

# Chatting facility development on computer aided instruction (CAI)

*by* Dr. Dr. Arlina Dewi, M.kes., Aak.

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# Chatting Facility Development on Computer Aided Instruction (CAI)

**Arlina Dewi**

Master of Hospital Management,  
Postgraduate Studies Universitas  
Muhammadiyah Yogyakarta,  
Indonesia  
Jl. Brawijaya, Tamantirto Bantul  
Yogyakarta Indonesia 55183  
+62 274 387656 Ext. 320  
arlinadewi@umy.ac.id

**Muhammad Wahyu Ramadhan**

Information Technology Department,  
Universitas Muhammadiyah  
Yogyakarta, Indonesia  
Jl. Brawijaya, Tamantirto Bantul  
Yogyakarta Indonesia 55183  
+628 1390428757  
realwahyoe97@gmail.com

**Dwijoko Purbohadi**

Information Technology Department,  
Universitas Muhammadiyah  
Yogyakarta, Indonesia  
Jl. Brawijaya, Tamantirto Bantul  
Yogyakarta Indonesia 55183  
+62 274 387656 Ext. 274  
dwijoko.purbohadi@umy.ac.id

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## ABSTRACT

This paper discusses chatting facility development on Computer Aided Instruction (CAI). Universitas Muhammadiyah Yogyakarta has been using CAI since 2017 to equip the LMS, so the students are more comfortable to access e-learning facilities. CAI help students to develop self-learning attitudes. Lecturers directed their role as teacher to observe and assist students in learning so the students can have the learning activities anytime and anywhere. Students can do this activity without connection to the internet. It is common for students to be listeners since elementary school. The application of e-learning such LMS or CAI in Indonesia still requires the role of lecturers. A lecturer needed to observe and assist students while they study outside, so the CAI module needs to add chatting facility. This facility provides communication between lecturer and student. Students can use this chatting facility when they open the CAI module. A lecturer can observe student learning activity by using CAI module. Students can ask questions to a lecturer by using this chatting facility. Chatting facility is easy to develop and effective by using the Moodle server. This facility uses to keep communication between lecturer and students while students study outside.

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## CCS Concepts

• Applied Computing → Education → Computer-assisted instruction

## Keywords

CAI; LMS; chatting facility.

## 1. INTRODUCTION

The CAI is a learning tool that helps lecturer to achieve teaching objectives to students [1]. Computer Aided Instruction (CAI) used to improve the quality of learning. Computers replace teaching and learning activities by using CAI module as a lecturer substitute. CAI has a facility to observe student learning activities. CAI is different from other applications. CAI claimed to increase interest

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and student motivation in learning exercises [2]. CAI provides an interactive environment for learning activities by influencing student development [3]. Students can use the material on CAI as long as they need. CAI as a modern form of learning has increased various facilities to support learning activities [4]. The advantage of using CAI in learning activities is providing multiple types of learning medium facilities ranging from pictures, sounds, to videos that can display in a single module. This facility makes student understands the material easier at various levels ranging from elementary school to university using CAI as a learning medium. Even the kindergarten level already use CAI [5].

The commonly used method Student-Centered Learning (SCL) to improve the quality of learning principle in Indonesia. The SCL concept becomes one of the most appropriate ideas for learning strategy [6]. This concept requires students to be able to learn independently. Lecturers serve as mentors and supervisors when students learn rather than as teachers [7]. Implementing e-Learning in a learning environment is the example of the right way to build the SCL concept. Students will have a sense of responsibility for learning activities independently [8]. Not only helping the student to develop independently, but this concept also improve student in an academically field [9].

One of the constraints to implementing CAI in Indonesia is the passiveness of the students. The way of managing the assignment and supervise student learning activities affect the change from the TCL concept to SCL concept [10]. Students tend to listen and take notes delivered by lecturers in the class. The face-to-face model is the most common method of learning. Therefore, even though the activities are face-to-face, the lecturer is more active than the student. The commonly used way for teaching is a face-to-face model so changing it might need time. Traditions and habits also vary in each generation so, it takes time and a systematic change to transition from TCL concept to SCL concept [11]. The SCL concept designed to encourage students to play an active role in learning activities by changing those habits [12].

