

## **Listening to the student voice on emergency remote teaching during the pandemic crisis**

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**Abstract.** There is a need to evaluate emergency remote teaching (ERT) effort during COVID-19 pandemic to design and plan more effective online distance learning. Students' voices are valuable input in evaluating ERT practice since the students are the ones most directly affected. This study aims to describe the students' voice regarding their experiences and expectations while being enrolled in ERT-based courses in a time of COVID-19 pandemic. This study used mixed methods with survey approach in describing the students' voice. Quantitative data analysis shows that the Community of Inquiry (CoI) elements, technology use, internet quality, and student perceived satisfaction are related to each other. As from the qualitative data analysis, seven main themes are obtained from students' responses, namely instructor's orchestration, assignments and internet constraints, learning process, the flexibility of emergency remote teaching, interaction among course participants, experiences in synchronous learning, as well as self- and co-regulation. The results in this study are expected to provide insightful input for the online instructor, learning designer, and policymaker in designing and planning more effective online distance learning programs.

### **1. Introduction**

The COVID-19 pandemic has disrupted the educational practice on a global scale. Many education institutions pivot their educational programs to online distance learning in a short time with minimal preparations. Therefore, many academics [1], [2] called the learning programs produced in this fashion as an emergency remote teaching (ERT). However, a closer look through educational binocular reveals new problems and challenges emerging from this movement [3]. There is a need to evaluate the ERT effort to become more effective online distance learning.

Multiple variables should be considered in evaluating the ERT programs. First, effective online distance learning from various literature should be examined. Revised Community of Inquiry (CoI) framework [4], [5] is one of the most widely used in the research of online distance learning [6]. This framework contends that higher-order learning results from a collaborative process between students and instructor in an online environment. Based on this framework, teaching presence (i.e. instructional management, building understanding, and direct instruction), social presence (i.e. emotional expression, open communication, and group cohesion), cognitive presence (i.e. triggering event, exploration, integration, and resolution), and learning presence (strategic student) are significant elements in building successful learning environment. Second, in an online distance learning environment, technology use and internet quality have an important role in providing effective learning [7]. Lastly, the student

perceived satisfaction as necessary to examine since it is one of the most important factors in evaluating the online learning programs [8].

Students' voices on ERT practices are valuable and insightful input for assessing the learning program they experienced. The perspective of the students directly impacted by ERT should be taken into account to provide constructive suggestions on teaching practice [9]. Furthermore, the process of designing and planning online distance learning should consider students' opinions [10]. Therefore, this study aims to describe student voice regarding their experiences and expectations while enrolled in ERT-based courses during COVID-19 pandemic.

## **2. Methods**

The present study employed mixed methods in answering the research question to take advantage of both quantitative and qualitative methods [11]. We used a survey approach to obtain an overall picture of the students' perceptions on their learning experience. A survey was designed and used to gather data on students' opinions of teaching presence, social presence, cognitive presence, learning presence, the use of technology, internet quality, and their perceived satisfaction.

### *2.1. participants*

Participants in the study were 283 undergraduate students from a mathematics education study program at a private university in Yogyakarta. Most participants were female (80.21%) whereas 19.79% were male. The participants spanned from the first year to final year students. The percentage of the first, second, third, and final year was 26.5%, 31.1%, 21.9%, and 20.5%, respectively. The mean of the participants' age was 20.61 (SD = 1.67). All students participating in the study were enrolled in the ERT-based courses in the study program.

### *2.2. data collection*

A student survey was used to collect data in the study. The survey items were developed based on the literature review and validated by peers experienced in online distance learning. Furthermore, the readability of the survey items and instructions was tested on the 12 target participants ranging from the first year to final year students in the study program. The validation and readability tests were used to revise both survey items and instructions.

