
Naturally Occurring Help-Seeking Exchanges on a Homework Help Forum

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Abstract

We analyzed naturally occurring help-seeking exchanges \((n = 123)\) between 11\textsuperscript{th} and 12\textsuperscript{th} graders and mathematics teachers on a French homework help forum. The results showed that (1) most students did not adopt a self-regulated learning (SRL) attitude when approaching the teacher for the first time (i.e., they did not communicate their preliminary work on the task for which they were seeking help, and they did not formulate an explicit request for help), (2) students’ SRL attitude facilitated the teacher’s work, while a non-SRL attitude made the teacher’s work more difficult, (3) more than one student out of four shifted from a non-SRL attitude to a SRL attitude during the help-seeking exchange, and (4) students who returned to the forum after receiving the teacher’s answer typically did so in order to ask for more help. Furthermore, the classical three-part structure (i.e., opening, message, closing) of traditional social interaction was only employed by the teachers; openings and especially closings were frequently absent in the students’ messages. In conclusion, the characteristics of the students’ initial message seemed to determine whether the pedagogical process between the student and the teacher got off to a good start. The students’ messages were different from standard written and spoken communication, tending towards abbreviated form, content, and politeness.

*Keywords:* computer-mediated communication; distance education and telelearning; pedagogical issues; secondary education; teaching/learning strategies
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1. Introduction

When faced with a (too) difficult task, students have the choice between several strategies: give up, keep on trying, search for information on the Internet, seek help, etc. According to current models of adaptive or “ideal” help seeking (e.g., Karabenick & Newman, 2009) a help-seeking sequence is made up of several steps. These include detecting a problem, determining the necessity of help, deciding to seek help, choosing the appropriate type of help, identifying a potential helper, soliciting help, obtaining help, and processing the received help. The last three steps—soliciting help, obtaining help, and processing the received help—deal with the actual help-seeking exchange. More precisely, in ideal help-seeking situations, students formulate targeted requests and address them to an expert (e.g., a teacher), the expert answers the students, and the students then process the obtained help in such a way that the likelihood of achieving the desired goal (e.g., completing homework, succeeding in solving a problem) is maximized, or at least increased (cf. Karabenick & Newman, 2009). This kind of help seeking can be considered to reflect a self-regulated learning attitude (cf. Puustinen, Lyyra, Metsäpelto, & Pulkkinen, 2008).

Perhaps the most important revolution in the 30-year history\(^1\) of help-seeking research has been provoked by the development of information and communication technologies (ICT). Järvelä (2011) noted that learning environments and classrooms are changing and that technology and opportunities for interactions (e.g., help-seeking interactions) will multiply.

\(^1\) The publication of Nelson-Le Gall’s (1981) article is generally considered as the starting point of “modern” help-seeking research.
This tendency is well illustrated in the volumes published by Karabenick, volumes which can be considered milestones in the help-seeking domain. Each of the first two volumes (Karabenick, 1998; Karabenick & Newman, 2006) included merely one chapter devoted to help seeking and ICT, whereas the latest volume (Karabenick & Puustinen, 2013) is entirely dedicated to the role of emerging technologies in help-seeking research and applications. Two journal special issue sections have also recently been devoted to this topic (Mäkitalo-Siegl & Fischer, 2011; Puustinen & Rouet, 2009).

Until now, help-seeking researchers have focused almost exclusively on the help seeker’s characteristics, behavior, etc., and have paid very little attention to the helper’s behavior and characteristics and/or the dynamics of the help-seeking interaction (cf. Makara & Karabenick, 2013). Recently, however, they have started recognizing that fully understanding the help-seeking process necessitates including both the help-seeker’s and the helper’s activity in the analyses. Karabenick and Puustinen (2013), for example, conclude their volume by stating that the “exponential increases in connectivity are accelerating the need for (…) the analysis of interactions in technology-mediated social networks in which help seeking may occur” (Puustinen & Karabenick, 2013, p. 277). This is in line with Wood’s (2009, p. 1051) recommendation that “we may find it useful in the future to add ways of looking more analytically at the nature and structure of the interplay between help seekers and help providers.”

ICT offer us efficient tools for analyzing help-seeking exchanges instead of keeping the focus solely on the help-seeker. Mazzolini and Maddison (2007, p. 212), for example, consider that as compared to “the complications of studying interactions in face-to-face education, it is relatively easy to preserve and study online forum interactions without disrupting the teaching and learning environment.” Puustinen and Karabenick (2013) have further emphasized the need to develop new research designs and methods adapted to the ICT
era. According to Wood (2009, p. 1049), spontaneously generated naturalistic data might “be useful as a means of exploring the extent to which the help actually offered to children is likely to have proved effective.” In fact, natural data, more than any other type of data, reflect both people’s actual behavior and the complexity of interactive learning situations (cf. Jang, Kim, & Reeve, 2012; Puustinen, Volckaert-Legrier, Coquin, & Bernicot, 2009). For example, Cheng, Paré, Collimore, and Joordens (2011) analyzed materials spontaneously posted in a discussion forum by volunteer undergraduate students during a psychology course and showed that students who participated in the forum (via discussions, debates, question asking, etc.) tended to have better performance in the course than students who did not participate.