CAI lacks a facility for communication. The reason is that the CAI module is still limited to self-learning media for students only. Thus, there is no supervision from lecturer to see the progress of the student. Therefore, it is essential to add the chatting facility to CAI.

This paper will discuss chatting facility development on CAI to maintain communication between students and lecturers. Students become more active in discussion with lecturers by using the chatting facility rather than nothing. Lecturers can monitor the student's learning activities directly. The role of lecturers to supervise the students still running anytime and anywhere. A

student can ask directly through this chatting facility if there is something they do not understand.

The result of this research is to minimize the failure rate of e-learning implementation in Indonesia.

## 2. DESIGN MODEL

A server must exist to develop the chatting facility. The design of this chatting facility utilizes the existing server in Indonesia. In Indonesia, most schools have a Learning Management System (LMS) facility. LMS is a teaching software for improving student learning [13]. This facility allows a student to learn anywhere as long as there is an internet connection [14]. LMS helps lecturer to create and manage materials also monitor student activities [15]. The growth rate of LMS sites in Indonesia is quite rapid. There is a lot of company or institution that build LMS in Indonesia. LMS has an essential rule in the use of web-based e-learning.

The design of the chatting facility on CAI use some of the considerations described as follows.

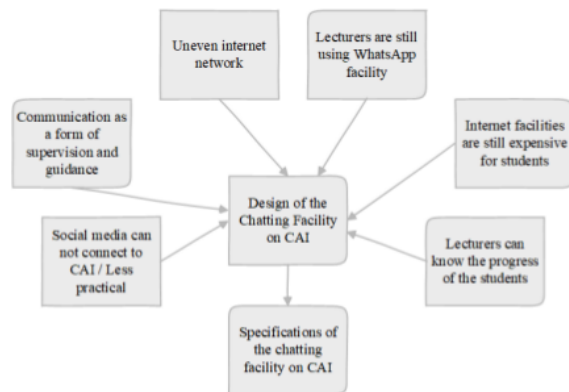


Figure 1. Design Model.

Figure 1 above explains the design model with some considerations to produce the specification of the chatting facility on CAI. The concept of this design is to determine the suitability of the chatting facility. This design itself will be useful on CAI module so, it will generate the appropriate concept for CAI. In the picture above there are five considerations as an excuse to create chatting facility design.

The first point is that communication as a form of supervision and guidance. This point explains that with the presence of the chatting facility on CAI, lecturers can supervise and guide students. This condition resulted in communication between lecturer and student in any situation. Lecturers can monitor the activities and progress of students through the CAI module. Specification of the chatting facility on CAI is the lecturers do not have to answer student questions immediately.

The second point is the uneven internet network. Internet facilities in Indonesia have not been able to reach most of the countryside. Whereas to run an online learning system requires a robust internet facility. By using this CAI module, learning activity still goes on without an internet connection.

The third point is that lecturers are still using WhatsApp facility. Lecturer and student usually get in touch using social media or short message service. However, this communication method has not integrated well with the CAI module. This point relates to the fourth point which contains social media cannot connect to CAI / less practical. The student will ask the lecturer through social media

when the chatting facility is not available on the CAI module. The lecturer should open the CAI module and find out which part is at issue. Communication between lecturer and student can be more practical and efficient when chatting facility is available on the CAI module. Specifications of the chatting facility on CAI in this point is the message using the text format on the CAI module.

The fifth point is the internet facilities are still expensive for students. No internet connection should not be a restriction to student learning activities. This point relates to the second point. Students should keep in mind that internet facility is not only for social media but also for a learning activity. Limitations of internet facilities are not an excuse not to use CAI. Students can download the CAI Module as long as there is an internet connection. After the download is complete, students can run the module anytime and anywhere both online and offline.

The sixth point is that lecturers can know the student's progress. This point relates to the first and the third point. In chatting facility on lecturer side of CAI module, there will be activity progress and student score bars. Lecturers can supervise student activities without having to meet students directly. When the activity progress or student score has not reached the target, the lecturer will send a notification through a message to the student. Therefore, the use of the chatting facility on CAI module will be more practical and efficient than using social media.

From the conditions above, the researchers designed the concept of chatting facility on CAI as follows.

