
The Learning Communities Scientific Calculator (LCSC) 45 Webinar on Problem-Solving in Mathematics

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Article History:

Received: Jan 14, 2021(SM)

Revised: Jan 22, 2021(SM)

Feb 4, 2021(SM)

Accepted: Feb 8, 2021(SM)

Keywords: LCSC 45,
Problem-Solving, Mathematics

Abstract: *The LCSC 45 webinar was a joint community service activity between Casio Education Indonesia and Sampoerna University. This activity was held in the form of online sharing session for mathematics teachers, with the topic Problem-Solving in Mathematics. The LCSC 45 webinar aimed to share ideas and build awareness of the importance of Problem-Solving in Mathematics. Most participants were very satisfied with the speaker's facilitation and sure that they understood mathematical problem-solving. The webinar activities were rated as attractive because of its rich contents, challenging problem-solving questions, the use of Padlet and sharing links via barcode. However, some obstacles were still encountered, such as unstable internet connections and limited webinar time duration. For future improvement, it was suggested to fully assist teachers in designing and implementing problem-solving in a mathematics lesson.*

Introduction

Learning Communities Scientific Calculator (LCSC) is teacher communities invented by Casio Education support Indonesia's education with the most advanced technology, scientific calculator for Indonesian students. These communities enable participants to share ideas and learn from each other, thereby improving their ability to achieve rapid yet significant progress. LCSC conduct free online webinars to facilitate sharing session and discussion among mathematics teachers and Casio learning communities. The webinar is hosted by Casio Education Indonesia and held regularly once in a week every Tuesday at evening time.

As part of further collaboration between Casio Education Indonesia with Sampoerna University, the 45-LCSC webinar session asked one lecturer at Mathematics Education Study Program of Sampoerna University to become a speaker to share about Problem-Solving in Mathematics. As part of further collaboration between Casio Education Indonesia with Sampoerna University, the 45-LCSC webinar session asked one lecturer at Mathematics Education Study Program of Sampoerna University to become a speaker to share about Problem-Solving in Mathematics. The 45-LCSC webinar session's main objective was to promote participants by several critical ideas on mathematical problem-solving, which is in the heart of mathematics teaching and learning. By the end of the session, participants are expected to be inspired to incorporate problem-solving in their mathematics lesson.

Method

LCSC Casio webinar is a weekly online seminar dedicated to all mathematics teachers throughout Indonesia which conducted using the Webex online meeting platform. LCSC is hosted by Casio Education Indonesia and held every Tuesday at 19.15 – 21.00. The activities covered in LCSC Casio webinar are opening by the moderator, the speaker's presentation, question and answer session, quiz, and closing. By the end of the LCSC webinar, participants will receive e-certificate issued by Casio Education Indonesia, and the recorded session is to publish to LCSC Casio youtube channel (<https://www.youtube.com/channel/UCRsP1T3xhGecbbAr9EFIqWQ>). The number of targeted participants is at least 40 teachers or other people in education sectors.

The 45 LCSC webinars brought up the topic Problem-Solving in Mathematics. The speaker shared several important key ideas on mathematical problem-solving. The key ideas were sequentially presented as seen on the following flow chart:

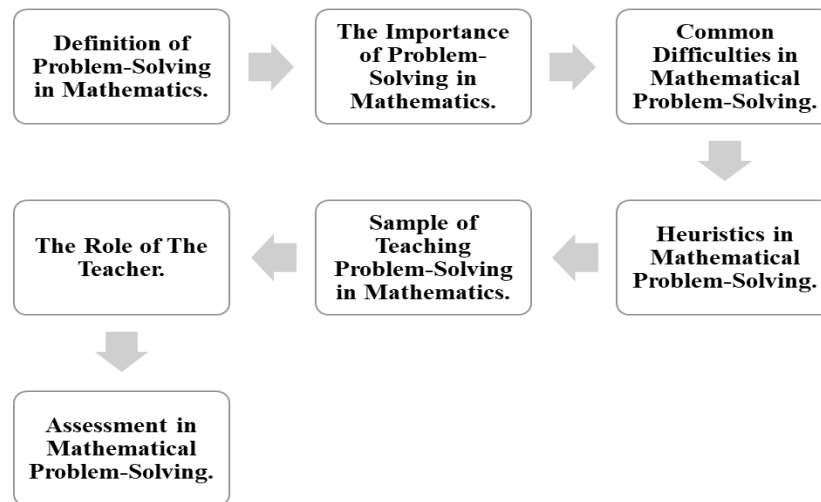


Figure 1. Key Ideas on Mathematical Problem-Solving
(Source: https://drive.google.com/file/d/1xwcl2kcVd-NM71e_SNIA94McaNiXtr0D/view)