It was within this context, and within the theoretical framework initiated by Nelson-Le Gall (1981), that we sought to study student help seeking. More precisely, our research aimed to fill the gap in the existing literature by analyzing help-seeking exchanges taking place between students and teachers (instead of focusing on help-seekers’ activity only). We analyzed help-seeking exchanges occurring naturally and spontaneously in an ICT environment, namely a French homework help forum (see 2.1 and 2.2 for more details). In terms of Loncar, Barrett, and Liu (2014, p. 102), “if instructional intervention in forum and AOD² is important, as the dominant paradigm assumes, then knowing more about students help-seeking behaviors is essential.” In particular, we sought to apply to the analysis of help-seeking exchanges the binary theoretical framework introduced by Puustinen, Bernicot, and Bert-Erboul (2011). These authors analyzed secondary school students’ spontaneously occurring computer-mediated help seeking using both a self-regulated learning and a communication pragmatics framework. Given the complexity of help-seeking exchanges, we considered such a pluridisciplinary approach particularly adapted to our data. Help-seeking

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² Asynchronous online discussion.
exchanges were defined as sequences of two or more speaking turns between a student and a teacher about one specific piece of homework³.

**Research Questions and Hypotheses**

What distinguishes help seeking from most self-regulated learning strategies is its *behavioral and social* nature (Karabenick & Newman, 2009; Puustinen et al., 2004). Pintrich (2000) has considered help seeking as a behavioral strategy in his model of self-regulated learning. In fact, seeking social assistance and processing the help provided by the expert necessarily involve the help seeker’s participation (cf. Puustinen et al., 2004). In addition, unlike most self-regulated learning strategies, help seeking takes place within a situation of social interaction requiring the use of social strategies (Karabenick & Newman, 2009; Newman, 1998; Puustinen & Bernicot, 2013; Puustinen et al., 2011). Without the involvement of the helper, the help-seeking process cannot succeed.

We had several reasons for choosing to focus the present study on 11th and 12th graders’ help-seeking exchanges. First of all, in the French school system, students take their high school final examination (*baccalauréat*) at the end of the 12th grade. For students, therefore, the stakes are high for these three years of high school⁴, and especially the last two, since a high school diploma is necessary for college admission. In line with this, the archives used in our study (see the Method section for more details) revealed that high school students are the most active users of the SoS-Math homework help forum. Furthermore, only a small number of studies to date have specifically analyzed help seeking in this age group. Within this context, we aimed to answer the following research questions:

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³ By definition, the minimum was two speaking turns (i.e., the request for help formulated by the student, and the answer formulated by the teacher), and the maximum observed in our data was 7 speaking turns. In this first study, we included the first three speaking turns (or two when there were only two speaking turns) in our analyses.

⁴ In France, high school (*lycée*) begins the year the students turn 15 and lasts 3 years. The first year of high school (10th grade) is called *seconde*, the second year (11th grade) is called *première*, and the third year of high-school (12th grade) is called *terminale*.
(1) Do high school students spontaneously adopt a self-regulated learning attitude when they first approach a teacher on a computer-mediated homework help forum (i.e., in speaking turn 1)? Previous research (Nelson-Le Gall, 1987; Puustinen, 1998) has shown that, in a traditional face-to-face learning situation, elementary students’ help-seeking behavior becomes more self-regulated with age. Puustinen et al. (2009) have further demonstrated that the use of help seeking as a self-regulated learning strategy in a computer-mediated learning situation continues to develop throughout the middle school years. In particular, these results revealed that 15-year-old students, as compared to 11-year-olds, provided the teacher with more varied information (e.g., they formulated an explicit request for help far more frequently). In a related domain, Farajollahi and Moenikia (2011) compared university students’ self-reported use of self-regulated learning strategies in computer-based vs. print-based learning situations. They found that students in computer-based learning situations reported higher rates of using self-regulated learning strategies than did students in print-based learning situations. On the basis of these findings, the prediction was that 16-to-18-year-old high school students would spontaneously adopt a self-regulated learning attitude (i.e., they would formulate an explicit request for help and communicate their preliminary work on the task for which they were requesting help; for more details, see Coding) on the homework help forum.

(2) Does the students’ self-regulated learning attitude in speaking turn 1 (ST1) facilitate the teacher’s work in speaking turn 2 (ST2)? Surprisingly few studies have specifically focused on the impact of students’ self-regulated learning attitude on teachers’ work (but see Lombaerts, De Backer, Engels, van Braak, & Athanasou, 2009, for an assessment of teachers’ beliefs concerning the introduction of self-regulated learning in primary school). In a related domain, however, research has demonstrated the positive effects of self-regulated learning training on students’ motivation and performance (e.g., Cleary &
Zimmerman, 2002; Dignath & Büttner, 2008; for a recent overview of research on self-regulated learning and academic performance, see e.g., Zimmerman & Schunk, 2011). Within this context, we expected that teaching self-regulated (i.e., more motivated and higher-performing) students would be easier for the teacher than teaching not-so-self-regulated (i.e., less motivated and lower-performing) students. In other words, we expected that students’ self-regulated learning attitude would facilitate the teacher’s work while the absence of a self-regulated learning attitude would make the teacher’s work more difficult.

