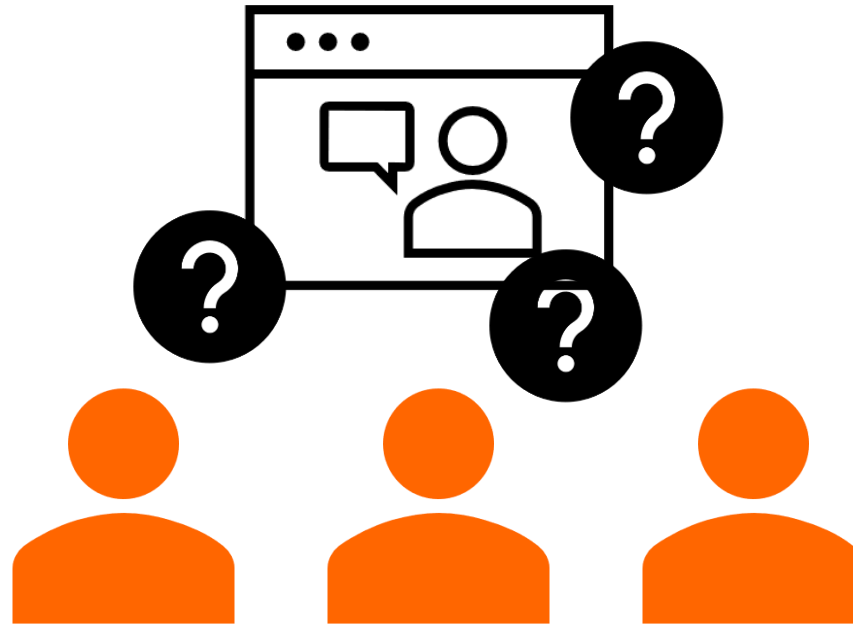


Online Collaborative Refinement to Increase the Quality of Students' Posed Questions

Ari Nugraha, Izhar Almizan Wahono, and Tomoo Inoue

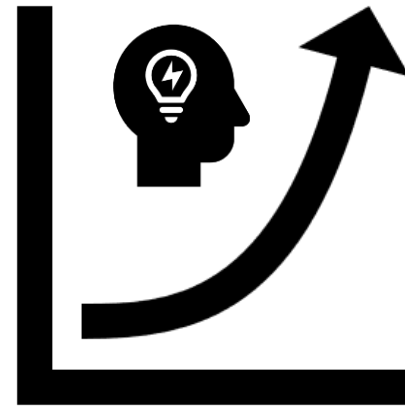
University of Tsukuba, Japan

Question Posing/Generation



Posing questions promotes a higher level of thinking to students as they tried to pose questions in which the answer can be found in the learning material [2]

[2] Papinczak, T., Peterson, R., Babri, A.S., Ward, K., Kippers, V., Wilkinson, D.: Using student-generated questions for student-centred assessment. *Assessment & Evaluation in Higher Education*. 37, 439–452 (2012). <https://doi.org/10.1080/02602938.2010.538666>