The speaker used Padlet pages (padlet.com) to build interactions during the webinar. Padlet pages were utilized to collect participants' responses and display them interestingly, which used to provoke further discussions. To ensure participants' attention, the speaker provides two questions for quiz activity. Participants who can answer the quiz questions correctly with the fastest time will receive merchandise provided by Casio Education Indonesia. The following diagram show the sequence of all activities delivered during the 45 LCSC webinar:

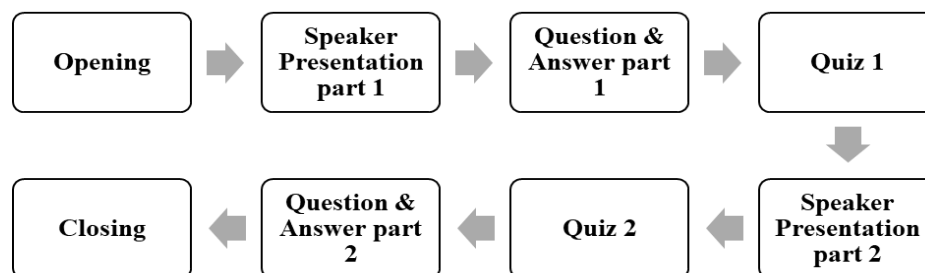


Figure 2. The Sequence of All Activities During the 45 LCSC Webinar
(Source: <https://www.youtube.com/watch?v=3WRPoY8qz8Y>)

Result

The number of participants in the LCSC 45 webinar was 45 persons. Most of the participants (80%) were mathematics teachers at Senior High School level. The rests were teaching mathematics at Junior High School, Elementary Schools, and university. Most of the participants were considered as senior teachers who have worked for more than ten years. The demographics of the participants are shown in Figure 3 and Figure 4. Some of the participants were participated in “Get to know each other” activity by introducing themselves in the following Padlet page <https://padlet.com/desyartis/8f7aw18fxew0lml>.

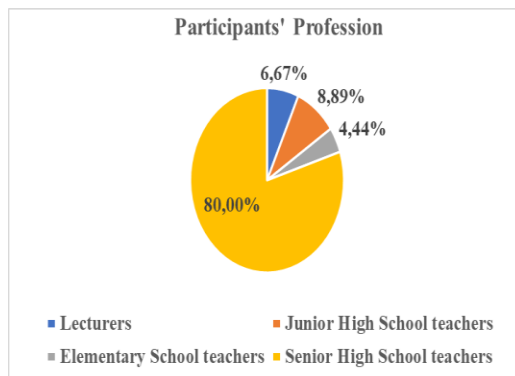


Figure 3. Participants' Profession
(Source: tinyurl.com/jxzapjep)

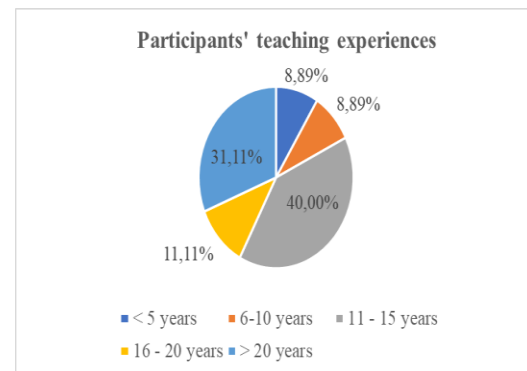


Figure 4. Participants' teaching experiences
(Source: tinyurl.com/jxzapjep)

All targeted activities were successfully delivered. The speaker has explained important critical ideas related to Problem-Solving in Mathematics, i.e., Definition of Problem-Solving in Mathematics, The Importance of Problem-Solving in Mathematics, Common Difficulties in Mathematical Problem-Solving, Heuristics in Mathematical Problem-Solving, Sample of Teaching Problem-Solving in Mathematics, The Role of The Teacher in Mathematical Problem-Solving, and Assessment in Mathematical Problem-Solving. The LCSC 45 webinar was recorded and can still be accessed through LCSC Casio Youtube channel in the following link <https://www.youtube.com/watch?v=3WRPoY8qz8Y>, which represented in Figure 5.