(3) Are the student’s self-regulated learning attitude in ST1 and/or the teacher’s difficulty in ST2 predictive of the occurrence (or not) of an eventual subsequent speaking turn (i.e., ST3)? Two competing hypotheses seem equally plausible. The first one corresponds to a “self-regulated learning (SRL) oriented” analysis of the help-seeking process and stipulates that both the students’ self-regulated learning attitude and the teacher’s difficulty are predictive of the occurrence (or non-occurrence) of a third speaking turn. In fact, the processing of receiving help is considered an integral part of adaptive or self-regulated help seeking (Karabenick & Newman, 2009). In addition, Puustinen (1998; Puustinen et al., 2004, 2008) has considered the ability to successfully reuse received help as an indicator of self-regulated help seeking. We might therefore expect that if students adopt a self-regulated learning attitude, including successfully reusing the help they receive from the teacher, they would not have the need to return to the forum after receiving the teacher’s answer. In other words, a self-regulated learning attitude in ST1 should contribute to the non-occurrence of a third speaking turn and, vice versa, a non-self-regulated learning attitude in ST1 should contribute to the occurrence of a third speaking turn. Moreover, as we also expected students’ self-regulated learning attitude in ST1 to facilitate the teacher’s work in ST2 (cf. research question 2), the “SRL oriented” analysis of the help-seeking process led us to formulate the hypothesis that a self-regulated learning attitude in ST1 would facilitate the teacher’s work in
ST2. This, in turn, would contribute to the non-occurrence of a third speaking turn, and vice versa (i.e., a non-self-regulated learning attitude in ST1 would make the teacher’s work more difficult in ST2, thereby contributing to the occurrence of a third speaking turn).

The second hypothesis is based on a “communicational” analysis of the help-seeking process and stipulates that neither the student’s self-regulated learning attitude nor the teacher’s difficulty are predictive of the occurrence (or not) of a third speaking turn. In fact, theories of communication pragmatics define help seeking as a situation in which a help-seeker formulates a directive speech act by which he or she attempts to get the interlocutor to do something (Searle, 1979; Searle & Vanderveken, 1985). Such an (oral) exchange typically contains three speaking turns: (1) the request for help formulated by the help-seeker, (2) the answer formulated by the helper, and (3) the help-seeker’s (verbal or non-verbal) reaction, revealing whether or not the interlocutor satisfied the request (Greenfield, 1980). This ternary structure of interaction, initiated by the help-seeker, mirrors the well-known “I, R, E” (Intervention, Reaction, Evaluation) structure of teacher-initiated classroom interactions (Sinclair & Coulthard, 1975). This model has formed the basis of “hierarchical-functional” models of communicative interaction in which each of the three basic elements can be hierarchically extended, (Moeschler, 1985) by, for example, asking questions to clarify the initial question or request for help. Consequently, we formulated the hypothesis that the help-seeking exchanges would systematically (i.e., irrespective of the self-regulated or non-self-regulated nature of the first speaking turn and of the teacher’s eventual difficulties in ST2) include a third speaking turn which would enable the students to express whether or not the teacher had satisfied their request.

(4) What are the characteristics of ST3? In particular, what is its frequency of occurrence, and what are the differences, if any, between ST1 and ST3 (in terms of content, length, and self-regulated learning attitude)? To our knowledge, there has been no previous
research conducted in this area within the help-seeking literature (which has mainly focused on the analysis of ST1 and, to a lesser extent, of ST2).

The frequency of occurrence is related to the SRL oriented vs. communicational analysis presented in research question 3. More precisely, if we were to adopt the SRL viewpoint described above, we would formulate the hypothesis that students return to the forum only when necessary (i.e., less frequently), whereas if we were to adopt the communicational viewpoint, we would expect the students to formulate a third speaking turn systematically (i.e., each time).

The question of the content of ST3 is also related to the SLR oriented vs. communicational analysis presented in research question 3. In other words, if we adopt the SRL viewpoint, we formulate the hypothesis that if students return to the forum, it is always in order to ask for more help (because they haven’t succeeded in reusing the help they received from the teacher). If we adopt the communicational viewpoint, we formulate the hypothesis that some of the students return to the forum in order to thank the teacher (in the case that the teacher has satisfied their request) and that some of the students formulate a third speaking turn in order to ask for more help (in the case that the teacher has not satisfied their request). As far as eventual differences in length between ST1 and ST3 are concerned, we expected that ST3 would be shorter and “simpler” than ST1. In fact, according to the preceding analysis, students who return to the forum after receiving the teacher’s answer do so in order to thank the teacher or to ask for more help. In other words, ST3 simply supplements the more complete information contained in ST1.

Finally, as far as an eventual difference in the self-regulated learning attitude between ST1 and ST3 is concerned, only the SRL oriented analysis presented in research question 3 allows us to formulate a hypothesis (cf. the communicational analysis is not related to the students’ self-regulated vs. non-self-regulated learning attitude), and only if we consider that
the self-regulated learning attitude is stable over time\(^5\). In fact, if the self-regulated learning attitude is stable, then in ST3 there should be more students with a non-self-regulated than with a self-regulated learning attitude, because students who adopt a self-regulated learning attitude in ST1 are not expected to return to the forum after receiving the teacher’s answer.

\(^{(5)}\) What is the structure of the three speaking turns in the computer-mediated homework help situation? In other words, when students and teachers have the opportunity to freely formulate their requests and answers on a homework help forum, do they follow the structure of traditional social interaction (i.e., opening, message, closing)? Does it apply to our asynchronous computer-mediated situation which creates the illusion of a quasi-synchronous flow of discussion? Goffman (1967) and Herring (1996; see also Bernicot, Volckaert-Legrier, Goumi, & Bert-Erboul, 2012) have defined the interactive outline of written language, or a basic three-part structure of social interaction between two persons. According to them, the basic structure of traditional oral and written social interaction contains (1) an opening epistolary convention (i.e., a greeting such as “Hello”), (2) the contentful message (e.g., the problem the student was having trouble solving, an explicit request for help, and signs of preliminary personal work on the task for a student’s speaking turn; procedural suggestions for a teacher’s speaking turn), and (3) a closing epistolary convention (i.e., a leave-taking such as “Bye”)\(^6\). On the basis of their work, we expected that the students’ and the teachers’ speaking turns (i.e., the student’s initial speaking turn, the teacher’s answer, and the student’s eventual subsequent speaking turn) would follow the opening-message-closing structure.