The student survey consisted of five main sections, namely revised Community of Inquiry (CoI), technology use, internet quality, perceived student satisfaction, and open-ended questions. The revised CoI [5] consisted of four sub-scales: (a) teaching presence, (b) social presence, (c) cognitive presence, and (d) learning presence. These measured the student's opinions or expectations with regard to the ERT they experienced. The technology use measures performance expectancy, effort expectancy, attitude toward using technology, social influence, facilitating conditions, self-efficacy, anxiety, and behavioral intention to use the technologies provided in the ERT [12] as well as the student preference of the technology in presenting learning content and assessing their performance. The internet quality measures student satisfaction on internet speed, communication quality, and easy to go online on the internet [13]. Perceived student satisfaction measures student satisfaction in their overall learning experience in the ERT environment [14]. All previous items were seven-level Likert scale ranging from 1 as strongly disagree to 7 as strongly agree. The final section of the student survey consisted of two mandatory open-ended questions and one optional open-ended question. The two mandatory questions asked the participant's opinions and suggestions regarding their learning experiences. The optional question was provided to facilitate participants to give their additional comments.

### *2.3. data analysis*

The study used Statistical Package for the Social Sciences version 25 (SPSS 25) and Gephi version 0.9.2 to analyze quantitative data. First, the paired sample *t*-test was used to investigate the gap between the students' expectation toward teaching presence and their actual experience. Second, we applied descriptive statistics analysis and correlation-coefficient analysis on each factor investigated in this

study. Third, we used social network analysis (SNA) in Gephi to create visual representation of the correlation-coefficient analysis.

In analyzing participants' responses to the survey's open-ended questions, we applied a qualitative data analysis procedure [15] using Atlas.ti and Gephi. First, we conducted open coding on participants' responses in Atlas.ti and produced 103 codes. Second, we exported and transformed a co-occurrence analysis table from Atlas.ti into social networks so that the networks can be analyzed in Gephi. Modular class computed in Gephi was used to group all the open codes and generate major themes.

### 3. Result and Discussion

Responses from 23 participants of the study were omitted in data analysis since they identified not focus when completing the survey. One item from the survey asked the participant to choose "2" to show that they still focus on completing the survey. Therefore, there were 260 valid responses (91.9%) to undergo further analysis.

#### 3.1. student's experience in ERT

Table 1 shows the descriptive statistics of student perceptions toward ERT. Overall, the students think favorably on Col's elements and technology use in the ERT. Interestingly, they perceived that they have high learning presence (mean = 5.83 out of 7) and experienced high cognitive presence (mean = 5.38 out of 7). The students also appreciate the technologies used in the ERT (mean = 5.16 out of 7). However, they considered that the quality of the internet was average (mean = 4.32 out of 7) and have low satisfaction with the learning they experience (3.79 out of 7).

**Table 1. Descriptive statistics**

	<i>M</i>	<i>SE</i>	<i>SD</i>	95% CI
Teaching Presence	5.40	0.05	0.77	(5.31, 5.50)
Social Presence	5.10	0.05	0.88	(5.00, 5.21)
Cognitive Presence	5.38	0.05	0.82	(5.28, 5.48)
Learning Presence	5.83	0.04	0.71	(5.75, 5.92)
Technology Use	5.16	0.05	0.76	(5.07, 5.26)
Internet Quality	4.32	0.07	1.11	(4.18, 4.45)
Perceived Student Satisfaction	3.79	0.07	1.08	(3.66, 3.92)

#### 3.2. the gap between student's expectation and experience toward teaching presence

Table 2 shows the gap between the student's expectation in ERT and their actual experience. The elements of teaching presence with the widest gap are content explanation, feedback, and instruction regarding how to participate in the learning activities. The students also feel that the instructor should build a sense of community more effectively. Further, they perceived that the timeframe of assignments should be communicated clearly by their instructor.