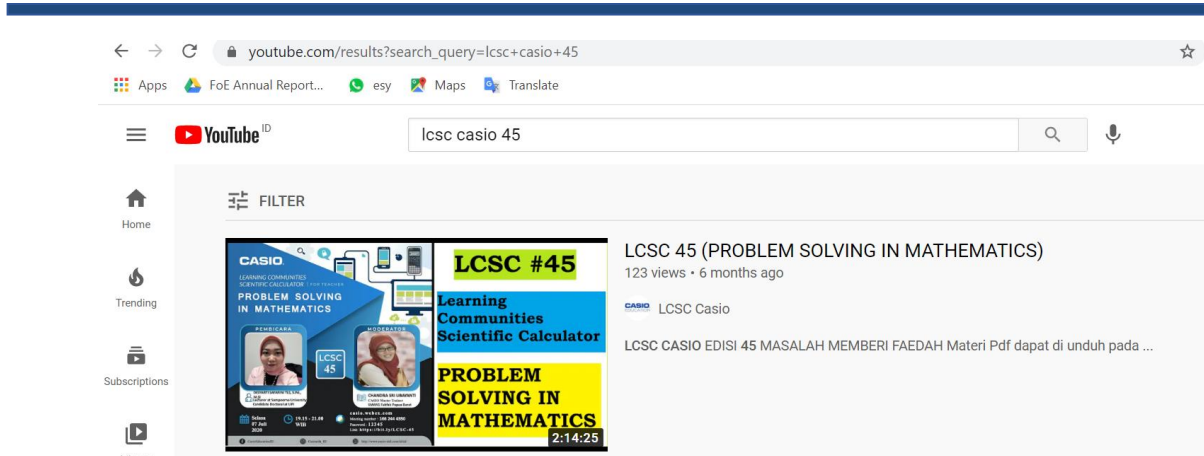


Figure 5. The Display of The Recorded LCSC 45 Webinar Session in Youtube
(Source: <https://www.youtube.com/watch?v=3WRPoY8qz8Y>)

There were two quiz activities given to the participants which utilized Padlet pages to collect all participants' responses. Some participants actively engaged in giving their answers which can be seen in Figure 6 and Figure 7. There were only a few participants got correct solutions for the quiz questions with various problem-solving strategies. Although most of the participants said that the given questions were challenging and the use of Padlet interest them a lot, in contrast, only a few of them got correct solutions in quiz activity. It might happen because most participants were not familiar with problem-solving questions requiring higher-order thinking skills. Besides that, according to the evaluation questionnaire, it was found that 35.55% of participants have problems with internet connections. Thus, it was not easy for all participants to open the Padlet pages and participated in quiz activity.