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\(^5\) In reality, however, the question of the stability of the self-regulated learning construct is tricky. In fact, as early as in 1987, Brown considered activities used to regulate and oversee learning as “relatively unstable” (p. 68). Hong (1995), on the other hand, made the distinction between the relatively stable trait of self-regulation and the more transitory state of self-regulation and demonstrated (Hong, 1998) that the trait of self-regulation was more stable over time.

\(^6\) Cf. the classical work in conversation analysis (Schegloff & Sacks, 1973) on “openings up closings”.
Running head: NATURALLY OCCURRING HELP-SEEKING EXCHANGES

At the same time, however, recent research has shown that the development of modern distant communication devices has blurred the distinction between synchronous and asynchronous communication situations, and that this has consequences for the structure of social interaction. Smartphones, for example, allow us to visualize technically asynchronous SMS messages as a quasi-synchronous flow of discussion in which each speaking turn is not necessarily considered as a new contact being made but rather as a continuation of the previous speaking turn (Panckhurst & Moïse, 2012); consequently, not all the speaking turns contain an opening and a closing. Similarly, on the SoS-Math homework help forum, the fact that both the students and the teachers can visualize all the speaking turns of their help-seeking exchange might create the illusion of a quasi-synchronous flow of discussion, thus contributing to the omission of openings and/or closings. In other words, the traditional opening-message-closing format may not necessarily apply to the situation of our technically asynchronous homework help forum, as it can be regarded as quasi-synchronous by the interlocutors.

2. Method

2.1. Participants

We used natural data extracted from the archives of SoS-Math (http://sgbd.ac-poitiers.fr/sosmath/), a French forum offering students free personalized homework help in mathematics. More precisely, a total of 123 help-seeking exchanges, composed of 297 speaking turns between students and teachers, were included in the present study. The student messages \((n = 123)\) were sent by 11th and 12th graders \((n = 56\) and \(n = 67\), respectively; the 11th and 12th grades of senior high school in France correspond approximately to ages 16 to 18), and the teacher messages \((n = 123)\) were sent by secondary school mathematics teachers who volunteered in answering student messages online. Both the students and the teachers used pseudonyms, therefore remaining anonymous and asexual.
2.2. Procedure

The SoS-Math homework help forum functions as follows: Students are free to go to the forum whenever they feel the need (i.e., at school during a break, at home, etc.), and they type their messages online (Roser, 2003). Voluntary secondary school mathematics teachers take turns replying to the students’ messages seven days a week (except during summer vacation). The teachers also act as forum moderators (e.g., they may decide not to display an undesirable message; Coquin, 2006). According to the rules of the forum, the teachers’ role is to help the students do their homework (i.e., provide instrumental help), not to do the problems for them.

We had at our disposal the archives of the forum, that is, a total of 1,521 help-seeking exchanges composed of 3,662 speaking turns between students and teachers. We used the following criteria for the selection of the help-seeking exchanges included in our analyses: (1) The students explicitly stated they were 11th or 12th graders; (2) only dyadic student-teacher exchanges were included (i.e., the cases in which another student also answered the requests for help were excluded from the analyses); (3) each help-seeking exchange, composed of two or three speaking turns (i.e., the student’s initial speaking turn, the teacher’s answer, and the student’s eventual subsequent speaking turn), was related to the same piece of homework. In other words, the data were natural but at the same time controlled for age, the “identity” of the interlocutors, and the homogeneity of the topic being addressed.

2.3. Coding

All the data (i.e., the students’ initial speaking turns, the teachers’ answers, and, in the case of three speaking turns, the students’ subsequent speaking turns) were analyzed in the

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7 With the permission of the Director of the Poitiers Board of Education. The forum archives are also freely accessible on the forum website.
8 Not all the student speaking turns included information on the students’ current grade level, thereby making it impossible to provide user profile statistics. However, a large majority of the speaking turns in which the students reported their grade were sent by middle school and, in particular, high school students.
same way: First, we conducted a propositional analysis in order to cut the speaking turns into segments (called “propositions”) and then analyzed the content with the aim of distinguishing the different parts of the speaking turns (called “constituents”); finally, each proposition was assigned to one of the constituent categories. A proposition corresponded to a single event defined by a verb and its arguments (Reilly, Losh, Bellugi, & Wulfek, 2004). A long sentence (e.g., “I know it seems easy to you but for me it’s catastrophic”) could thus contain several propositions (“I know // it seems easy to you // but for me it’s catastrophic”). We considered the “proposition” to be a more suitable unit of analysis for our data than the “utterance” (e.g., Graesser, Person, & Huber, 1992). This was due, for example, to the characteristics of naturally occurring data, especially the heterogeneous use of traditional phrase structures or grammar rules (cf. Puustinen et al., 2009). For examples of speaking turns and how they were coded, see Tables 1 and 2, respectively. In the following, we will first present the categories—which were used as variables in the analyses—for the student speaking turns (i.e., ST1 and ST3), then for the teachers’ answers (i.e., ST2), and finally for the help-seeking exchanges (i.e., sequences of two or three speaking turns between a student and a teacher).