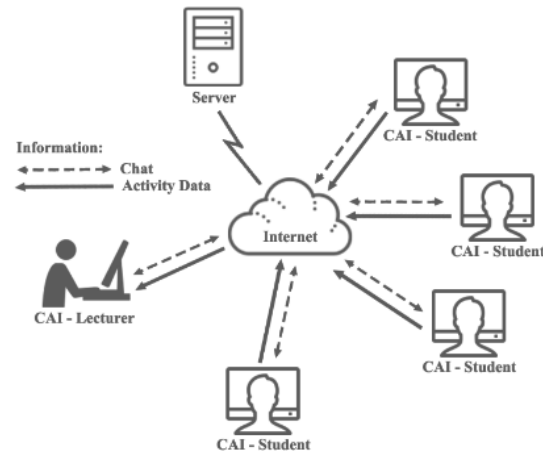


Figure 2. CAI Architecture.

Lecturers do not have to answer student's questions immediately. Messages use text format.

Students can run the CAI module anytime and anywhere both online and offline.

There are activity progress and student score bars to know students activity by using CAI module.

Based on this specification, the CAI design uses the architecture in Figure 2.

## 3. IMPLEMENTATION MODEL

Figure 2 shows the CAI architecture. The right design of CAI architecture with interactive features can achieve good results in learning activities [15]. Students download the CAI module for the learning module when students have access to the internet through



the server. After the students enroll, CAI can be used module either online or offline anytime and anywhere. Lecturers employ CAI module to monitor student activities without meeting. A lecturer can send a message to students if there are students who do not understand the discussion or topic in the CAI module.

In this research CAI module development using some software as follows:

- Moodle
- CourseLab
- HTML Executable

### 3.1 Moodle

Moodle is a software that runs a web-based online learning system. Moodle is a software Learning Management System (LMS) which is quite famous and widely used in the world [17]. Moodle is an open source software which can be the advantage for online learning. Thus, the software is more flexible and easy to develop. In case no experts can build this system, Moodle cannot run.

Many levels ranging from schools to universities use Moodle as a supporter of learning activities [18]. Moodle provides virtual learning with lecturers able to upload material and tasks and to make this easy to use [19]. Students can choose materials that lecturer upload. Moodle records student activity when students access material. Moodle involves students in activities independently [20]. It has facilities including forums for discussion, quizzes, submit tasks, downloading, and archives.

Moodle provides chatting facility. However, the chatting facility is quite massive in Moodle. If students use the chatting facility, this will cause other facilities running. A bad connection can also affect the use of chatting facility.

The user needs a CAI module that connects between lecturer and student to optimize its use. Therefore, the user that use the chatting facility on CAI module become more practical, because CAI module uses peer to peer communication. Minimal communication can run because the chatting facility is a text exchange merely. Another comparison between the use of chatting facility in Moodle and CAI module is in Moodle, student and lecturer need to log in to the server, whereas in CAI module student and lecturer do not need to login to the server. This chatting facility is individual. It means that the chatting facility focused on a particular theme.

### 3.2 CourseLab

CourseLab is a software that can change the face-to-face model in the class. This software serves to design the learning module. CourseLab generates interactive facilities and plentiful in various e-learning-based media making it easy to use by anyone. Users need results publication of HTML form to the .exe file to run CourseLab. It is easy to use and secure.

CourseLab is similar to PowerPoint when the application runs. Also, a slide on the CourseLab has frames that mean one slide can contain more than one frame. Therefore, students can move from one frame to another freely. These sequential and random models are suitable for independent learning model.

A slide indicates objects, i.e. buttons, images, videos, and documents. To insert these objects using Object Library include Form, List, Media, Navigation, Question, and more, so that CAI module can run adequately and requires the objects in the process. CAI module requires JavaScript functions to interconnect objects. This is the advantages of CourseLab compared to other software. JavaScript function needs to establish an appropriate structural

design and execute automated work system. Each object in the Object Library requires JavaScript functions.

### 3.3 HTML Executable

HTML Executable is a software to convert a web into an executable file. Executable HTML turns the results from creating a CAI module to an executable file form. The CAI module form in the directory comes from a collection of files in the folder before HTML Executable converts the CAI module. HTML Executable converts all data from HTML, images, sound, video, JavaScript, and more merged into the .exe file. This software makes windows application running on a PC and Windows tablet. This conversion builds the module is easier to run. The advantage of this conversion is to change the script in it to be invisible, safe and easy to use.