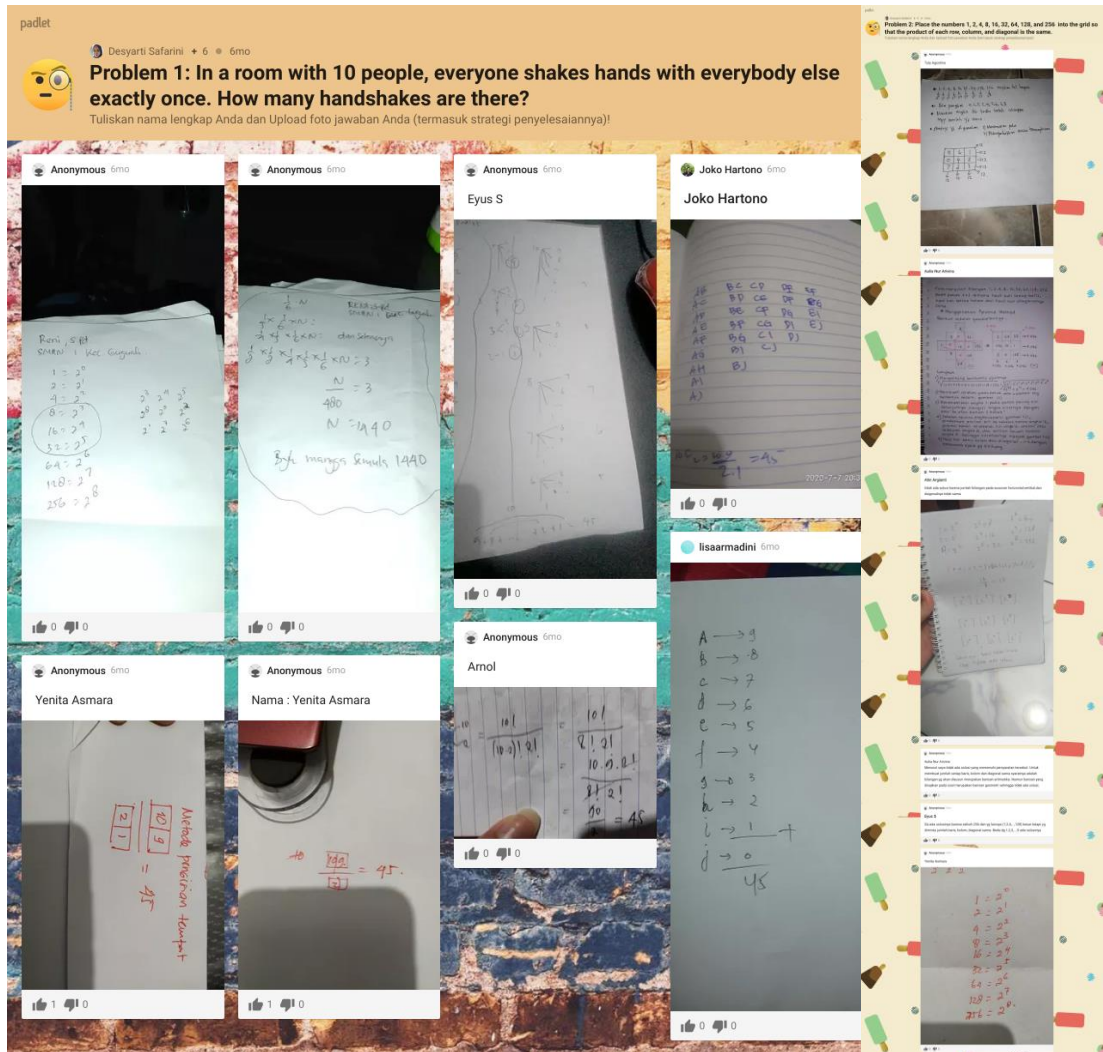


Figure 6.

Padlet page for Quiz 1

(Source: <https://padlet.com/desyartis/de4cmpzlk8ka>)

Figure 7.

Padlet page for Quiz 2

(Source: [https://padlet.com/desyartis/20a4\)\)got4ue7v2hpy](https://padlet.com/desyartis/20a4))got4ue7v2hpy))

According to the questionnaire results, 60% of participants sure that they have a high understanding of mathematical problem-solving (see Figure 8). Some participants also mentioned that the presented topics provide clear information about the importance of problem-solving in teaching and learning mathematics and effectively implementing them in a mathematics lesson. Moreover, 62.22% of participants felt very satisfied with the speaker's facilitation. Similarly, 37.78% of the participants also agreed that they felt satisfied with the

speaker’s facilitation. Some of them mentioned that the speaker was able to explain the material very well. Various activities were presented attractively, primarily through Padlet pages, barcodes for sharing links, and challenging quiz questions. Samples of participants’ feedbacks can be seen in Figure 9.

