student-centred learning in higher education.

Problem formulation

The project addresses the following question:

“How can structured collaborative learning formats support participation, inclusion, and learner ownership in research-based teaching and supervision settings?”

This question is particularly relevant in academic environments where strong expert roles and hierarchical structures may unintentionally reduce dialogue and shared learning. The project addressed this challenge by promoting broader participation, clearer learner-generated contributions, and a redistribution of responsibility during discussions.

Background and teaching perspective

Participation in learning activities is strongly shaped by structure and facilitation. When formats signal that correct interpretations are held by the most senior participants, fewer voices are likely to contribute. Conversely, when learning activities normalise exploration, questioning, and partial understanding, broader participation becomes possible. For junior members of academic groups, predictability, clarity of expectations, and tone are especially important in supporting contribution. A second guiding principle in this project is that reflection is necessary for transforming experience into learning. Meetings with external experts can be intensive and informative, but without structured reflection they may not lead to changes in future practice. For this reason, the teaching experiment included a dedicated reflection meeting designed to support analytical and forward-looking learning. Finally, the project treats teaching development as an iterative process. The value of the experiment lies not in achieving an optimal format immediately, but in systematically

examining what was attempted, what occurred, and how future practice can be refined.

Design of the teaching experiment

Contexts

1) Journal club (mixed academic levels).

A 60-minute journal club was conducted within Kim Jensen's research group discussing a publication by Das et al., "Liver X receptor unlinks intestinal regeneration and tumorigenesis", *Nature* (2024). Fourteen participants attended, including MSc students, PhD students, postdoctoral researchers, and staff scientists. The session was observed by a departmental supervisor.

2) Supervision sequence (single PhD student).

A sequence of three supervision meetings was conducted with one PhD student in connection with an expert consultation on publication strategy. The sequence included a preparation meeting, the expert consultation itself, and a structured reflection meeting. The preparation and reflection phases were observed and discussed with departmental and didactical supervisors.

Design intentions

Across both contexts, the teaching experiment aimed to:

- 1) increase active participation beyond the most senior voices,
- 2) support learners in formulating and owning their interpretations and questions,
- 3) clarify the purpose and expectations of each learning activity,
- 4) reduce the centrality of the teacher/supervisor as the sole authority in discussions.

Description of activities

Journal club intervention

The journal club format combined a paper presentation with structured peer discussion supported by Padlet as a shared digital workspace. Three guiding questions framed the activity (Table 1), with paired discussions followed by plenary sharing (see Annex 1).

Table 1. Questions that drove the discussion during the last 15 minutes

Question	Purpose
Q1. Which is the main discovery of the study?	Shared understanding of core contribution
Q2. Why is it important to our research?	Collective relevance-making
Q3. What is the one question you would like to ask the author if given a chance?	Critical and forward-looking thinking

Supervision Intervention

1) Preparation meeting (Session 1).

The preparation meeting followed a clear agenda with explicit learning aims, including strengthening the scientific narrative, increasing strategic awareness, and supporting the student in leading the upcoming expert discussion (see Annex 2). During the meeting, the student presented the project, followed by a structured dialogue focused on storyline and strategic choices. The atmosphere was supportive and appreciative, with explanations provided for suggested changes (see Annex 3).

2) Expert consultation (Session 2).

The second meeting was the expert consultation itself, attended by the PhD student, me, and an external expert (Georg Busslinger). The PhD student led the meeting by presenting the project and engaging directly in discussion with the expert. My role during this session was deliberately restrained. Rather than intervening, I remained largely silent, allowing the student to respond to questions, handle challenges, and steer the

discussion. This intentional withdrawal was aimed at supporting the student's sense of agency, confidence, and ownership in a high-level academic interaction.

3) Reflection meeting.

Following the expert consultation, a reflection meeting was conducted using structured questions designed to guide the discussion from description to analysis and synthesis (see examples in Table 2 and extended list in Annex 4). Reflecting on the previous journal club experience, the role of the observer was explicitly clarified to reduce uncertainty and protect the learning environment. This session supported consolidation of learning related to scientific communication, strategic reasoning, and professional identity.

Table 2. Example questions that guided the discussions.

Focus	Purpose
Immediate impressions	How did you feel in the meeting and why?
Strategy and content	How would the publication strategy be revised?
Communication	What worked well and what could be improved?
Professional development	Which skills should be strengthened next time?

Evaluation and outcomes

Evaluation was based on qualitative observation notes, Padlet contributions, supervisor feedback, and written reflections. In the journal club, interaction during the presentation phase was limited and dominated by senior participants. When structured peer discussion using Padlet was introduced, engagement increased visibly, and a broader range of

participants contributed. At the same time, observations highlighted limitations. The pedagogical aim of collaborative learning was not clearly communicated at the beginning of the session, and I responded to most Padlet entries, reinforcing a central authority role rather than encouraging participant-to-participant dialogue (see Annex 5).

