

Simulated Jury as a Model for Teaching and Learning in a Remote Chemistry Teaching Methods Course

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Abstract

In this article, we focus on a set of remote activities regarding simulated juries, judges' evaluations, communication of verdicts, and a post-discussion conversation. These activities aimed to promote learning of the preservice teachers about the differences between remote and in-person teaching in a chemistry teaching methods course. The set of activities was developed at the beginning of the course, during the Pandemic Covid-19, and the interchanging of roles was applied by the teacher educator. These structured activities were accomplished through the preservice teachers' interactions and their interactions with the teacher educator by means of arguments, explanations, dialogues, and injunctions. We used a multi-level method for discourse analysis to map, sample, and analyze virtual interactions, which afforded the following results: 1) the preservice teachers strongly engaged in the remote activities and constructed arguments and counterarguments in the simulated jury activities, showing active roles as knowledge producers in all set of activities; 2) several themes and subthemes were developed; 3) the teacher educator assumed the roles of instructor, manager of the discussions, and commentator; 4) the preservice teachers evaluated positively their experience with the set of activities; 5) the application of the multi-level method allowed us to make explicit the discursive moves of the participants and a model for the simulated juries and related activities.

Keywords: argumentation, activity theory, discursive moves, discursive orientations, model for teaching, remote simulated juries, teacher's roles, sociolinguistics' contextualization cues, students' learning, text linguistics

1. Introduction

Due to the Pandemic of Covid-19, the educational system was forced to change to remote working. During this period research claimed more student-student and student-teacher interactions to improve students' participation, argumentation, emotional engagement, and learning during synchronic teaching (Jilil & Masuku, 2021; Yong et al., 2021; Pimentel & Araujo, 2020; Pimentel & Carvalho, 2020).

Rovai (2002) argued that students' interactions are essential to the development of a sense of community. Following the same perspective, Jiang (2017) argued that a sense of community can be best developed through student-teacher and student-student interactions than student-content interaction. In addition, Park and Kim (2020) showed that students feel more connected with their teachers and colleagues in online courses when the teachers use consistent and purposeful interactive technologies.

In the university context, engagement encompasses participation in in-person activities and interaction with online resources (Miltiadous et al., 2020). It is documented that engagement is closely related to the quality of effort students expend to perform well and have desired outcomes (Sun & Rueda, 2012). Furthermore, in distance education, both course tutors (Richardson & Long, 2003) and the quality of technology (Webster & Hackley, 1997) are positively related to levels of student engagement.

Lack of interaction can lead to feelings of isolation, which has been reported to be one of the barriers associated with distance learning (Dietrich et al., 2020). In a study focused on language learning, Le and Truong (2021) concluded that a pedagogy that prioritizes student-student and student-teacher interactions during lessons promotes a positive learning experience in the remote teaching context. The frequency and relevance of

student-teacher interactions are related to improved quality of online education and student achievement (Protopsaltis & Baum, 2019).

Whittle et al. (2020) reported that remote teaching had a negative impact as perceived by the students who experienced a sudden loss of social engagement in the classroom due to remote teaching and learning. From a different perspective, remote teaching was seen as a solution for some educational purposes, such as individualized and differentiated instruction by means of immediate formative mechanisms of feedback and instruction regarding the student performance, and through modulated content, which allows learning the same content in different rhythms (Le & Truong, 2021). Thus, remote teaching is a polemic issue, which is crucial to promoting argumentation.

The Pandemic has ended, and many educational systems and courses still offer online teaching and support to students. The need to improve online teaching is still a challenge, and special activities and models of teaching need to be developed.

The simulated jury is a type of role-play activity that has been used by teachers and researchers as a resource for teaching and learning in basic and higher education, and variations are documented in the literature, as well as the positive impact on the students learning (De Souza et al., 2019; Lopes & Milaré, 2018; Silva & Martins, 2009; Vieira et al., 2015). In the English literature, there are still very few studies concerning the uses of the simulated jury in science education and no literature regarding the uses of the remote simulated jury.

In this resource, the students are split into groups against and in favor of a polemic question, problem, or subject, and the judges, who constitute a third group of students with the task of evaluating the arguments produced in the simulated jury activity. The participants can interchange their roles, having opportunities to attack, defend and evaluate arguments from different perspectives, even if they do not agree with the perspective to be defended. Thus, they can experience the decentralization process, which contributes to increasing empathy and interactions (Vieira et al., 2015).

In this sense and using the precepts of Vieira et al. (2015), we present in this article analysis of two remote simulated jury activities and related activities, that is, the judges' evaluations, the communication of the judges' verdicts, and the post-discussion conversation. These activities were used by the teacher educator for teaching and learning purposes during the Pandemic Covid-19 in a remote chemistry teaching methods course. The teacher educator applied the interchanging of roles of the preservice teachers (hereinafter called "students"), which contributed to putting themselves in the perspective of the other.

The set of remote activities functioned to engender interactions and argumentation among students regarding a very important issue at the time the course was taught - emergency remote teaching. Through the application of a multi-level discourse analysis method (Vieira & Kelly, 2014), we show how the simulated juries and related activities, with the support of the teacher educator, provided favorable context for the emergence of the students' interactions through argumentations, explanations, and dialogues. For the purposes of this study, we raise the following questions:

- 1) What themes and subthemes were developed along the simulated juries?
- 2) What were the roles of the teacher educator in the development of the full set of activities?
- 3) How the teacher educator and the students constructed instructional conversations in the set of simulated juries and related activities?
- 4) What discursive model for teaching and learning can be derived from the developed virtual classroom interactions?

In the next sections, we describe the context investigated and a brief description of the multi-level method for discourse analysis we used to analyze our data.

2. The Context Investigated

The first author functioned as the teacher educator in a mandatory chemistry teaching methods course and is experienced in teaching chemistry in basic education. The purpose of the course was to develop the students' knowledge of chemistry education and their pedagogical knowledge through a variety of experiences.

The course was taught in the evening for one semester in an emergency remote mode at a large public university in Brazil. The course comprised the second semester of a total of four semesters. The first and second semesters were theoretically orientated through discussions of scientific literature regarding education in general and chemistry teaching in specific. The third and fourth semesters were dedicated to immersion in secondary chemistry teaching at local schools with the teacher educator (hereinafter called "teacher") orientation. All the

research participants had coursed the first semester with the teacher before the beginning of the Pandemic. At the beginning of the second semester, March 2020, the in-person classes were suspended, and the course was offered in remote mode one year after. The students were low-middle class.