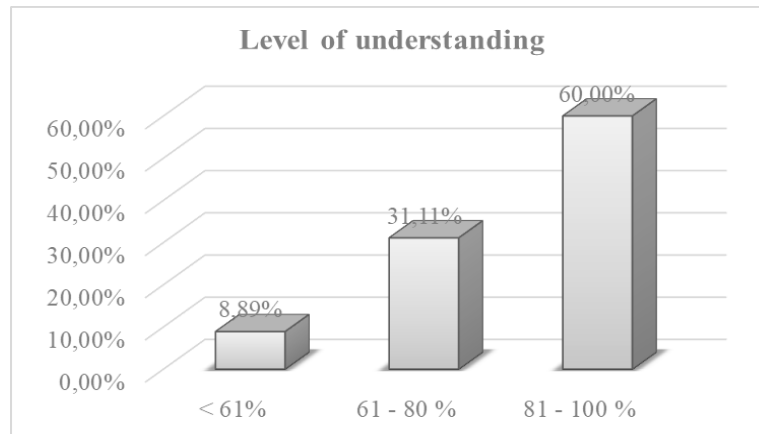


Figure 8. Participants’ Level of Understanding
(Source: tinyurl.com/jxzapjep)

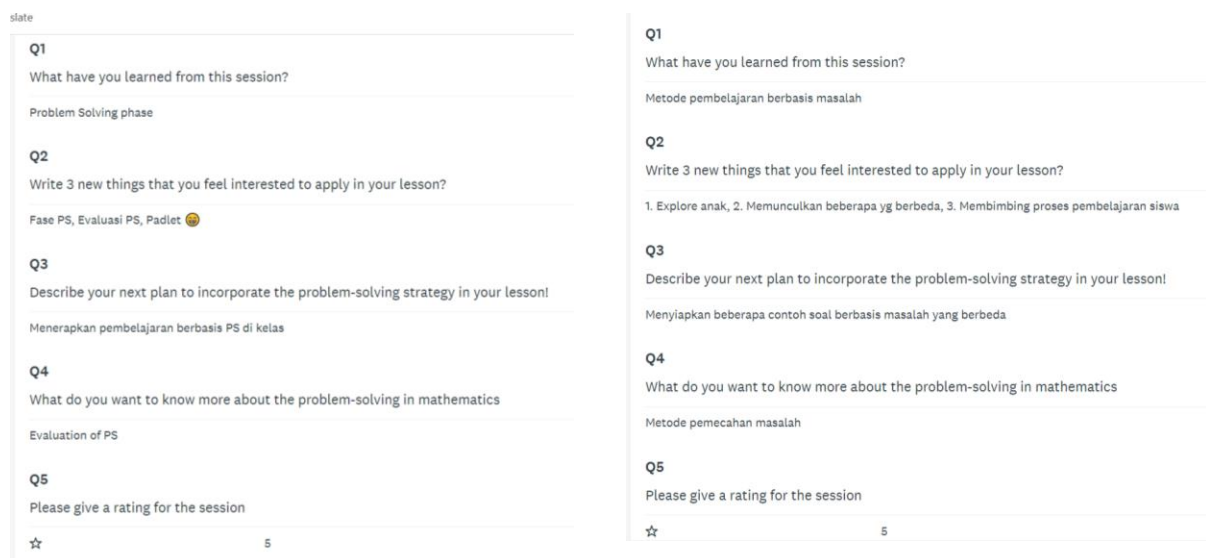


Figure 9. Samples of Participants’ Feedbacks
(Source: <https://bit.ly/2Z3MVeH>)

For future improvement of LCSC webinars, the participants suggested conducting the webinar in the earlier time. Since the presented topic was rich in contents, it will be better to add the webinar duration. There is also a suggestion for Casio Education Indonesia to held teachers training to give teachers intensive guidance in designing and implementing problem-

solving in the mathematics classroom. Casio Education may also consider using other platforms that provide more simple registration process and use more efficient internet quota. Samples of participants' feedbacks for future improvement of LCSC webinar events, is presented in Table 1.