In the supervision setting, observations described a constructive and psychologically safe atmosphere, with clear learner ownership of content and decisions (see Annex 6). The structured reflection meeting supported the articulation of learning related to communication, strategy, and professional interaction. However, feedback also suggested that further redistribution of control could strengthen learner leadership during analytical discussions.

Conclusions

This project explored how structured collaborative approaches function in two everyday research-based teaching settings: a journal club and a supervision sequence. The results show that participation and learner ownership do not arise automatically, even when collaborative tools are introduced. Instead, they depend on how clearly the purpose of the activity is framed and how responsibility for discussion is distributed.

In the journal club, the introduction of peer discussion and Padlet-based input increased engagement and allowed a wider range of participants to contribute. The written responses showed that participants were able to identify key findings, connect them to their own research, and raise critical and translational questions. However, the session remained too presentation-focused, and the learning aim was not clearly stated at the beginning. By responding to most Padlet entries personally, I unintentionally maintained a central expert role, which limited participant-to-participant dialogue.

In the supervision sequence, the alignment between intention and outcome was stronger. The preparation meeting provided clear structure, while the expert consultation allowed the PhD student to lead the discussion and respond directly to feedback. My deliberate decision to remain silent during the expert meeting supported the student's sense of agency. The subsequent reflection meeting helped the student articulate

learning related to communication, strategy, and professional interaction. Observation feedback nevertheless indicated that even more student leadership could be encouraged during analytical discussion.

Overall, the project demonstrates that collaborative learning in research settings requires explicit purpose-setting, reduced presentation load, and conscious restraint from the facilitator. Future iterations will therefore emphasise clearer framing at the outset, fewer focal points for discussion, greater use of participant-to-participant responses, and continued attention to sharing responsibility during discussion.

References

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Annex 1 – Journal club questions and answers

Martti Maimets 3/27/2025

Journal Club 250402

Promoting collaborative learning

Annex 2 - Agenda for preparation meeting

Agenda: Expert Consultation Preparation Meeting

19th of November, 09:00 – 10:00, Panum building, 04-5-17

Duration: 60 minutes

Participants: Martti Maimets (supervisor), Lingbing Zhang (PhD student)

Observers: Nicole Schmitt (departmental supervisor), Lars Ulriksen (pedagogical supervisor)

Purpose of the session:

To prepare for an expert consultation by strengthening the scientific narrative, increasing strategic awareness of publication planning and empowering Lingbing to lead the upcoming meeting.

1. Opening & Framing the Session (2 min) - Martti
 - a. Welcome and introduction
 - b. Overview of agenda and a brief statement of purpose with learning outcomes (clarity of storyline, identification of data needs, preparation of strategic questions.
2. Introduction of the Expert (5 min) - Martti
 - a. Short slideshow summarizing Georg A Busslinger's background and research focus.
3. Manuscript Presentation (20 min) – Lingbing
 - a. Project aims, progress, preliminary figures, and outstanding questions.

4. Presentation Discussion (20-25 min) – Martti and Lingbing
 - a. Narrative coherence and areas needing strengthening.
5. Preparing Questions for the Expert Meeting (8–13 min) – Martti and Lingbing
 - a. Formulation of high-value, strategic questions that will maximize the benefit of the expert consultation.
6. Closing & Next Steps (1–2 min) – Martti
 - a. Acirmation of support and readiness for the next session.

Annex 3 - Reflection on a preparation meeting

Reflection on a supervision meeting with a PhD student (preparation for expert meeting)

This specific supervision meeting with my PhD student, Lingbing, served as a preparation for her upcoming discussion with an external expert, Georg Busslinger. I was observed by my didactical supervisor Lars Ulrikssen. My primary intention was to support her in shaping a coherent narrative for her presentation and to help her articulate the strategic questions she wishes to raise. Reflecting on the observation notes, several strengths and developmental points emerge regarding my supervisory approach.

I began the session by clarifying the purpose of the meeting and situating the expert within the field. This framing aimed to reduce uncertainty and make the expectations transparent. During Lingbing's presentation, I monitored time and focused our subsequent discussion on the storyline. Lars noted that I interwove appreciation of her project with concrete suggestions and that I frequently explained why I proposed certain changes. In hindsight, this explanatory practice reflects my deliberate attempt to give students access to the often implicit criteria that shape scholarly communication: how we structure arguments, how we anticipate reviewers' perspectives, and how we position work within a

field. I see this “making the implicit explicit” as an important dimension of academic apprenticeship.