The course had approximately thirty contact hours and classes lasted about one hour and forty minutes. The classes were taught through the google meet platform, contracted by the university, and the recordings were accomplished with the recording app of the computer screen. The course was divided into three units. The first was dedicated to exploring the potential of remote teaching. The two simulated juries and related activities were accomplished in the second and third classes of the course. The teacher used them to develop discussions, giving the students opportunities to further their knowledge about remote teaching and put themselves in a perspective they do not agree with. There was a total of ten students attending the course and nine participated in this study. During the three recorded classes of the first unit of the course, for the purpose of this study, the student Jorel missed the first class.

In this article, we present analyses of the second, third, and fourth classes of the course. The classes encompassed two simulated jury activities, two judgment activities, two communication of verdict activities, and a conversation activity with the students regarding the previously experienced activities. In the first class, before the simulated jury activities, the teacher explained the activities, and divided the groups, aiming to make both balanced from the perspective of having students with more and less difficulty in learning and in expressing themselves. She instructed the students to make previous research to ground their arguments. The simulated jury activities were accomplished in an argument-rebutting format, that is, a group posed and developed an argument that should be rebutted by the rival group, and the teacher acted as a manager of the discussions, instructor, and commentator. The teacher selected the judges at the beginning of the simulated jury activities, one from a group and another from the rival group. Her criterion to select the judges was based on those students who showed the most commitment to the activities she proposed in the past. On the second day of the simulated jury activity, the teacher promoted the interchanging of the students' roles and selected other judges. In the fourth class, the teacher promoted a conversation with the students about which didactic goals the activities fulfilled in the course and the opinions of the students regarding the developed activities.

3. Methods and Materials

We used a multi-level method for discourse analysis (Vieira & Kelly, 2014) to organize, map, sample, and analyze our data, constituted of video and audio recordings of three sequenced days of classroom interactions. The method is grounded on activity theory and on the macrostructure of human activity (activity, actions, operations) asserted by Leontiev (1978) and appropriates resources from sociolinguistics (Gumperz, 2008), and text linguistics (Adam, 2008; Bronckart, 1999). The multi-level method allows both wide and detailed analyses of discourse events in the classroom.

According to Leontiev (1978), the macrostructure of human activity is composed of non-addictive levels: 1) activity (related to a need satisfied by the object of activity—its motive, that is, the stimulating agent of the activity, which can be material or ideal); 2) actions (related to the accomplishment of a previous conscious or emergent goal); and 3) operations (related to immediate conditions and methods for the action accomplishment).

For the activity level, we used notes made by the second author of each recorded class, and the teacher's planning, to identify the activities and the need/motive for each of them. This analysis answers the "why did it happen?" question.

For the action level, we constructed the *Narrations Frames* (Table 1) to narrate the interactions, map the actions with stamped time and duration, the related pragmatic goals (i.e., goals of the actions related to discourse accomplishments), turns of talk, themes, subthemes, comments from the analyst, and the discursive orientations for each action (explanation, argumentation, description, narration, injunction, and dialogue). The discursive orientation concept is derived from studies in text linguistics regarding the concept of "sequence", that is, how the text and discourse are organized beyond the level of the phrase (Adam, 2008; Bronckart, 1999). The established discursive orientation is related to the dominant sequence in each action, providing possibilities and constraints to human action, thus, constituting a discursive tool for acting in the world, shaping discourse interactions with appropriate norms, ways of talking, goals, expectations, and roles.

Table 1. A small segment of the narrations frames for the second simulated jury activity

Action Time (h:m:s) Duration (m:s)	Turn de talk Interlocutor (against/favor/neutral)	Discursive Orientation	Main theme Episode	Subthemes	Narrations of the discursive flux <u>Underlined – teacher’s punctual talk</u> <i>Italics – Contextualization cues and the teacher’s injunctive propositions, and meta-discourse from the teacher and the students, signaling the ending of turns of talk and the action</i>	Pragmatic Goal	Analyst’s comments <i>Interpretations italicized</i>
ACTIVITY 1 – SIMULATED JURY – Total time: 01:13:50							
TEACHER’S NEED: Promote learning regarding the differences between remote and in-person teaching							
MOTIVE: Argumentation							
1 Informal conversations 00:00:00 12:15	Several interlocutors speaking	Dialogue	Several themes – informal conversations	Several subthemes – informal conversations	The teacher waits for the students to arrive to begin the simulated jury. Student Cathy writes on the chat that she is in a meeting and cannot hear the teacher.	Wait until the students enter the room to begin the class	
2 Reinforces the members of each group and chooses the judges 00:12:15 03:40	1 Teacher (neutral)	Explicative	Simulated Jury Episode 1	Instructions to accomplish the simulated jury: - Members of each group - Judges - Procedures	The teacher reinforces the interchanging of groups and roles and communicates the students’ names who will debate against remote teaching (Jorel, Ayra, James, and Cathy) and in favor of remote teaching (Anne, Clair, Brian, Lia, and Ben). She informs that one student from each group will be taken out of his/her role to be a judge of the discussion. The teacher says that Ben, from the favor group will be a judge. She says: Ok Ben? Ben answers: Ok teacher, cool. The teacher informs that Ayra, from the against group will be a judge. The teacher says: Alright, Ayra? Ayra answers: Alright. The teacher explains to the judges the criteria of evaluation – thematic, transactional discourse, and consistency of the arguments. She informs again the names of who will be in each group and informs that the against group will begin without Cathy because she is in a meeting and said she will enter soon. The teacher points out that James and Lia, who were judges last week, will have the opportunity to debate today. She informs that both will make odd or even to decide which group will start. Lia wins and the favor group will begin the discussion. The teacher asks the students to keep their cameras on all the time, and, if they could not, at least turn them on while talking. She informs them to use the digital resource of raising hands to signal who wants to talk. <i>She says: Thus, the favor group can start. She makes a long pause.</i> The student Ayra says to the teacher she did not begin the recording. The teacher thanks her and says she is already recording her screen and will make available the resource of recording afterward. <i>The teacher says: Thus, let’s go, the favor group starts.</i>	Give instructions on the simulated jury	

From video and audio analysis, we identified contextualization cues (Gumperz, 2008) such as intonation and pauses, since was not possible to have access to other cues, like eye gaze and proxemics. Contextualization cues were important to delimit the actions since they often co-vary with changes in the direction and content of discourse. Following this process, the discourse was divided into segments through the identification of the participants’ contextualization cues, changes of turns of talk, the thematic content of the talk, and the teacher’s injunctive propositions and meta-discourse. The divided segments were considered the participants’ actions, with related pragmatic goals. The narrations frames were made for the full set of the developed activities, that is, the two simulated jury activities, the two judges’ evaluations activities, the two communication of verdict activities, and the post-discussion conversation activity. The analysis with the support of the narrations frames answers the “what happened?” question.