Student speaking turns. We analyzed ST1 and ST3 using the same constituent categories. The seven constituent categories used as variables in the analysis of the student data were the following:

1. Openings (e.g., “Hello”, “Hi”);

2. Information about the context in which the message was sent (e.g., “This is my homework for Friday”, “I’m having trouble solving this problem”, “There’s a part of the lesson I don’t understand”, “I’m stuck”);

3. The problem the student was having trouble solving (e.g., “1 among 2n + 2 among 2n + 3 among 2n = 387n and (((n - 5) among (n - 1)) = 3 ((n - 7) among (n - 3)))”; “Let
ABCD be a convex quadrilateral. I and J are the respective centers of the segments [AB] and [CD]. Demonstrate that any point M of the segment [IJ] is the center of a segment [KL] where K is a point of the segment [BC] and L a point of the segment [DA]; “Solve \( \cos 2x = \frac{1}{2} \) in \([-\pi; \pi]\) and then \( \sin 2x = \sin x \) in \([0, 2\pi]\). Find a formula for \( \sin 3x \)”; 

4. **Signs of preliminary personal work on the task** (comments on methods already tested, answers already found, etc.; e.g., “In problem 2 I used this formula and I found \((4 - 8\sqrt{2})/6\)”, “I managed to prove that \( V_n \) is a geometric series of ratio \(-3/10\)”, “I tried with the reciprocal of the Pythagorean theorem”);

5. **An explicit request for help** (e.g., “How should I do it?”, “Should I use \( b(x) \)?”, “How can you get from the strictly inferior of the preceding double inequality to the inferior or equal of the last one?”, “Help me!”);

6. **Politeness markers** (e.g., “Thanks”, “Thanks in advance for your help”);

7. **Closings** (e.g., “Bye”, “Good luck”).

**Teacher speaking turns.** The seven constituent categories used as variables in the analysis of the teacher data were as follows:

1. **Openings** (e.g., “Hello”);

2. **Reminders of the forum rules** (e.g., “You didn’t ask me a question, you only copied the problem!”, “If you want some more help you’ll need to tell me what you’re stuck on”, “We will never provide a complete correction”);

3. **Requests for clarification and remarks concerning the mathematics content of the student’s speaking turn** (e.g., “Don’t you have any other information on \( f \) than \( f(6 - x) \) \( f(x) \)?”, “You’re forgetting the sign of \( g(x) \)”, “Your first question is strange”);

4. **Procedural suggestions** (e.g., “The area of a triangle can be calculated using the formula \((\text{base} \times \text{height})/2\)”, “You need to use the theorem that states that the sum of
the 3 interior angles of a triangle is equal to \( \pi \), “Regarding the tangent question, remember that the tangent’s coefficient in \( a \) is \( f'(a) \) and that if two straight lines are parallel they have the same slope”;

5. **Evaluation of the student’s work** (e.g., “There is an error of logic that explains the contradiction that you’ve found”, “Your calculations seem to be correct”, “That’s good work, there’s just a tiny error in \( 2a \)”);

6. **Encouragement to independently pursue the work** (e.g., “Then the best thing to do would be to finish the problem without any help!”, “It’s up to you to continue”);

7. **Closings** (e.g., “Goodbye”, “Good luck”).

Proposition-coding reliability and constituent-coding reliability were estimated by having two coders independently assess the same, randomly selected cases (10% of the student and the teacher data). For the proposition-coding, the inter-rater reliability rates were 93% (student data) and 90% (teacher data), and for the constituent-coding, 90% (student data) and 89% (teacher data).

**Help-seeking exchanges.** First of all, when a student’s speaking turn (ST1 and ST3) contained both preliminary personal work on the task (constituent category 4) and an explicit request for help (constituent category 5), we regarded it as self-regulated. Both preliminary personal work and explicit requests for help “prove”—in line with previous definitions of self-regulated help-seekers (e.g., they “begin first by trying to solve the problems themselves”; Puustinen et al., 2004, p. 231)—that the students have both taken time to think through their problems before soliciting help, and are also capable of taking into account what the remote online expert needs in order to be able to help them in an effective way. In fact,
both signs of preliminary personal work on the task and explicit requests for help have been defined as “core” elements that make a computer-mediated help-seeking message cognitively understandable (Puustinen et al., 2009). Consequently, we divided the student speaking turns into two categories:

- \textit{self-regulated} speaking turns ($n = 37$ in ST1 and $n = 27$ in ST3), since they contained the two constituent categories, and

- \textit{non-self-regulated} speaking turns ($n = 86$ in ST1 and $n = 24$ in ST3), since they did not contain both constituent categories.

In addition, we considered that on a homework-help forum, according to the classical schema of the help-seeking exchange (i.e., request, answer, reaction of the help-seeker), the teacher’s role should ideally consist of “simply” answering the students’ requests. Consequently, then, if teachers had included in their speaking turns other elements, in particular reminders of the forum rules (constituent category 2) and/or requests for clarification and remarks concerning the mathematical content of the student’s speaking turn (constituent category 3), it meant that the student’s speaking turn had put the teachers in a difficult (or at least uncomfortable) situation. Consequently, we divided the help-seeking exchanges into two categories:

- exchanges ($n = 76$) which did not contain any supplementary constituent categories, thus reflecting the fact that \textit{the situation had been “easy” for the teacher} (i.e., the teacher had succeeded in answering the student without difficulty), and

- exchanges ($n = 47$) which contained reminders of the forum rules and/or requests for clarification and remarks concerning the mathematical content of the student’s speaking turn, thus reflecting the fact that \textit{the situation had been “difficult” for the teacher}. 