The feedback dynamic was described as open, constructive, and appreciative. I recognise this as a strength, particularly in terms of building psychological safety and fostering genuine dialogue rather than one-directional correction. At several points, I emphasised that my comments were suggestions rather than prescriptions. This was intentional, as I want Lingbing to feel ownership over her decisions. However, Lars’ remark about exploring how to “let go of control” invites reflection. While I aim to support her development into an independent scholar, I may still lean too heavily into structuring the conversation. A more balanced approach might involve giving her more space to lead the analytic discussion after her presentation, or inviting her to articulate first what she sees as strengths and weaknesses before I provide my perspective. Remember, active listening by Carl Rogers: https://www.youtube.com/watch?v=r_yGBnZXFFA

Finally, the meeting touched on broader scholarly values: being open to identifying weaknesses, seeking expert critique, and situating work within one’s academic community. These meta-messages were partly deliberate, though I could be more intentional about identifying which aspects of scholarly practice I most want my students to internalise. Going forward, I will reflect on how to consciously integrate such developmental aims into my supervision while remaining responsive to each student’s needs.

Annex 4 - Extended question list for reflection meeting

1. Immediate Impressions

How did the meeting go from your point of view?

How did you feel during the meeting (confident, nervous, curious, overwhelmed, etc.) and why?

What surprised you — either positively or negatively?

What was the most valuable or insightful part of the discussion?

2. Content and Strategy

Did dr. Busslinger raise points or perspectives you hadn't considered before?

How did he weigh novelty, completeness, and narrative coherence?

How would you now revise your plan or strategy for the manuscript?

3. Communication and Interaction

The preparation and presentation of your project to dr. Busslinger - what worked well and what could be improved?

How did you handle questions or challenges raised during the meeting?

What did you notice about his communication style (tone, structure, questions)? How did the dynamics of the meeting influence your own engagement?

4. Learning and Professional Development

What did you learn about how a junior group leader thinks and makes decisions? What competencies do you think are important in such level discussions?

How might you prepare differently next time for a meeting with a junior group leader? What are 1–2 skills or attitudes you'd like to strengthen before the next such interaction?

Annex 5 - Observation summary, Nicole Schmitt

UP Martti Maimets

Observation summary – Journal Club session – 2 April 2025

CONTEXT AND SETTING

The observed session was a journal club held within a research group, focusing on the presentation of a seminal paper relevant to the group's scientific interests. A total of 14

participants attended the session, ranging from MSc students to postdocs, a group leader, and support staff. Among the participants, 10 appeared female and 4 male.

The session took place in a meeting room with a glass wall facing a hallway, which introduced occasional distractions from people passing by and background noise. All observers but one joined the session online.

The total session time was 60 minutes, divided into approximately 40 minutes of presentation followed by 20 minutes of pairwise discussions (using Padlet as scaffold) and follow up in plenum.

SUMMARY OF OBSERVATIONS

Overall, Martti Maimets (MM) showed clear dedication to the session and a willingness to experiment with new tools and approaches.

Specific comments

The overall objective of the session, as stated by MM toward the end, was to enhance collaborative learning in the group. This aim was not explicitly communicated at the beginning. It was not clear to me whether this was on purpose or a missed opportunity to align participants around a shared goal.

MM opened the session by presenting the agenda and referring to a previously distributed Padlet link. He asked the group for agreement, receiving affirming nods — a positive effort to establish a didactic contract. It was not clear to me whether participants had been informed that the session would be observed. Neither the observers nor their roles were introduced, which may have contributed to the slightly reserved atmosphere (at least at the time I was present).

The presentation was conducted while seated, which lent an inclusive tone but limited MM's ability to engage participants through eye contact or body language. The introductory slides were generally text-heavy, and figures were difficult to see clearly due to their small size. Several participants turned to their own devices or printed papers to follow the material more effectively, which could have an impact on their ability to listen.

At times, I found it difficult to discern whether MM was explaining original content from the paper or offering his own analysis. During the 40-minute presentation, interaction was limited. Around five questions were asked, most of them clarifying factual points, with only one opening a more interpretive discussion.

These questions came from two postdocs. MM's responses were well-informed but tended to

close down rather than open up further discussion — a style that risked consolidating his role as expert rather than facilitator.

Midway through the session, MM noted the group's relative quietness compared to previous meetings. This was a valuable recognition, although it was not followed by an explicit invitation for the group to re-engage. The format — a comprehensive walkthrough of all figures in the paper — left little room for open discussion, and participants' attention began to drift slightly toward the end of the presentation (I observed 2 participants checking and writing emails on their laptops).