For the operations level, we applied the *Propositional Frames* (Table 2), which allowed analysis of the moment-by-moment interactions. In these frames, the transcription of selected actions, following criteria established with the support of the narrations frames, is categorized into propositions-utterances (according to Adam 2008, propositions-utterances are the smallest units of communication) identified through contextualization cues, the thematic content of the talk, and speech cohesion. The definition of

propositions-utterances is similar to what the American ethnographic tradition in discourse analysis calls “message units” (Green & Wallat, 1981). From grouping convergent propositions-utterances (convergent in the sense they are ‘doing’ or ‘signifying’ similar processes), the second author developed the concept of “discursive procedure”, that is, how an individual uses linguistic resources to conduct and manage speech. Such categorization is the core of the microanalysis we offer in this article. Thus, the convergent propositions-utterances are grouped into discursive procedures, that is, the operations - the means through which the teacher and the students accomplish the goal of action. The analysis with the support of the propositional frames answers the “how did it happen?” question.

Table 2. A small segment of the propositional frame for Ben and the teacher, class 1, activity 1 (The uses of commas signal the participants’ silent pauses. Words in |bars| are simultaneous talking in the same turn of talk, the symbol *** represents inaudible talking)

	Turns of talk	Propositions-utterances (smallest units of communication)	Discursive Procedures (set of convergent propositions-utterances)
Action 6 Argumentative	6 Ben	1. When he brings the data of 26%,	1–3. Resumption of information brought by Brian
		2. of people,	4. Specification of information for the countryside case
		3. this is in the urban zone,	5. (not specified)
		4. when you consider the countryside, these numbers grow a little to 47%,	
		5. this data ***,	
Action 7 Dialogue	7 Teacher	1. Just clarify for me	1. Solicitation of clarification
		2. (BEN): you can speak	2. Consent
		3. one thing is 47% of those who have or do not have access?	3. Questioning
		4. (BEN): Those who do not have access to the internet in the countryside,	4. Response
		5. and in the urban zone ,	5. Beginning of specification to the case of the urban zone
		6. 26	6. Anticipation of the response
		7. (BEN): 26 % as Brian mentioned ,	7. Confirmation

From this approach, that is, considering the roles the propositions-utterances and the set of discursive procedures play in one’s action, the analysts had access to the participants’ discursive moves. We define the concept of “discursive move” as comprised of the means, content, and how the participant accomplishes his/her action considering the goal it is aimed for and the related discursive orientation.

We used descriptive statistics to analyze the duration time of the teacher’s actions and turns of talk, thus complementing the discourse analysis method.

4. Analysis and Results

4.1 The Structure of the Set of Activities

There was a total of seven sampled, mapped, and analyzed activities with the narrations frames. Selected actions were analyzed in detail with the support of the propositional frames. The second day of the course comprised the simulated jury activity, the judges’ evaluations activity, and the judges’ communication of the verdict to the class. The third day comprised the same structure as the second day, that is, there were the same three activities, with interchanging of the students’ roles. Finally, the fourth class comprised a conversation activity regarding the teacher and the students’ opinions regarding the previous activities.

Each activity had its own need/motive. For this study, we worked with the teacher’s and the judges’ needs/motives. The motives were established by a number of discursive orientations. The needs/motives were the following:

Second day:

First simulated jury activity—Teacher’s need: promote learning regarding the differences between remote and in-person teaching. Motive: argumentation.

First judges’ evaluation activity—Judges’ need: decide which group constructed better argumentation. Motive: dialogue/explanation.

First judges’ communication of the verdict activity—Judges’ need: communicate the judges’ verdict. Motive:

explanation/dialogue

Third day:

The structure was the same as the first day.

Fourth day:

Conversation activity about the simulated jury activities—Teacher's need: promote the students' understanding of the simulated juries and related activities. Motive: explanation/dialogue.

According to the analysis of the temporal, the action, and the categories of the narrations frames (Table 1), which were made for the full set of activities, the students showed active participation as knowledge producers. They constructed several arguments and counterarguments, explanations, and dialogues to accomplish the activities, with the support of the teacher, who used explanations, dialogues, and injunctions to instruct, manage and comment on the students' actions at the full set of activities.

4.2 Themes and Subthemes Developed Along the Simulated Jury Activities

In the first action of each of the two simulated jury activities, the teacher clearly explained to the students how to act. In the first simulated jury, episode 1, she initiated the activity by reinforcing the instructions given in the previous class, when she divided the groups in favor and against remote teaching. She explained what transactional discourse is (according to Zeidler et al., 2005, transactional discourse occurs when a student internalizes and articulates the thoughts, arguments, or position of another student, so his/her reasoning is built in consideration of what was exposed by the colleague), emphasizing that this is one evaluation criterion of the arguments, and gave examples about this issue. She presented the thematic contents of speech as the second criterion, emphasizing they must be evaluated, as well as the third criterion, the consistency of the arguments. Along her explanation she gestured a lot and changed intonation, marking important issues of her speech.

Still in her first action of the first simulated jury activity, episode 1, the teacher said she will perform during the jury as a mediator, that is, beginning the sessions, coordinating the turns of talk, and giving the floor to one specific student. The teacher selected among the students two judges to decide through an agreement which group argued better and won the discussion and instructed them to take notes of the arguments of each group. She explained she will put the theme under discussion on the right side of the "chat". Also, she informed the students that a session of discussion does not necessarily end by theme change since it can be framed in another theme, as it may present itself as a refutation to a previous argument. Her criterion for session change was based on significant theme change, that is, when the subject changed much the session was finished and opened the way for another session.

Episode 2, first simulated jury—theme: "necessary resources for remote teaching", ten related subthemes, of which five presented transactional discourse within the episode: (1) lack of access to the internet, equipment, and knowledge (6 taken up); (2) alternative resources such as radio and TV (4 taken up); (3) lack of teachers' computer skills (3 taken up); (4) teachers' guidance in the use of technologies; (5) planning for equitable teaching (2 taken up); (6) accommodated teachers; (7) outdated educational system (1 taken up); (8) students' ability to concentrate; (9) teacher education; (10) teaching and learning process.

Episode 3—Theme: "democratization of education", six subthemes, three of which had transactional discourse within the episode: (1) distance education (7 taken up); (2) lack of access to the internet, equipment, and knowledge (1 taken up); (3) teaching work conditions (1 taken up); (4) students' characteristics; (5) right to education; (6) teacher education.

Episode 4—The theme of this episode emerged as a subtheme of episode 2: "students' ability to concentrate", two subthemes, both had transactional discourse within the episode: (1) teacher planning (2 taken up); (2) teaching and learning process (1 taken up).