Tabel. 1 Samples of Participants' Feedbacks for Future Improvement of LCSC Webinar Events

LCSC Series	LCSC Topic	What is your suggestion for a better LCSC event in the future?
45	PROBLEM SOLVING IN MATHEMATICS	Everything about the event is good.
45	PROBLEM SOLVING IN MATHEMATICS	Please add the duration of the event.
45	PROBLEM SOLVING IN MATHEMATICS	Hold a more frequent event.
45	PROBLEM SOLVING IN MATHEMATICS	Better held the event in the afternoon time
45	PROBLEM SOLVING IN MATHEMATICS	The registration process quite difficult; thus, please make it simple in the future.
45	PROBLEM SOLVING IN MATHEMATICS	To hold the event to discuss other issues in the teaching-learning of mathematics.
45	PROBLEM SOLVING IN MATHEMATICS	Hold offline training.
45	PROBLEM SOLVING IN MATHEMATICS	Everything about the event is good.

(Source: tinyurl.com/jxzapjep)

Discussion

The LCSC 45 webinar was run well and met the minimum number of participants. They are 45 mathematics educators with the majority considered as senior mathematics teachers at middle schools level. Most of them are Casio Education Indonesia communities who have strong concerns related to teaching and learning of mathematics.

Based on the observations during the LCSC 45 webinar session, it appears that the majority of participants have enthusiasm. Participants engaged in "get to know each other" activity, answering quiz questions, and "question and answer" session. Several participants agreed that the speakers provided new and useful information for them to apply problem-solving strategies into their lesson. It was suggested that mathematics teachers should provide students with more problem-solving tasks to develop students' thinking skills and prepare

them to be a problem solver. NCTM (2000) boldly states that problem-solving should be an integral part of all mathematics learning, not an isolated part of the mathematics program. Thus, problem-solving become one of the most important aspects of mathematics across all phases of education.

Furthermore, the speaker was able to explain the fundamental concepts of mathematical problem-solving clearly. The majority of participants rated their understanding as relatively high (above 81%) regarding mathematical problem-solving. The webinar activity was rated attractive because of its rich contents, challenging problem-solving questions, the use of Padlet and sharing links via barcode. However, not all participants answered the quiz questions on the Padlet pages, and only a few participants answered the quiz questions correctly. Success in problem-solving depends upon the metacognitive process, as described by Garofalo and Lester (1985). According to Charles and Lester (1984), generally, three factors influence an individual's problem-solving process. They are experience factors, both environmental and personal, such as age, content knowledge, familiarity with solution strategies, familiarity with problem context and content; affective factors, such as interest, motivation, pressure, anxiety, tolerance for ambiguity, perseverance, etc.; cognitive factors, such as reading ability, spatial ability, analytical ability, logical ability, computational skill, memory, etc.

Another factor that could be an obstacle for participants to submit their responses to the Padlet pages is the unstable internet connection. Several participants stated that they experienced internet network problems when participating in the webinar. The duration of the webinar activity, which is limited to only two hours, may also be another factor that makes participants complete the quiz questions. Several participants submitted input so that the activity's duration was added because the content presented in the webinar was quite extensive and in-depth. Moreover, there are quiz questions that are quite challenging and require additional time to solve. Participants also suggested to Casio Education Indonesia to hold training on problem-solving in mathematics in the future. Thus they can receive more intensive guidance in developing mathematics learning designs that integrate problem-solving.

Conclusion

The LCSC 45 webinar on Problem-Solving in Mathematics was run well, whereas all the essentials concepts have been delivered and well understood by most participants. The webinar activities with rich contents, challenging questions, Padlet, video, and sharing links with barcodes are considered attractive for many participants. Some obstacles were still encountered, such as unstable internet connections and limited duration of webinar time. Based on the participants' input, there is an opportunity to collaborate with Casio Education

Indonesia to conduct training activities for teachers related to Problem-Solving in Mathematics. It is expected that through this training, community service activities can fully support the development of teacher professionalism, especially in implementing problem-solving in mathematics.

Acknowledgements

The author would like to thank Casio Education Indonesia for the given opportunities in becoming the speaker in LCSC 45 webinar. Special gratitude also dedicated to the Dean of the Faculty of Education and Head of Mathematics Education Study Program at Sampoerna University for all the supports and encouragement given to the author in preparing and facilitating the 45 LCSC webinar. Last but not least, the author would like to thank Mrs Pientha Glenys Amanti, S.Pd, MM., for her great supports during the whole process of webinar up until the finalization of this journal.

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