The Padlet activity, introduced after 40 minutes, created a great shift in dynamics. Two participants had already contributed during the presentation— suggesting an overall willingness to engage. MM facilitated three rounds of short, peer-to-peer discussions, which visibly increased energy in the room and prompted additional Padlet entries, mostly submitted via phone.

MM took on the task of reading and responding to nearly all entries himself. This created a dynamic in which he appeared to be defending or explaining the discussion points, rather than facilitating a broader dialogue. Shifting toward a more participant-driven model — inviting individuals to expand on their own posts or respond to others — may distribute engagement more effectively and create a safer environment for critical thinking. This will of course pose a challenge to the time management as activities like this require time.

Some comments were read aloud with a tone that might be interpreted as ironic. This might be in line with overall friendly tone, informal settings and positive attitudes in the group, but also made me wonder whether this could discourage contributions from more junior group members.

The session concluded with MM inviting the group to reflect on the journal club format and consider whether to continue with this structure. This open-ended closure was constructive and appropriate. Informal feedback from one participant to me suggested that typical journal clubs are more interactive, and that the presence of observers likely played a role in the more cautious atmosphere.

Recommendations

- Consider whether and if so how to communicate the pedagogical aim (e.g., collaborative learning) at the beginning of the session.
- Explicitly acknowledge the presence and role of observers to avoid confusion or hesitation.
- Consider reducing the number of slides and focusing on selected key figures to open up more space for reflection and discussion. Consider embracing even more that PP is a visual medium.
- Tools like Padlet are great to support peer dialogue. Rather than reading aloud and responding to each entry, consider asking participants to expand on posts or to react to each other's contributions.
- Be attentive to tone when discussing contributions, especially in age-diverse groups (GenZ, millennials, GenX...)
- Reflect on how to gradually shift from a presentation-centered format to a more dialogic and participant-driven structure.

Nicole Schmitt | Dept. of Biomedical Sciences

Annex 6 - Observation summary, Lars Ulriksen

Notes from observation of supervision meeting between Martti and Lingbing Zhang, 19 November 2025

The meeting was a preparation for a meeting between Lingbing and Georg Busslinger. Martti will be there as well, but without interfering.

Martti opened the meeting presenting the purpose of the meeting and why he had selected GB as the expert Lingbing should meet and discuss with. He mentions where GB has published and in particular two recent papers.

Lingbing then makes her presentation and Martti sets the timer to keep track of the time. She makes a brief meta-comment the presentation in relation to the title slide and then continues. A focus of what should be discussed concerning the presentation is the storyline: what story will she tell?

After the presentation, Martti and Lingbing walk through the slides and Martti comments. The very first comment is that he really likes the project. Then he reminds her to explicitly thank Kim and the Marie Curie Network to (as I understood it) get the practice of thanking the lab PI and the colleagues and networks embedded in her.

The conversation continues as a combination of appreciation and praise of the project and parts of the presentation, and some suggestions for changes. These include suggestions concerning the design and formulations at the slides as well as content. Occasionally, Martti emphasises that he makes suggestions and she can decide what to do. He also frequently explains why he makes the suggestion. Lingbing also explains her reasons for doing what she did, she mostly take the ideas presented by Martti, but she also engages in a dialogue back and forth about what would be better to do.

At the end of the meeting, they talk more specifically about what to ask GB about – what kind of feedback they would like to get. At the end of the meeting, Martti summarises.

After the meeting, Martti and I talked about the supervision. We particularly talked about the open, constructive and appreciative atmosphere, and that Martti several times mentioned that he found the project and the work of Lingbing as being of high quality. We also talked about the possibility of letting go of the control, leaving more to Lingbing. The point was not to let go altogether, but if the conversation and the running of the meeting could be taken more over by Lingbing. It should be balanced with what Martti finds himself comfortable with, but to develop her as an independent scholar that could be a good idea.

...

There are a couple of other things we could reflect on in the coming meeting. I noticed that you (Martti) in many cases explained the reason for your suggestions and why you believed it to be better ideas. Through this, you gave Lingbing access to the criteria behind your reflections and suggestions related to the presentation. You also referred to the way you were yourself as a PhD student: “I was very confident as a PhD student, who didn’t see the weak sides. It helped me to talk to experts. Ask him: What are the weak parts”. This is also a way of communicating scientific practice and values (be open to mistakes; be confident but still open). Is

it a deliberate part of your supervision through the explanations, but also the meta-comments to other the PhD student access to the ways of thinking, the practice of a scholar and to the criteria that you use?

If it is, then how do you select what to convey? Is there something in particular that you wish the students to develop and to reflect on?