**Table 2.** The student's expectation and experience gap on teaching presence

Teaching presence	<i>M</i>	<i>SD</i>	<i>t</i>	Cohen's <i>d</i>
Informing course goals	0.896	1.153	12.535	0.777
Informing how to participate	1.269	1.144	17.885	1.109
Informing the period or deadline of assignments	0.812	0.986	13.272	0.824
Keeping students to engage	0.985	1.249	12.713	0.789
Encouraging students to explore the learning content	0.888	1.135	12.620	0.782
Facilitating self-evaluation and reflection	0.704	1.283	8.847	0.549
Building sense of community	1.142	1.233	14.939	0.926
Providing clear illustrations in presenting learning content	1.565	1.297	19.457	1.207
Providing clarification and feedback	1.465	1.268	18.629	1.155

Teaching presence is an important element to build and maintain a community of inquiry that support higher-order learning. The responsibility of teaching presence is to design learning content and activities, manage collaboration, identify needs, as well as to provide timely instruction and direction [16]. In presenting learning content, the instructor needs to consider theories and principles so that students understand the content easier. For example, a cognitive theory of multimedia learning [17] can be considered to design learning media. The instructor should also provide clear instruction on how students should participate in the designed learning activities. Given the importance of feedback for students [18], the instructor should facilitate students in effective feedback practice [19] and promoting feedback literacy in the learning process [20]. Sense of community also has an important role in student's learning [21]. Therefore, in designing the learning activities, the instructor should also give an effort in building the sense of community, e.g. by facilitating social interaction among course participants [22].

### 3.3. result of correlation-coefficient analysis

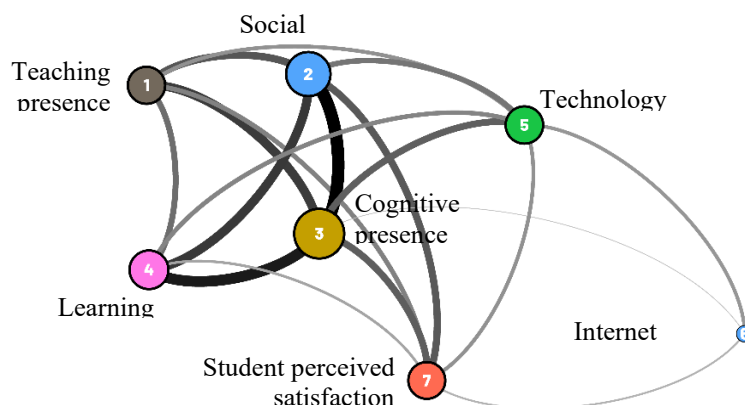
Table 3 shows Spearman's correlation coefficient among the factors investigated in the study. Unsurprisingly, almost all correlation coefficients among factors in the revised CoI were significantly high, ranging from 0.522 to 0.673. However, there are two correlation coefficients in the revised CoI that less than 0.5, i.e. the correlation between teaching presence and social presence, and the correlation between teaching presence and learning presence. The correlations that include technology use and student perceived satisfaction were adequate, ranging from 0.218 and 0.444. It appears that the internet quality does not quite associate with other factors, except for cognitive presence, technology use, and student perceived satisfaction. To provide an insightful picture of those correlations, Figure 1 shows the network graph describing the relations among key variables that were significant at the 0.01 level.

**Table 3.** Correlations

	1	2	3	4	5	6
1. Teaching presence	–					
2. Social presence	0.453**	–				
3. Cognitive presence	0.522**	0.673**	–			
4. Learning presence	0.393**	0.529**	0.606**	–		
5. Technology use	0.302**	0.372**	0.429**	0.335**	–	
6. Internet quality	0.091	0.106	0.172**	0.065	0.289**	–
7. Student perceived satisfaction	0.342**	0.444**	0.431**	0.253**	0.301**	0.218**

\*\*Correlation is significant at the 0.01 level (2-tailed)

It is apparent from Figure 1 that the cognitive presence is the center of the graph. In order to facilitate students to learn, the instructor should provide a learning environment that encourages social presence and learning presence. Further, it is evident that the technology also relates to cognitive presence. Cognitive presence also has an acceptable correlation to student perceived satisfaction. Interestingly, Figure 1 shows that relation between teaching presence and social presence, as well as the relation between teaching presence and learning presence are still low. Therefore, the instructor should consider building a learning environment that promotes social presence and learning presence.