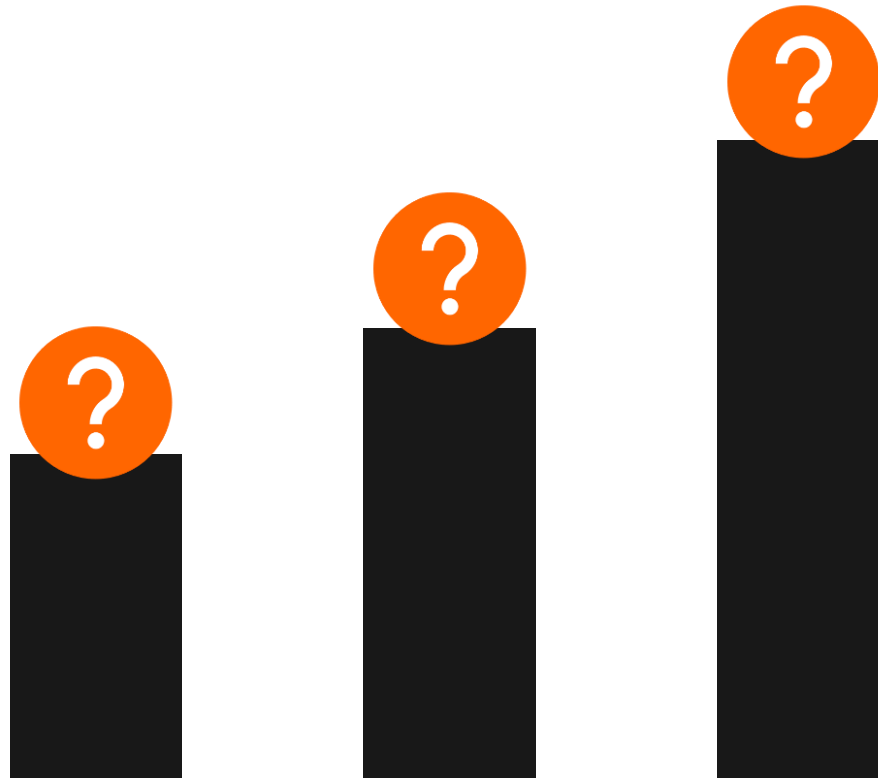


Collaborative learning enables students to develop higher-order thinking skills and achieve richer knowledge generation[1]

[1] Brindley, J., Blaschke, L.M., Walti, C.: Creating Effective Collaborative Learning Groups in an Online Environment. IRRODL. 10, (2009). <https://doi.org/10.19173/irrodl.v10i3.675>



Question Refinement



Problem: Student were posed low-level quality questions [3]. Therefore questions refinement needed to increase the questions quality

[3] Logtenberg, A., van Boxtel, C., van Hout-Wolters, B.: Stimulating situational interest and student questioning through three types of historical introductory texts. *Eur J Psychol Educ.* 26, 179–198 (2011). <https://doi.org/10.1007/s10212-010-0041-6>

Questions Quality



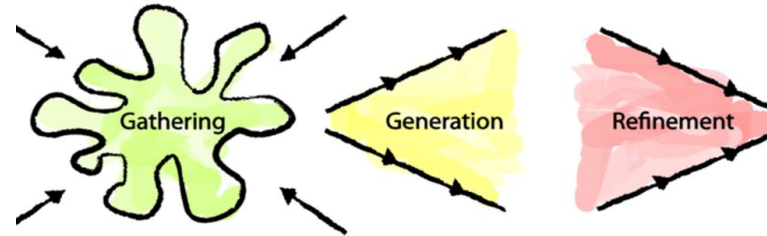
Several taxonomies exist to categorize the quality of student generated questions [2, 4, 5]

[2] Brindley, J., Blaschke, L.M., Walti, C.: Creating Effective Collaborative Learning Groups in an Online Environment. IRRODL. 10, (2009). <https://doi.org/10.19173/irrodl.v10i3.675>

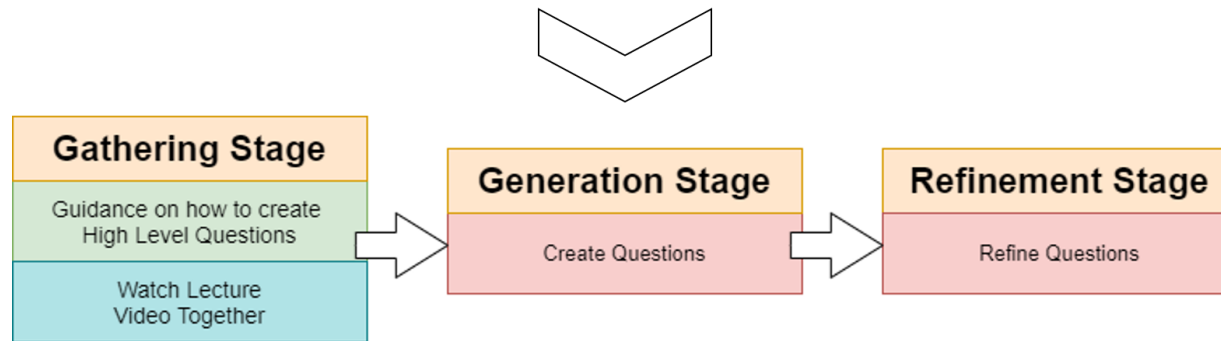
[4] Gallagher, J., Aschner, M.J.: A Preliminary Report on Analysis of Classroom Interaction. Merrill-Palmer Quarterly of Behavior and Development. 9, 183–194 (1963)