In the first simulated jury, there was argumentation in three central themes that unfolded on eighteen related subthemes. Episodes 2 and 3 had more subthemes, and for these, the first subthemes had the highest number of recurrences. In episode 3 two subthemes from episode 2 were taken up: "lack of access to the internet, equipment, and knowledge" and "teacher education".

Episode 4 was different from the others because it has already been discussed as a subtheme of episode 2. This episode comprised two subthemes and one of them—teaching and learning process—had already appeared as a subtheme in episode 2.

In the second simulated jury activity, episode 1, the teacher made an explanation to highlight the groups' interchanges of roles and informed the class about the students she selected to be the judges. She pointed out that

the two judges in the previous class will have the opportunity to participate in the discussion and explained to the new judges the three evaluative criteria. She informed the judges they will draw lots to decide which group will begin the discussion. Finally, she asked the students to use the digital resource of raising their hands when they want to speak. She said: “so, with the word the favor group” and made a long silent pause.

Argumentation went through four main themes, which unfolded into twenty-one related subthemes. The theme of Episode 3 was “teacher overload”, which had the greatest number of related subthemes – twelve in total. It is interesting to note that this theme came back partially into the discussion as the last subtheme of episode 5 – “reduction of teaching work”. This theme was put forward by the student Lia from the favor group when the subject of asynchronous classes was debated. Her argument was refuted by counterarguments of three students from the against group.

Episode 2—theme “integration of disciplines and increasing empathy among teachers”, unfolded into three subthemes, all with transactional discourse: (1) mutual faculty help (2 taken up); (2) interdisciplinarity (3 taken up); (3) use of social networks (5 taken up).

Episode 3—theme “teacher overload”, twelve subthemes, five with transactional discourse: (1) planning (8 taken up); (2) teachers’ wage (1 taken up); (3) mental health (2 taken up); (4) school years mergers (2 taken up); (5) remote teaching as support for high school exam to give students access to university (1 taken up) (6) combining professional and personal demands; (7) housing conditions; (8) precariousness of work; (9) sickness; (10) work schedule; (11) number of teachers; (12) evasion from technical courses.

Episode 4—theme “robotization/dehumanization of teaching”, four subthemes: (1) literacy difficulty; (2) specificities of the students; (3) human formation; (4) planning.

Episode 5—theme “asynchronous lessons”, two subthemes, both with transactional discourse: (1) free access to classes (1 taken up); (2) reduction of teaching work (1 taken up).

4.3 The Teacher’s Roles in the Developed Activities

1) The first simulated jury and related activities

Activity 1—Simulated jury: roles of instructor and manager. The teacher began the activity acting as an instructor in a turn of talking that lasted 07min27sec. During the activity, she acted moment-by-moment, following the students’ actions and discursive procedures. During the two sessions of the simulated jury activity, she developed 30 actions in a total of 09min52sec of talk, from which 20 actions had the goal of managing the discussion (157 sec/20 actions).

The teacher was responsible to distribute the turns of talk to the students during the simulated jury activity. She was responsible for almost half of the actions developed in the activity, which was accomplished by a total of 69 actions. However, she was responsible for 25.6% of all talking. If we do not consider the initial instruction this percentile drops to 14.6%.

Activity 2—Judges’ evaluations: role of instructor. The beginning of this activity, again, was accomplished by the teacher functioning as an instructor in a turn of talk that lasted 03min11sec, in which she gave orientations to the judges. She did not participate in the judgment phase of this activity and returned to the virtual room to instruct the judges to return to the main virtual class.

This activity lasted 16min39sec and was accomplished by 7 actions (2 from the teacher) and 7 turns of talk (2 from the teacher). The duration of the time of the teacher’s talking was 04min32sec, which corresponds to 27.2% of all talking. It is important to highlight that, due to the changing of virtual rooms part of this time refers to the assistance the teacher gave to the judges, putting links and waiting for their establishment of connection. The judges gave victory to the against group.

Activity 3—Judges’ communication of verdict: roles of instructor and manager. This activity initiated with the teaching functioning as a manager. After the judges communicated the verdict, she asked the judges for more clarification and finished this activity functioning as an instructor.

The activity lasted 07min08sec and was accomplished by 6 actions (4 from the teacher) and 5 turns of talk (3 from the teacher). The teacher’s time of talking was 04min21sec, which corresponds to 60.9% of all talking.

2) The Second Simulated Jury and Related Activities/

Activity 1—Simulated jury: roles of instructor and manager. The teacher began acting as an instructor in one turn of talk that lasted 03min40sec. Throughout the development of the activity, she acted moment-by-moment following the students’ actions and procedures. During the three sessions of the simulated jury activity, the

teacher developed 40 actions which lasted a total of 15min41sec time of talking, from which 36 actions had the goal of managing the discussion (430seg/36actions).

The teacher was responsible to distribute the turns of talk during the simulated jury activity. She was responsible for almost half of the actions developed, of a total of 84 actions, but for only 26.2% of all time talking. If we do not consider her first action, this percentile drops to 21.2%. It is important to note that the teacher's time talking includes the teacher signaling problems with the students' technological devices.

Activity 2—Judges' evaluations: role of manager of the activity. The beginning of this activity was accomplished by the teacher functioning as a manager in one turn of talk that lasted 36sec, in which she asked the judges to leave the virtual room they and the other students were in and go to the judgment virtual room. She did not participate in the judgment and returned to the judgment virtual room to ask the judges to return to the main virtual room. The activity lasted 11min01sec and was accomplished by 21 actions (2 from the teacher) and 20 turns of talk (2 from the teacher). The duration of time of her talking was 16.5% of all talking time. It is important to note that, due to the change of virtual rooms part of the teacher's talking corresponds to the assistance she gave to the judges regarding her using of links and waiting for their connection. The judges gave victory to the favor group.

Activity 3—Judges' communication of verdict: roles of manager and commentator. This activity began with the teacher functioning as a manager. After the verdict communication, she assumed the role of commentator, that is, she explained to the students her roles and decisions during the simulated jury activities, aiming to promote their understanding of her choices and didactic planning for the course. This activity lasted 13min56sec and was accomplished by 14 actions (7 from the teacher), and 10 turns of talk (5 from the teacher). The teacher's time of talk was 09min10sec, corresponding to 65.8% of all talking time.

3) Conversation post-simulated juries and related activities

Teacher's role: commentator. This conversation activity lasted 41min27sec and was accomplished by 44 actions (23 from the teacher) and 41 turns of talk (21 from the teacher). The teacher's time of talk was 26min22sec, which corresponds to 63.6% of the total activity time. The teacher acted throughout the whole activity, questioning the students about other possible forms of simulated jury activities. She justified all her didactic choices regarding the simulated juries and related activities.