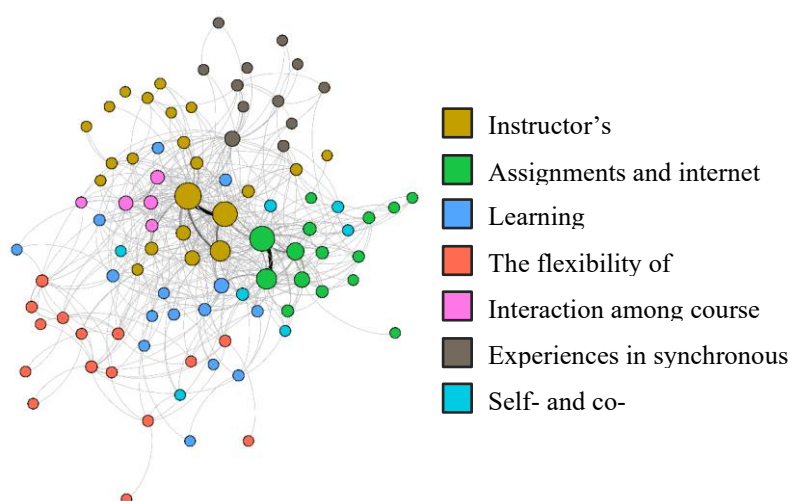


**Figure 1.** Network graph of the correlations

Figure 1 also shows a low correlation between internet quality and other variables. However, students' internet quality should be considered in designing online learning since the online learning program is depended on the internet connection. The instructors or learning designers should be aware that the learning environment they designed should be accessible by all their students.

### 3.4. result of qualitative data

Figure 2 shows the network graph of all codes produced in the open coding phase. The codes, then, were grouped based on their modularity class to obtain seven major themes (identified by different colors in the network graph), i.e. instructor's orchestration, assignments and internet constraints, learning process, the flexibility of emergency remote teaching, interaction among course participants, experiences in synchronous learning, as well as self- and co-regulation.



**Figure 2.** Network graph of all codes

The seven themes obtained from students' responses are a critical consideration in designing effective online distance learning. First, the emergence of instructor's orchestration in the first theme shows an important role of the instructor in designing and adapting learning content for use in the online distance learning [23]. Second, the design of the learning task and assignment should consider students' internet access and the difficulties of students with deadlines and time management skills [24]. Third, a learning process that builds a sense of community and provides good feedback practice is appreciated by the students and evidently has impacts on students' learning [25], [26]. Fourth, flexibility is considered by students as the advantage of online distance learning. Fifth, it is agreed by the fifth theme, interaction among course participants (student-student and instructor-student) is a critical factor for effective online distance learning [27]. Sixth, the advantages of synchronous learning in increasing students' motivation and participation [28] are perceived as a powerful tool in the online distance learning environment. Lastly, the students' abilities in regulating their learning and collaborating with others are an important factor for conducting online learning [29], [30]. Therefore, online distance learning should be supported by students' active role in mastering the learning content and collaborating with others.

#### 4. Conclusion

The present study has highlighted students' voice regarding their learning experiences and expectations toward emergency remote teaching during COVID-19 pandemic. The student's voice is valuable for the instructor, learning designer, and policymaker to evaluate and plan better online distance learning. In summary, this study gives evidence that instructor roles in designing and maintaining higher-order learning supported by the social presence, active and strategic students, effective technology use, and internet quality are critical for online distance learning. Even though this study uses a large dataset of students' voice, we give caution for the instructor, learning designer, and policymaker in adapting the results of the study to design an online distance learning program. The result of this study still should be interpreted along with the analysis of targeted students' context and teaching context.

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