The user needs to know the interface design in the use of the chatting facility. There is a text input to enter the message, a chat screen that displays the word, and a send button to send the messages. By using text for communication between lecturer and student, an activity stores text.

Modul Name	NIM	Status	Message
Hospital Management	20140140039	VALID	Dialog Text

Figure 3. Text Format on Chatting Facility.

Figure 3 describes the text format on the chatting facility. Chatting facility has a chat news content structure that user can see through Moodle. Chats news content has a separator using other characters. In the figure above, the Module Name format section to the Status has a spacer using the character ",e.g. "Hospital Management, 20140140039, VALID". In the text format, the Message uses the character as a separator as well. Lecturer and student send messages to each other so that both use different characters. To distinguish messages between lecturer and student by using special characters. There are some characters like "@D\$\$" which indicate that the character is a lecturer. If the lecturer has filled the message field, the character separator used the "\$\$\$" character. The character indicates the delimiter between the previous message. A student used the "@M\$\$" character with the message column separator used the "\$\$\$" character.

## 4. RESULT AND DISCUSSION

Figure 4 above is a picture of the relationship among the Moodle server, the CAI architecture, and the chatting facility on CAI. In the architecture section, the Request serves to capture text from CAI and send to LMS Moodle. The HTMLChat assignment module holds text messages on the Moodle server. The content of HTML chat is an online task as well as a place to hold conversations. The function of the Moodle server is to accommodate the text message content between lecturer and student. Lecturer and student obtained the advantages not have to open the web because the chatting facility can run through the CAI module.

CourseLab software creates a display of chatting facility. CAI module requires chatting facility for communication between lecturer and student. Communication occurs when students find material or problem that they do not understand. Lecturer and student can send messages through the chatting facility on CAI module. The user can use the chatting facility and free to get an internet connection.

There are numbers on the chatting facility in Figure 4 section above. Number 1 is the logo of the Muhammadiyah University of Yogyakarta. Number 2 consists of menus, i.e. Home, Course, Exercise, and Chatting. Pictures on the menu come from the external picture. Home is the initial appearance of the CAI module. The course contains learning materials. Document contains a list of learning documents in .pdf or .ppt. The video contains learning videos from lecturers. Chatting facility display contains Object Library and Autosshapes, i.e. Textbox, Line, IFRAME, Button, and Text Area. Number 3 is a Chat object, and number 6 is a Message object. These objects use the Textbox object library. Number 4 is a Line that uses Autosshapes Lines. Number 5 is a Chat screen using the IFRAME Object Library. Number 8 is a Send Object using the Button object library, and number 7 is an object for filling out text messages using the Text Area object library.

To use this chatting facility by typing text in Text Area and click Button Send. Text contents will appear in the IFRAME. JavaScript on IFRAME as follows:

```
var view = document.getElementById('Chatbox');
```

The script above explains that IFRAME displays the text with the "Chatbox" id. Text in IFRAME is HTML-shaped. This requires to modify comma punctuation because this punctuation marks is part of the JavaScript. Here is the code to replace punctuation:

```
buffer = text.replace('%$%',',');
```

In JavaScript, there must be a distinction between lecturer and student messages. "@D\$\$" character for lecturer messages and "@M\$\$" character for student messages. Adding <font color> to distinguish text messages between lecturer and student.

Script for lecturer:

```
buffer = newText2.replace("@D$$", "<font color='black'>");
```

Script for student:

```
buffer = newText4.replace("@M$$", "<font color='brown'>");
```

Data from the questionnaire collected 20 respondents consisting of 15 men and five women. From the survey, the average respondent used at least two kinds of social media. This questionnaire collects information about the ease and convenience of using the chatting facility on CAI module. By looking at its convenience, 50% of the respondents strongly agree if the installation is easy to use, 40% agree, and 10% neutral. A total of 50% of the respondents strongly agree if installation is easy to understand, 35% agree, and 15% neutral. A total 45% of the respondents agree if the facility is sufficient, 25% strongly agree, 25% neutral, and the rest disagree.