[5] Guthrie, J.T., Wigfield, A., Perencevich, K.C. eds: Motivating reading comprehension: concept-oriented reading instruction. L. Erlbaum Associates, Mahwah, N.J (2004)

Proposal



Idea generation and refinement stage from **Perteneder**



Our proposed question generation and refinement stages

We adapted idea refinement method by Perteneder
[6] for our questions refinement method

[6] Perteneder, F., Grossauer, C., Seifried, T., Walney, J., Brosz, J., Tang, A., Carpendale, S., Haller, M.: Idea Playground: When Brainstorming is Not Enough



Collaborative Refinement Tools



Online off-the-shelf tools is used to create full online learning experience



Collaborative Refinement Tools

The image is a composite of two screenshots. The left screenshot shows a Zoom meeting window. In the foreground, a woman is speaking. Behind her is a video player showing a presentation slide titled "The wind energy resource". The slide features a circular diagram with the following data:

Energy Source	Times Larger than Current Demand
Solar Energy	2650 Times
Wind Energy	200 Times
Wind	40 x
Biomass Energy	20 Times
Hydropower	1 Times
Geothermal Energy	5 Times
Wave-Tidal Energy	2 Times

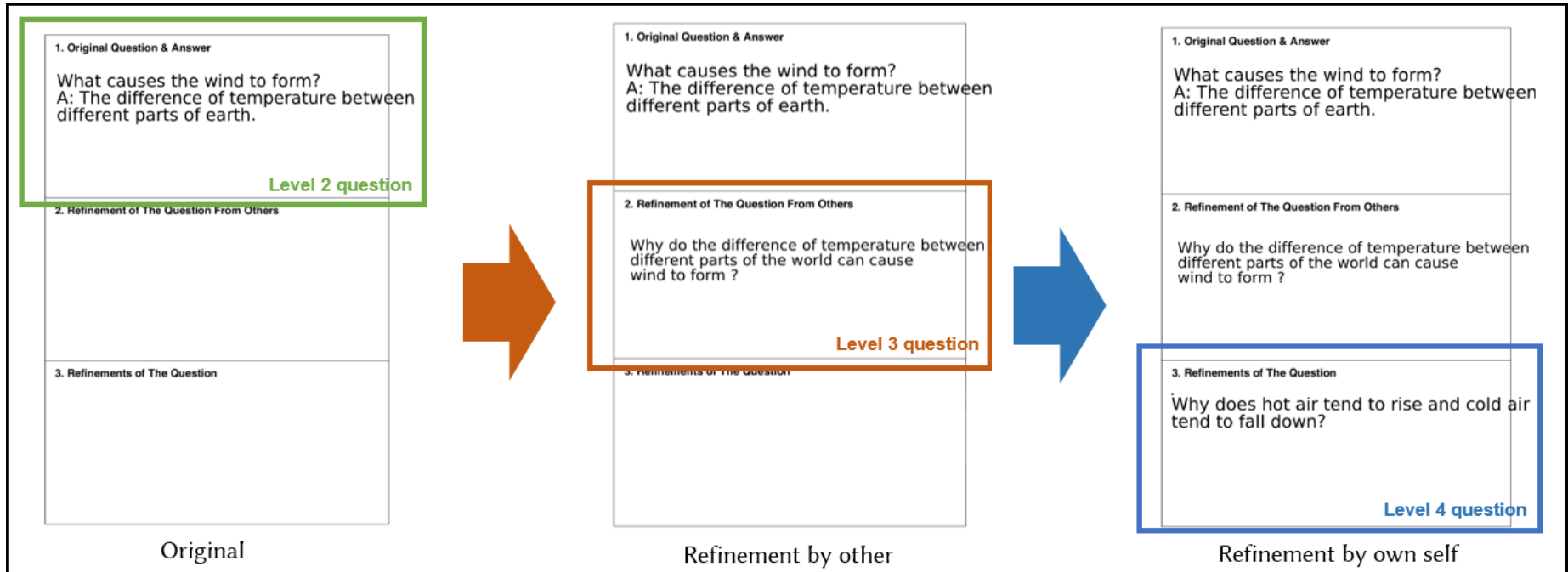
Below the diagram, the text reads: "the wind energy resource is still 40 times larger than the current energy demand." The right screenshot shows a web browser window displaying the TestBoard interface. It has three sections:

1. Original Question
What is the name of Japan capital city?
2. Question Improvement/Refinement from Other
3. Question Improvement/Refinement by Yourself
How does the Tokyo become the Japan capital city?

Online off-the-shelf tools is used to create full online learning experience



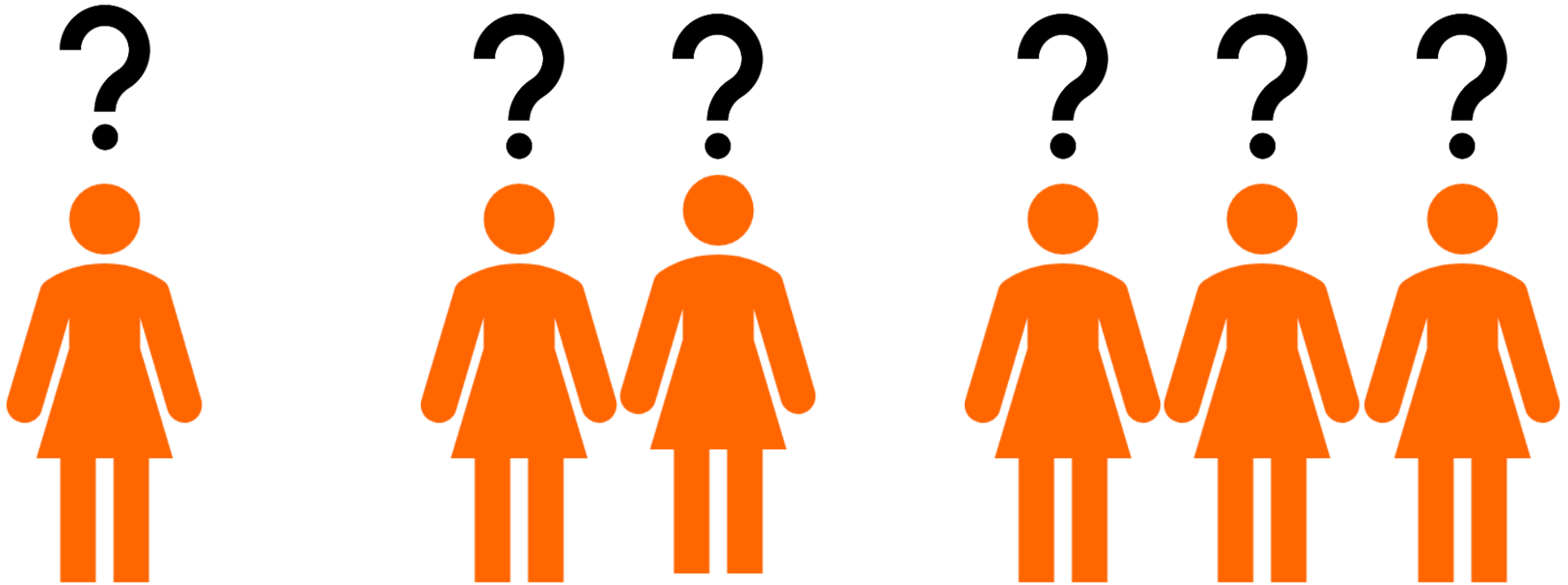
Initial Evaluation



Students were able to refine others' questions to higher level



Future Study



We planned to have experiment with three type of refinement activities.



Conclusion

- Our initial study revealed that we got the prospect that students can increase the quality of their questions based on questioning-rubric level.
- Our future plan is to conduct more experiments to investigate more on how the students' questions evolve through the refinement process