4) A synthesis of the teacher's roles in the developed activities

From the inspection of Table 3, it is possible to identify a pattern in the percentile of the teacher's talking during her actions. In both simulated jury activities, she was responsible for almost half of the actions, which evinces that she followed the students' moment-by-moment interactions, making small interventions. This is characteristic of managing the simulated jury activities since her time talking was almost half of the percentile of the total of her actions for these activities, which evinces her time of talking was shorter than that of the other participants.

In the first judgment activity, she had more participation when acting as an instructor, a role that demands more talking time, which is evinced by the close percentile of time of talk and action in this activity. In the first verdict activity, she had turns of talk a slightly shorter than the second verdict activity, when she, among other roles, also assumed the role of commentator. Finally, in the conversation activity, she fully assumed the role of commentator and had more than half of the actions and the time of the turns. Such a result evinces that she participated more, with longer turns of talk, which is characteristic of the role of commentator.

Table 3. The teacher's roles in each activity

Day	Activity	Role	% Actions	% Time of talking
2	1- Simulated Jury	Instructor and manager	~45%	~26%
	2- Judgment	Instructor	~29%	~27%
	3 - Verdict	Instructor and manager	~67%	~61%
3	1- Simulated Jury	Instructor and manager	~49%	~26%
	2- Judgment	Manager	~10%	~16%
	3 - Verdict	Manager and commentator	50%	~66%
4	1 - Conversation	Commentator	~52%	~64%

4.4 Teacher and Students' Instructional Conversations

The teacher idealized and put into practice her structure for the simulated juries and related activities. In the simulated juries, the students constructed several arguments and counterarguments, by means of their discursive procedures and discursive moves. The students made research on the internet about remote teaching to ground their arguments. Also, the teacher and the students constructed well-structured explicative and dialogue-discursive moves. The teacher used several injunctions during the activities to orient the students' attention, distribute turns of talk, and advance the discussion.

The analysis with the support of the narrations frames evinced that the judges evaluated well the arguments in the judgment activities and communicated their evaluation to the other students in the verdict activities, by means of explanations and dialogues, with the support of the teacher. In the conversation activity, the teacher asked the students to give their opinion about the experience with the simulated juries and related activities. During the conversation, she justified all her didactic choices. All the students evaluated positively their experience with the developed activities and there was consensus among the students and the teacher that the second day of discussion was better than the first day. This probably was a consequence of the interchanging of roles and the students' experience with the developed arguments and the dynamics of the simulated jury activity on the first day of discussion. Many students stated they want to use the simulated jury activity as a model for teaching and learning in basic education.

Still in the conversation activity, the student Cathy raised doubt if the simulated juries could be used for learning chemistry content knowledge, like physical chemistry. The teacher recognized the importance of this question and addressed it by giving references to studies that document the uses of simulated juries regarding content knowledge of natural sciences. The student Lia supported the teacher's references and justified by using an example of a simulated jury concerning atomic models, from one of the articles she read regarding simulated juries.

The analysts (first and second authors) combined analyses of the propositions-utterances and discursive procedures of each propositional frame to unfold the participants' discursive moves. We made 14 propositional frames for selected actions mapped through the narrations frames. The criteria for the selection of actions were based on what the narrations frames evinced as exemplary of the teacher's interventions and the students' arguments, explanations, and dialogues.

We selected for the analysis presented in this article four discursive moves: one argumentative move of the student Ben, one dialogal move of the teacher with the student Ben, and one argumentative move of the student Cathy, all of them produced on the first jury activity and related to the same theme of argumentation. Finally, we present one explicative move of the student Ayra, who acted as a judge on the second day of activities.

1) Selected discursive moves of the teacher and the students

The teacher used a set of explicative, injunctive, and dialogal discursive orientations to accomplish her task and positioned herself as a neutral manager of the discussion, distributed the turns of talk, and gave instructions to the students. Additionally, she asked for clarification when perceived inconsistencies, lack of coherence and cohesion, and lack of information, as shown in Table 2, for the case of her interactions with the student Ben.

- In action 6 of the second episode of the first simulated jury activity, Ben functioned against the remote teaching. Ben's goal was to add one more quantitative data to Brian's argument, within the theme "lack of access to the internet, equipment, and knowledge". Following his intention, he constructed an argumentative discursive move resuming the statistical information brought by Brian in the second action of this activity, that 26% of the Brazilian population do not have access to the internet. Ben highlighted it applies to the urban zone but did not specify if it applies to those who have or do not have internet. In the sequence, he presented new information specifying the countryside – 47%, but again, he did not specify to who's this number applies.
- In action 7, the dialogal didactic discursive move of the teacher consisted in asking for clarification from Ben, and after his agreement, she questioned him about the percentual he provided, questioning if it refers to those who have access to the internet or to those that have not. Ben answered that 47% refers to those that do not have internet access in the countryside and went to specify for the urban area, but the teacher anticipated his answer, informing the number 26. He then confirmed the teacher's information and added the percentual. He ended by mentioning that this information came from the student Brian. The teacher moved her head, gestured, and said she understood. It is important to note that the teacher already knew the correct answer, as she informed during the elaboration of this article. However, for the sake of the students'

understanding and for giving an active role to Ben, she positioned herself as not understanding exactly what the percentual meant, thus, questioning the information Ben provided.

- After the dialogal action of the teacher, the student Ayra, of the favor group, presented in action 8 her argument which consisted of a brief history of the alternatives modalities of distance teaching for those who do not have at their disposal more modern technological resources, aimed to counter-argument Brian's second argument (that there are many students that do not know how to use modern technology for educational purposes). After Ayra's argument, the teacher's, in action 9, moved her head signaling that understood the student's argument, and gave the floor to student Cathy. In her argumentative discursive move, action 10, Cathy, of the favor group, within the theme "lack of access to the internet, equipment, and knowledge" and following her goal of counterargument the arguments of Ben and Brian, consisted first in specifying the population that can participate in remote teaching to those who have internet. For that, she focused on the data presented by Ben in his argument, presenting it in an inversed logic, making first a factual affirmation ("offer remote teaching to 74% who have internet in detriment to the 26% who do not have it") and then making a rhetoric question based on her previous affirmation ("or will you deny [the remote teaching] to the 74% that have it [the internet]?"). In the sequence, she inverted explicitly the logic of the argument of her colleague by means of a deduction based on more people contemplated by the data brought by Ben ("thus you are giving access to education in this remote format to a greater number of students [...], 74% that have access"). Cathy goes on and articulated another argument with a different theme from the previous one. In her second argument, she addressed Brian's second argument concerning that many students do not know how to use technological resources for educational purposes which hampers remote teaching and learning. She counterargued affirming that is part of the education process learning also about new technologies and virtual spaces. Thus, Cathy refuted two arguments of the against group in her action, taking the common grounds of the arguments of Ben and Brian and transforming these common grounds into a different perspective, looking to address them from the point of view of who is in favor of the remote teaching, changing the order of perspective of Ben's argument (focuses on 74% that have access instead of focusing in the 26% that does not have access) and in adding a point of view to Brian's argument (many students do not know how to use technology for educational purposes, but, it is part of education learning how to use it).