By looking at the comfort side, 50% of respondents strongly agree if the letters are easy to read, 35% agree, and 15% neutral. A total of 45% of respondents strongly agree if the information is easy to find, 30% agree, 20% neutral, and the rest do not agree. A total of 30% of respondents strongly agree if the composition of colors, letters, backgrounds, and buttons are correct, 30% neutral, 25% agree, and 15% disagree. A total of 35% of respondents agree if there is a minimal error in the application, 35% neutral, 15% strongly agree, and the rest disagree. A total of 55% of respondents strongly agree if the information from chatting opponents is easily differentiated, 35% agree, 10% neutral, and the rest disagree.

The result of the questionnaire above that from the ease, respondents, strongly agree if the installation is easy to use, strongly agree if the installation is easy to understand, and agree if the facility is sufficient. From the convenience, respondents strongly agree if the letters are easy to read, strongly agree if the information is easy to find, agree if the compositions in the application are correct, agree if the application has minimal errors,

and strongly agree if the information from chatting opponents is easily differentiated.

## 5. CONCLUSION

Need communication between lecturer and student while learning by using the chatting facility on CAI module. A lecturer can see the activity progress and student score bars in chatting facility. The availability of this facility, its use will be more practical and efficient than using social media. Lecturers can supervise and assist student learning activities. When the activity progress or student score bar is still low, the lecturer can send the message to the student. Students can ask questions or materials that they are not understood through the chatting facility on CAI module when they have learning activities. Therefore, the use of the chatting facility on CAI focuses only on learning.

## 6. ACKNOWLEDGMENTS

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## 7. REFERENCES

- [1] Minyi, K., Huazhong, J., and Shangling, F. 2010. Discussion of Models and Developing Technique of Multimedia Computer Aided Instruction. In *2010 Second International Workshop on Education Technology and Computer Science* (Wuhan, China, March 06 - 07, 2010), 705-707. DOI=[15://doi.org/10.1109/ETCS.2010.377](https://doi.org/10.1109/ETCS.2010.377).
- [2] Yaghoobi, M., and Razmjoo, S. A. 2016. The potentiality of computer-assisted instruction towards ameliorating Iranian EFL learners' reading level. *Computers in Human Behavior*. 59 (Jun. 2016), 108-114. DOI=[12://doi.org/10.1016/j.chb.2016.01.033](https://doi.org/10.1016/j.chb.2016.01.033).
- [3] Aqda, M. F., Hamidi, F., and Rahimi, M. 2011. The comparative effect of computer-aided instruction and traditional teaching on student's creativity in math classes. *Procedia Computer Science*. 3 (Dec. 2011), 266-270. DOI=[6://doi.org/10.1016/j.procs.2010.12.045](https://doi.org/10.1016/j.procs.2010.12.045).
- [4] Yu-bao, L., Xiao-jing, W., Qian-li, M., and Shao-tang, L. 2010. How to Improve the Quality and Effect of Computer Aided Instruction's Application in Classroom Teaching in Institutes of Higher Learning. In *2010 Second International Workshop on Education Technology and Computer Science* (Wuhan, China, March 06 - 07, 2010), 658-661. DOI=[13://doi.org/10.1109/ETCS.2010.325](https://doi.org/10.1109/ETCS.2010.325).
- [5] Eder, M.S., Rojas, P., Empasis, M.G., and Raboy, L.J.M. 2014. Computer Aided Instruction For Preschoolers In Mathematics. *Proceedings Journal of Education, Psychology and Social Science Research*. 1 (Nov. 2014), 37-44. DOI=[13://doi.org/10.21016/ICEPSS.14018](http://doi.org/10.21016/ICEPSS.14018).
- [6] Seppälä, J., and Yajima, K. 2017. Development of Student-Centred Language Learning Environment. In *2017 9th International Conference on Information Technology and Electrical Engineering* (Phuket, Thailand, October 12 - 13, 2017), 1-6. DOI=[6://doi.org/10.1109/ICITEE.2017.8250433](http://doi.org/10.1109/ICITEE.2017.8250433).
- [7] Judia, H. M., and Saharia, N. 2013. Student Centered Learning in Statistics: Analysis of Systematic Review. *Procedia -*