Finally, when students did not return to the homework help forum after the teacher’s answer, we considered that to mean that the help-seeking exchange had not followed the classical three-step schema (i.e., the request, the answer, and the reaction of the help-seeker, revealing whether or not the teacher had satisfied the request). Consequently, we divided the help-seeking exchanges into two categories:

- the help-seeking exchanges which contained *three speaking turns* and which thus followed the three-step schema \((n = 51)\), and
- the help-seeking exchanges which contained only *two speaking turns* and which thus did not follow the three-step schema \((n = 72)\).

### 2.4. Data Analysis

Chi-square analyses were conducted to test the relationships between the indicators of the help-seeking exchanges (i.e., self-regulated vs. non-self-regulated student, easy vs. difficult situation for the teacher, and help-seeking exchanges with two vs. three speaking turns). In the \(t\)-tests, the total number of propositions (considered as an indicator of a speaking turn’s length) and the total number of constituent categories (considered as an indicator of the variety of information included in the speaking turns) were the dependent variables. The indicators of the help-seeking exchanges (i.e., self-regulated vs. non-self-regulated student, easy vs. difficult situation for the teacher, and help-seeking exchanges with two vs. three speaking turns) were the independent variables. More detailed analyses of the constituent categories were carried out using Friedman, Wilcoxon paired samples, and Mann-Whitney \(U\) tests. They examined the form of the speaking turns (e.g., how many constituent categories were included in a speaking turn) rather than the number of propositions attributed to each category. We therefore dichotomized the categories (i.e., a constituent category was either observed or not) before conducting the analyses.

### 3. Results
3.1. Descriptive Statistics

**ST1** (*n* = 123). The average number of propositions per speaking turn was 20.94 (*SD* = 17.43), and the mean number of constituent categories was 4.31 (*SD* = 1.71). In other words, the students employed, on average, between four and five constituent categories in their initial speaking turns (ST1; see Figure 1 for more details).

The constituent categories were not homogeneously distributed, $\chi^2 (6, N = 123) = 225.31$, $p < .001$. The most frequently observed categories were, in decreasing order of frequency, the problem the student was having trouble solving (constituent category 3), politeness markers (category 6), information about the context in which the message was sent (category 2), explicit requests for help (category 5), and openings (category 1). The results show that the 11th and 12th graders more frequently provided the online teacher with information about the context in which the message was sent (75%) than the ninth graders (64%) in the study by Puustinen et al. (2009). However, these older students made fewer explicit requests for help (65% vs. 75%) than their younger counterparts.

**ST2** (*n* = 123). The average number of propositions per speaking turn was 13.31 (*SD* = 7.63), and the mean number of constituent categories was 3.54 (*SD* = 0.78). In other words, the teachers employed, on average, three to four constituent categories in their answers (cf. Figure 1). The categories were not homogeneously distributed, $\chi^2 (6, N = 123) = 350.35$, $p < .001$. The most frequently observed categories were openings (constituent category 1), procedural suggestions (category 4), and closings (category 7).

**ST3** (*n* = 51). The average number of propositions per speaking turn was 10.98 (*SD* = 6.76), and the mean number of constituent categories was 3.61 (*SD* = 1.23). In other
words, the students employed, on average, three to four constituent categories in their subsequent speaking turns (cf. Figure 1). Furthermore, the constituent categories were not homogeneously distributed in ST3 either, $\chi^2 (6, N = 51) = 110.17, p < .001$. The most frequently observed categories were politeness markers (category 6), explicit requests for help (category 5), information about the context in which the message was sent (category 2), and signs of preliminary personal work on the task (category 4).

3.2. Adoption of Self-regulated Learning Attitude in ST1 (Research Question 1)

In ST1, 86 students (69.9%) were non-self-regulated, while only 37 students (30.1%) were self-regulated. The $\chi^2$ test showed that the difference was statistically significant, $\chi^2 (1) = 19.52, p < .001$. In other words, and contrary to our hypothesis, most high school students did not spontaneously adopt a self-regulated learning attitude when they first approached a teacher on a computer-mediated homework help forum.

In addition, the $t$-tests showed that with self-regulated students, there were twice as many propositions in ST1 as with non-self-regulated students, $t(121) = 6.06, p < .001$. A more detailed analysis revealed that with self-regulated students, ST1 contained far more openings (category 1, $U = 1004.50, Z = 3.23, p = .001$), information about the context in which the message was sent (category 2, $U = 1202.00, Z = 2.14, p < .05$), and politeness markers (category 6, $U = 1208.50, Z = 2.11, p < .05$) than with non-self-regulated students.

3.3. Effect of Self-Regulated Learning Attitude in ST1 on Teacher’s Work in ST2 (Research Question 2)

When students were self-regulated in ST1, 8.5% of the situations ($n = 4$) were difficult and 89.2% ($n = 33$) were easy for the teachers in ST2. When students were non-self-regulated in ST1, 50% of the situations ($n = 43$) were difficult and 50% ($n = 43$) were easy in ST2. The $\chi^2$ test showed that the difference was statistically significant, $\chi^2 (1) = 15.21, p < .001$. To put it another way, the situation was difficult for the teachers far more often when the students’
initial speaking turn (ST1) did not contain explicit requests for help and signs of preliminary personal work on the task, \( U = 1382.00, Z = 2.10, p < .05 \) and \( U = 1150.00, Z = 3.31, p < .001 \), respectively. Thus, as expected, the students’ self-regulated learning attitude in ST1 facilitated the teachers’ work in ST2. In addition, the situation was difficult for the teacher far more often in ST2 when ST1 contained fewer propositions, \( t(121) = 2.89, p < .01 \).