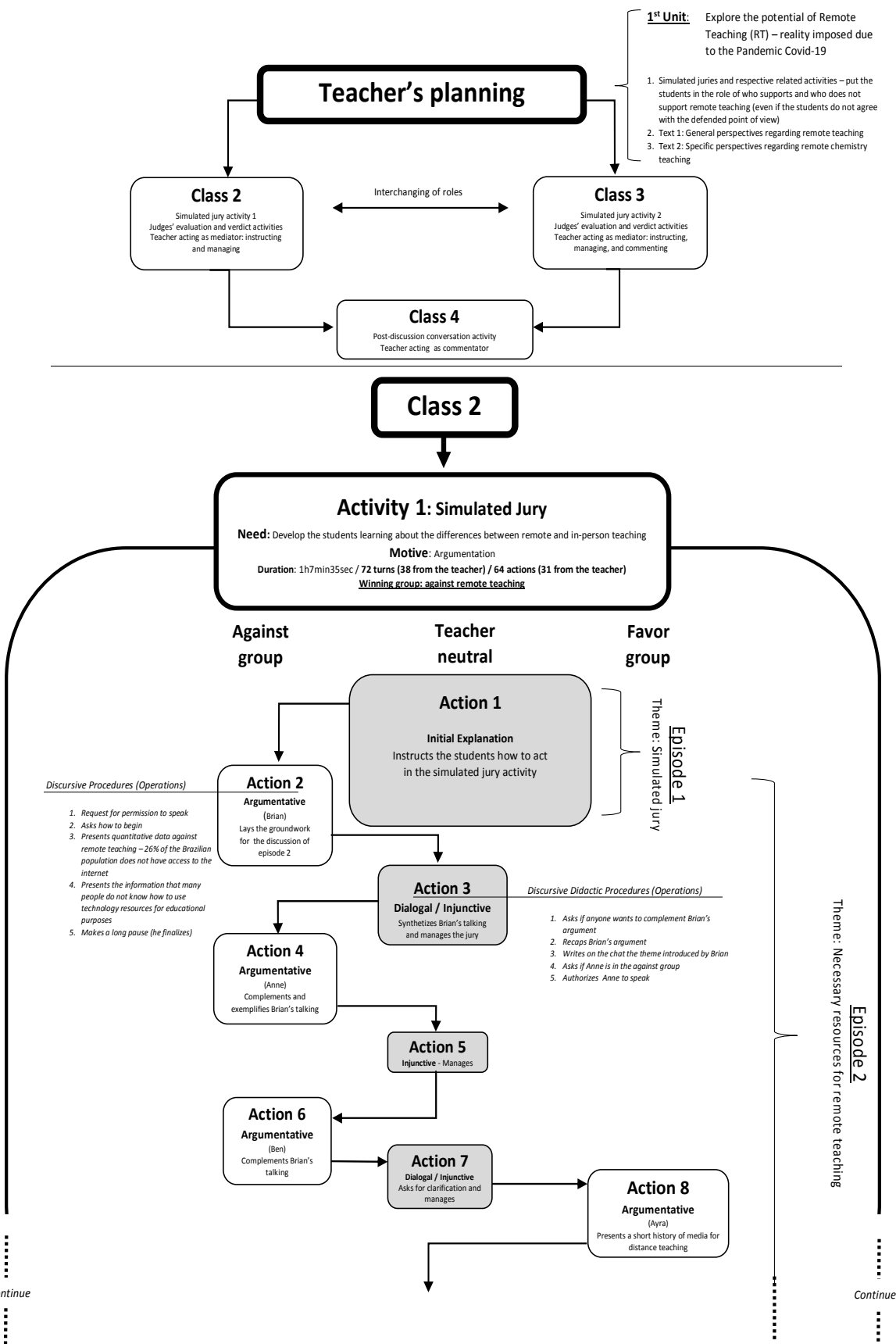
For the related activities, that is, the judges' evaluating activity and the judges' communication of the verdict to the class, there were several explicative and dialogal actions. We present judge Ayra's explanation to judge Ben of her evaluation of the discussion of the second simulated jury activity. She was personally against the remote teaching and expected to be of the against group because she was in favor of the remote teaching in the previous class and the teacher applied the interchanging of roles to the students in the next class. However, she was chosen by the teacher to be a judge during the teacher's delivered explanation to the students in the first action of the second simulated jury activity.