- Social and Behavioral Sciences*. 103 (Nov. 2013), 844-851. DOI= <http://doi.org/10.1016/j.sbspro.2013.10.406>.
- [8] Roman, I. 2014. Development of Agronomic Education by Student-Centred Learning. *Procedia - Social and Behavioral Sciences*. 180 (May. 2015), 441-447. DOI= <https://doi.org/10.1016/j.sbspro.2015.02.142>.
- [9] Tyabaeva, A. E., Sedelnikova, S. F., and Voytovicha, A. V. 2015. Student-Centered Learning: The Experience of Teaching International Students in Russian Universities. *Procedia - Social and Behavioral Sciences*. 215 (Dec. 2015), 39. DOI= <https://doi.org/10.1016/j.sbspro.2015.11.578>.
- [10] Danko, C. C., Duarte, A. A. L. S. 2009. The Challenge of Implementing a Student-Centred Learning Approach in Large Engineering Classes. *WSEAS Transactions on Advances in Engineering Education*. 8, 6 (Aug. 2009), 225-233.
- [11] Cingi, C. C. 2013. Computer aided education. *Procedia - Social and Behavioral Sciences*. 103 (Nov. 2013), 220-229. DOI= <https://doi.org/10.1016/j.sbspro.2013.10.329>.
- [12] Unina, N., and Bearing, P. 2015. Brainstorming as a Way to Approach Student-Centered Learning in the ESL Classroom. *Procedia - Social and Behavioral Sciences*. 224 (Jun. 2016), 605-612. DOI= <https://doi.org/10.1016/j.sbspro.2016.05.450>.
- [13] Hariri, M. M. 2013. Effective Use of LMS (Learning Management System) in Teaching Graduate Geology Course at KFUPM, Saudi Arabia. In *2013 Fourth International Conference on e-Learning "Best Practices in Management, Design and Development of e-Courses: Standards of Excellence and Creativity"* (Manama, Bahrain, May 07 - 09, 2013), 343-347. DOI = <http://doi.org/10.1109/ECONF.2013.27>.
- [14] Cavus, N., and Alhih, M. S. 2014. Learning management systems use in science education. *Procedia - Social and Behaviour Sciences*. 143 (Aug. 2014), 517-520. DOI= <https://doi.org/10.1016/j.sbspro.2014.07.429>.
- [15] Cheng, M., and Yuen, A. H. K. 2018. Student continuance of learning management system use: A longitudinal exploration. *Computers & Education*. 120 (May. 2018), 241-253. DOI= <http://doi.org/10.1016/j.compedu.2018.02.004>.
- [17] Cai, H., Wang, Y., and Yusheng, L. 2012. Research and Development based on Interactive Computer Aided Instruction Software. *IERI Procedia*. 2 (2012), 420-424. DOI= <https://doi.org/10.1016/j.ieri.2012.06.110>.
- [18] Tsai, C. T., Lin, H. T., Hung, M. H., Lin, C. F., and Yuan, S. M. 2010. Exchanging Course Content Mechanism for Moodle LMS. In *2010 International Conference on Cyber-Enabled Distributed Computing and Knowledge Discovery* (Huangshan, China, October 10 - 12, 2010), 464-467. DOI= <https://doi.org/10.1109/CyberC.2010.91>.
- [19] Caputi, V., and Garrido A. 2015. Student-oriented planning of e-learning contents for Moodle, *Journal of Network and Computer Applications*. 53 (Apr. 2015), 115-127. DOI= <http://dx.doi.org/10.1016/j.jnca.2015.04.001>.
- [20] Rodriguez, T. E., and Lozano, P. M. 2012. The acceptance of Moodle technology by business administration students. *Computers & Education*. 58, 4 (May. 2012), 1085-1093. DOI= <https://doi.org/10.1016/j.compedu.2011.11.012>.
- [21] Amandu, G. M., Muliira, J. K., and Fronda, D. C. 2013. Using moodle e-learning platform to foster student self-directed learning: Experiences with utilization of the software in undergraduate nursing courses in a Middle Eastern university. *Procedia - Social and Behavioral Sciences*. 93 (Nov. 2013), 677-683. DOI= <http://doi.org/10.1016/j.sbspro.2013.09.260>



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