In 76 cases (61.8%), ST2 did not contain reminders of the forum rules (category 2) or requests for clarification and remarks concerning the mathematical contents of the student speaking turn (category 3) which indicated that the teacher had been in difficulty, while in 47 cases (38.2%), ST2 contained at least one of these two constituent categories. The \( \chi^2 \) test revealed that the difference was statistically significant, \( \chi^2 (1) = 6.84, p < .01 \). In other words, even if the situation was easy for the teachers far more often than it was difficult, there still was a non-negligible number of cases (i.e., nearly 40% of the cases) in which the situation was difficult. Furthermore, the \( t \)-tests showed that when the situation was difficult for the teacher, there were far fewer propositions in ST2, \( t(121) = 2.37, p < .05 \). A more detailed analysis showed that when the situation was easy for the teacher, ST2 contained far more procedural suggestions (category 4) than when the situation was difficult, \( U = 1239.50, Z = 2.84, p < .01 \).

3.4. Self-Regulation in ST1 and/or Teacher Difficulty in ST2 as a Predictor of ST3 (Research Question 3)

All the analyses yielded statistically non-significant results with regard to the relationship between the characteristics of the student’s initial speaking turn (ST1) and the existence (vs. non-existence) of a subsequent speaking turn (ST3), thus lending support to the hypothesis reflecting the communicational viewpoint. More precisely, there was no significant relationship between the student’s self-regulation (self-regulated vs. non-self-regulated) in ST1 and the existence (or lack thereof) of ST3, \( \chi^2 (1) = 0.15, p = .70 \). In the self-
regulated student group, 21 (56.8%) help-seeking exchanges contained two speaking turns, while 16 (43.2%) contained three speaking turns. In the non-self-regulated student group, 52 (60.5%) help-seeking exchanges contained two speaking turns, while 34 (39.5%) help-seeking exchanges contained three speaking turns. Furthermore, we also found no statistically significant relationship between teacher difficulty in ST2 and the existence (vs. non-existence) of ST3, $\chi^2 (1) = 0.03, p = .85$. More precisely, when the situation was difficult for the teachers, 28 (59.6%) help-seeking exchanges contained two speaking turns and 19 (40.4%) help-seeking exchanges contained three speaking turns. When the situation was easy for the teachers, 44 (57.9%) help-seeking exchanges contained two speaking turns and 32 (42.1%) help-seeking exchanges contained three speaking turns. In sum, neither student self-regulation in ST1 nor teacher difficulty in ST2 was predictive of the occurrence of ST3.

3.5. Characteristics of ST3 (Research Question 4)

Seventy-two help-seeking exchanges (58.5%) included two speaking turns and 51 of them (41.5%) included three speaking turns. The $\chi^2$ test revealed that the difference was not statistically significant, $\chi^2 (1) = 3.59, p = .06$. This finding lends support to the hypothesis reflecting the SRL viewpoint.

An analysis of the content revealed that in one single case out of 51, the ST3 consisted only of an expression of satisfaction, without an explicit request for help. More precisely, the speaking turn in question contained politeness markers, signs of preliminary personal work on the task, and information about the context in which the message had been sent, i.e., constituent categories 6, 4, and 2. In 41 (82%) of the remaining 50 cases, ST3 contained an explicit request for help (i.e., constituent category 5). An explicit request for help was the most frequently observed constituent category in ST3 after politeness markers. In other

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9 The difference takes on greater importance at the level of the entire data set (i.e., the 1,521 help-seeking exchanges included in the SoS-Math archives): Of these, 1,347 (89%) included two speaking turns and only 174 (11%) included three speaking turns.
words, the students who returned to the forum after receiving the teacher’s answer essentially did so in order to ask for (more?) help. This result seems to be in accordance with our SRL oriented hypothesis.

A comparison of the number of propositions and the constituent categories in ST1 and ST3 further showed that there were significantly fewer propositions and constituent categories in ST3, \( t(172) = 3.96, p < .001 \), and \( t(172) = 2.65, p < .01 \), respectively. In other words, and in conformity with our hypothesis, ST1 was significantly longer and contained more varied information than ST3.

Finally, in ST3, 27 students (52.9%) were self-regulated while 24 students (47.1%) were non-self-regulated (cf. in ST1, 69.9% of the students were non-self-regulated, and 30.1% were self-regulated). The difference was not statistically significant, \( \chi^2 (1) = 0.18, p = .67 \). This finding did not lend support to our hypothesis. Furthermore, the \( t \)-tests showed that when the students were self-regulated in ST3, there were far more propositions in their speaking turns than when they were non-self-regulated, \( t(49) = 4.26, p < .001 \).