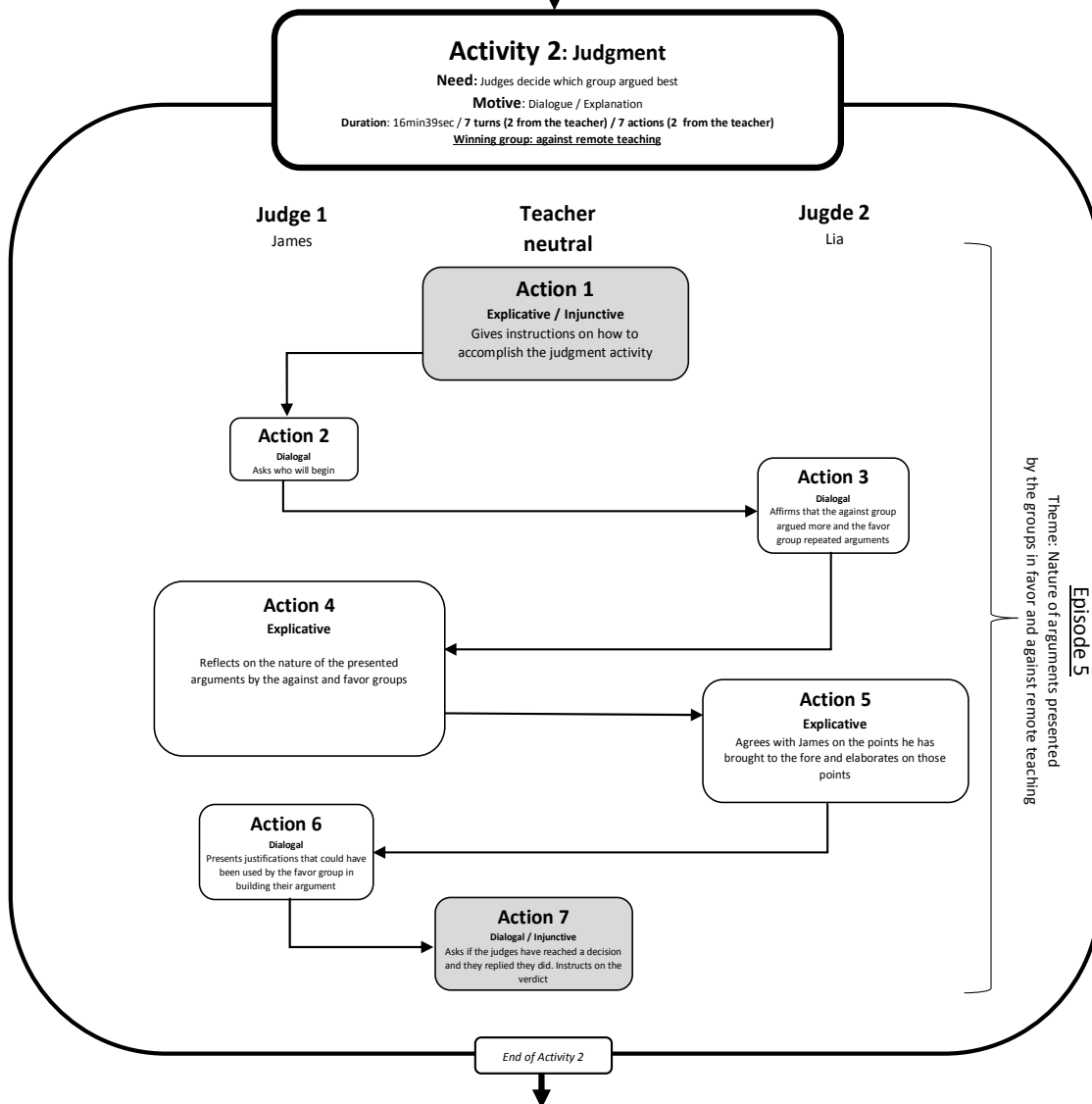
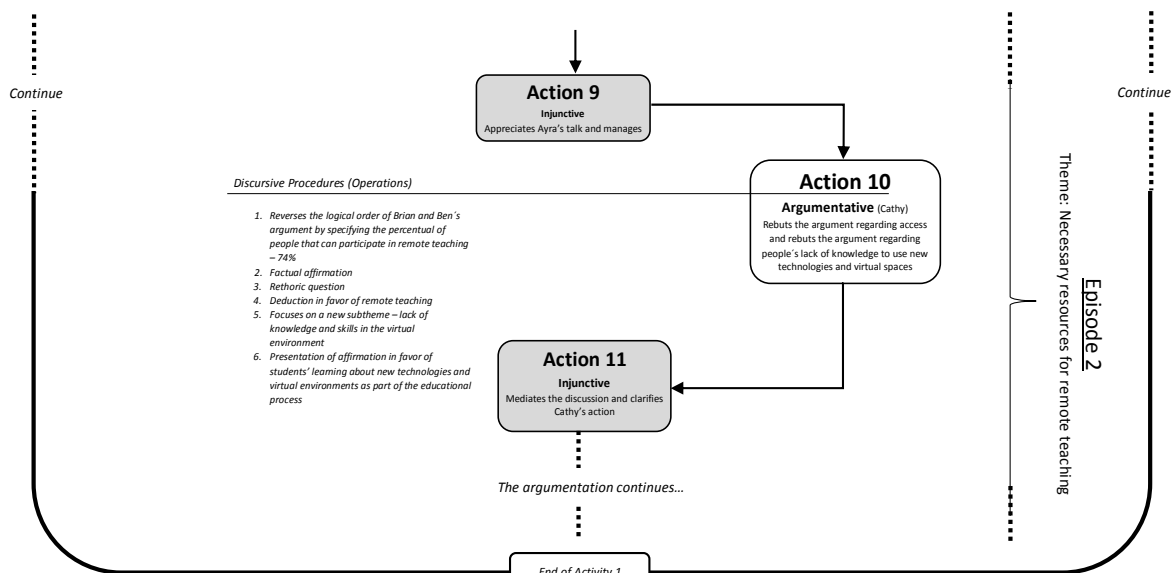
- The explicative discursive move of the student Ayra, as a judge in the judgment activity, in action 4, and following her goal of positively evaluating the favor group, together with the reinforcement contributions of her judge colleague Ben, was to remember the preliminaries of the against group before the second simulated jury. Ayra said she proposed to begin with the theme of "tiredness of the teachers" because the argumentation on this theme could make the against group win the discussion. She read her notes about the favor group and then openly recognized that was personally convinced by the favor group, something unusual since her own opinion was against remote teaching, and she prepared herself to argue against remote teaching, due to the interchanging of roles applied by the teacher. Thus, she gave up her own opinion and recognized that was convinced by the other group. Ayra said that she thought the theme she proposed, "tiredness of the teachers" would have great appeal and win the discussion because it has relation to the precariousness of the work conditions and the fact that the teachers' wage at distance teaching is less than in-person teaching. Finally, she recognized that the favor group convinced her due to the argued themes about the organization, the time available to work, and the schools being better organized this year due to the experience of the previous year. Ben agreed with her.

4.5 A Model Derived from Interactions in Virtual Classrooms

From the application of the multi-level method for discourse analysis and by inspection of the narrations frames and the propositional frames, we constructed a model for remote teaching and learning for the first simulated jury and related activities (the judgment and presentation of verdict activities). The model allows an understanding of the structure and dynamics of the set of activities developed in the second class of the chemistry teaching methods course. The model is presented in Figure 1.

The teacher interventions followed a pattern: she mainly acted in a neutral instance, began, and finished all the activities, using for that a set of mixed explicative/dialogal/injunctive actions, and acted moment-by-moment by means of a set of short injunctive/dialogal actions, following closely and mediating the students' actions.





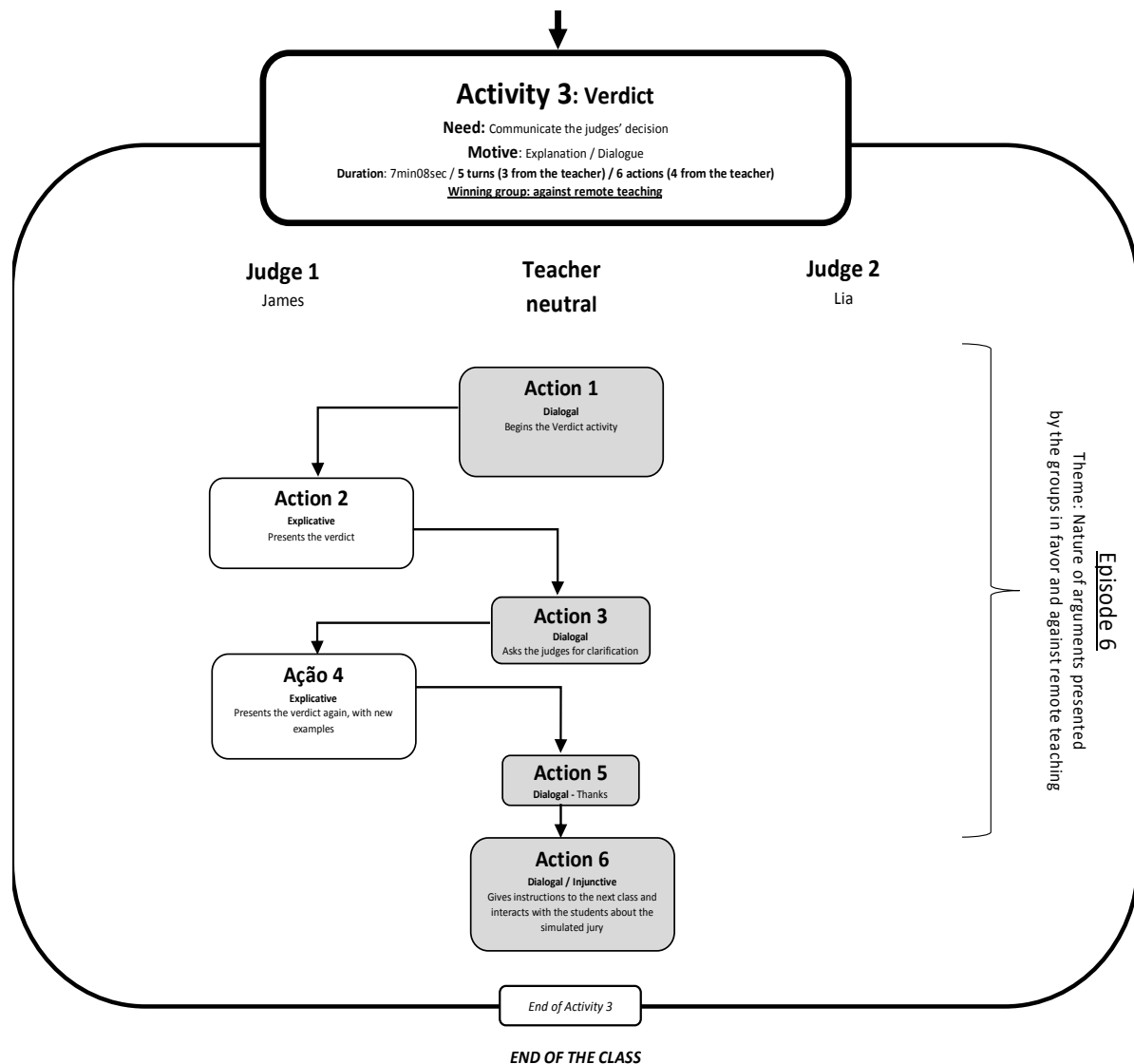


Figure 1. A model for the first simulated jury and related activities (the size of the actions is proportional to their time duration)

5. Discussion

The scientific literature we presented in this article raises a series of problems with remote and distance education, such as the lack of interactions, interest, and motivation of students, calling for more argumentation and dialogue practices in remote science teaching in basic and higher education. As an alternative to overcome these problems the teacher, grounded in the international literature concerning the uses of the simulated jury in science teaching, designed a set of remote simulated juries and related activities to further the students learning about the differences between remote and in-person teaching. The teacher acted mainly as a neutral mediator, assuming the roles of instructor, manager, and commentator, following moment-by-moment the students' interactions. The set of activities proved to be very fruitful in accomplishing her didactic goals, promoting the students learning, argumentation, dialogues, and explanations through interactions as can be found in the analysis and results presented in this article.

The students showed active roles as knowledge producers throughout the set of developed activities. They prepared themselves for the discussions by reading literature from remote and in-person classes. Along the simulated jury activities, the students' interactions were realized in an argument-rebutting format. In the set of activities, the students engaged in attacking and defending arguments, evaluating, and communicating the

evaluations of arguments. Important to highlight, the teacher wanted the students to get out of their argumentative “comfort zone”. For this, she applied the interchanging of the students’ roles on the second simulated jury activity, which increased interactions, improved argumentation and learning, and contributed to the “decentralization process”, that is, the students acted, argued, and thought in a role they do not agree with, thus collaborating to development of empathy – putting themselves in the other’s perspective and getting out of their comfort zone. The analysis showed that the simulated juries and related activities were an excellent resource to accomplish such didactic goals.

Several themes and subthemes were developed during the simulated jury activities, thus, bringing diversification to the students’ arguments. The teacher instructed and managed the judges’ evaluation and verdict activities, who used the criteria she established for evaluating the arguments of the simulated juries. The judges evaluated more in terms of the arguments’ themes, the number of arguments constructed by each group, the arguments that were rebutted or not by the rival group, and the clarity of the sequences of arguments. Finally, they evaluated negatively in terms of repetitions of arguments.

As an example of the consequences of these activities on the students’ opinions, the student Ayra changed her own opinion about remote teaching. She was personally against it, and, on the second day of activities, after she acted as a judge evaluating the arguments in favor and against remote teaching, she turned herself in favor of remote teaching. Such a result shows how important the roles of acting as a judge are, both to the accomplishment of the evaluation of the arguments and communication of the verdict activities and for the students’ understanding of the argumentation in the simulated jury activities.

In the final conversation activity, the teacher totally assumed the role of commentator, commenting on the previous activities and her didactic choices, and asking the students about other possible forms of simulated jury activities. She justified all her choices regarding the simulated juries and related activities. In this last activity, there was a consensus between the students and the teacher that the previous activities were very worthwhile, and the students manifested the will to use the simulated jury activities as a model for their teaching in basic education.

From the results of applying the multi-level discourse analysis method, we constructed a model for the first day of activities, providing visual insights into how these activities were performed in the remote classroom. The model is a very important construct since it can inform teachers and researchers in developing and designing simulated juries and related activities for teaching and learning and promoting argumentation in remote teaching mode.

In conclusion, we consider that the set of activities was very worthwhile and realized the teacher’s goals and planning. However, it is still questionable if these activities work well for virtual classrooms attending much more students than the number of students in this study. In special, we question if the set of activities works well in basic education in which the number of students attended is usually much superior to the preservice chemistry teacher methods course.

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