Only 7.8% \( (n = 4) \) of the students shifted from self-regulated in ST1 to non-self-regulated in ST3, but 27.5% \( (n = 14) \) of the students shifted from non-self-regulated in ST1 to self-regulated in ST3, \( \chi^2 (1) = 4.34, p < .05 \). When the situation was difficult for the teachers in ST2, there were 22 (81.5%) non-self-regulated and 5 (18.5%) self-regulated students in ST3. The difference was statistically significant, \( \chi^2 (1) = 7.00, p < .01 \). The number of propositions in ST3 did not vary according to whether the situation had been easy or difficult for the teacher in ST2, \( t(49) = -0.88, p = .38 \). Table 3 shows the occurrences that were observed with regard to the different combinations between student self-regulation (self-regulated vs. non-self-regulated student) and teacher difficulty (easy vs. difficult situation for the teacher) in ST1, ST2, and ST3. It shows that the most frequently observed combinations were, in decreasing order of frequency: (1) The student was not self-regulated in ST1, the
situation was difficult for the teacher in ST2, and the student was not self-regulated in ST3 (25.5%); (2) the student was self-regulated in ST1, the situation was easy for the teacher in ST2, and the student was self-regulated in ST3 (23.5%); and (3) the student was not self-regulated in ST1, the situation was easy for the teacher in ST2, and the student was self-regulated in ST3 (19.6%). Finally, when the students were self-regulated in ST1 there were far more propositions (i.e., the speaking turns were longer) in ST3, \(t(49) = -2.46, p < .05\).

Insert Table 3 about here

3.6. Structure of the Speaking Turns (Research Question 5)

In most cases (63.4%), the initial speaking turns (ST1) contained an opening (constituent category 1), but very few of them (17.9%) contained a closing (category 7). In other words, ST1 finished in another constituent category (which, in 46% of the cases, was a politeness marker, and in 22% of the cases, the problem the student was having trouble solving). As far as the teachers' answers (ST2) were concerned, 95.9% of them contained an opening and 85.2% of them contained a closing. Finally, one third (35.3%) of the third speaking turns (ST3) contained an opening, and only 11.8% of them contained a closing. Just like in ST1, the students’ subsequent speaking turns most often finished in another constituent category (which, in 51% of the cases, was a politeness marker, and in 25% of the cases, an explicit request for help). In sum, only the teachers’ speaking turns followed the classical opening-message-closing structure of traditional social interaction (and thus lent support to our hypothesis).

4. Discussion

The aim of the present study was to analyze high school students' naturally occurring computer-mediated help seeking addressed to a mathematics teacher on a homework help
The work reported is based on a web environment where learning support is available, and thus employs computers in education. Our first research question concerned the students’ adoption of a self-regulated learning attitude when first approaching a teacher on a homework help forum (i.e., in ST1). We expected that 16-to-18-year-old high school students would spontaneously adopt a self-regulated learning attitude when addressing an online teacher. This expectation was based on previous research involving elementary and middle school students’ help seeking in traditional (face-to-face) and computer-mediated learning situations (Nelson-Le Gall, 1987; Puustinen, 1998; Puustinen et al., 2009), as well as on university students’ self-reported use of self-regulated learning strategies (Farajollahi & Moenikia, 2011). Our results did not confirm this hypothesis: Less than one third of the students provided the teacher with signs of preliminary personal work on the task and an explicit request for help. This result is especially alarming since both signs of preliminary personal work on the task and explicit requests for help are considered “core” elements for making a computer-mediated help-seeking speaking turn cognitively understandable (Puustinen et al., 2009). It is further interesting to note that in the present study, 11th and 12th graders’ speaking turns contained fewer (65%) explicit requests for help than 9th graders’ speaking turns (75%), as shown in a previous study (Puustinen et al., 2009). More research is needed in order to fully understand this evolution which could potentially prove harmful for the effectiveness of the help-seeking exchange. More pedagogical efforts are also clearly needed so as to help students become aware of the “helpful” and “unhelpful” ways of seeking online help.

The second research question concerned an understudied research area, namely the impact of the students’ self-regulated learning attitude in ST1 on the teacher’s work in ST2. The results confirmed our hypothesis: The first speaking turn did indeed seem to play an important role in the success (or failure) of the help-seeking exchange. This is because students’ self-regulated learning attitude in ST1 facilitated the teacher’s work in ST2, while a
non-self-regulated learning attitude in ST1 made the teacher’s work more difficult in ST2. In other words, our results clearly indicate that teachers answering students’ messages on a homework help forum are better able to help students who show signs of self-regulation than students who do not show signs of self-regulation. Therefore, it is important for students to manifest a self-regulated learning attitude in their requests. The designers of homework help forums should pay special attention to this question, which is also reminiscent of the issue of self-regulated learning training (Clearly & Zimmerman, 2002; Dignath & Büttner, 2008): How can students be made aware of the importance of a self-regulated learning attitude? The forum user instructions are probably not sufficient: With regard to the SoS-Math forum, for example, the forum user instructions explicitly urge students to state their questions in detail and to provide the online teacher with other kinds of information concerning their homework (e.g., which math lesson their homework is dealing with). Even so, most of the students did not provide the online teacher with an explicit request for help and/or signs of preliminary personal work on the task.

The third research question examined the occurrence of a third speaking turn: Are student self-regulation in ST1 and/or teacher difficulty in ST2 predictive of the occurrence of ST3? The results showed that neither student self-regulation nor teacher difficulty were predictive of the occurrence of ST3. In other words, our results lend support to the communicational (rather than the SRL oriented) hypothesis according to which help-seeking exchanges would systematically include a third speaking turn (Greenfield, 1980; Sinclair & Coulthard, 1975), thereby enabling the students to express whether or not the teacher had satisfied their request (cf. Searle, 1979; Searle & Vanderveken, 1985).

The fourth research question concerned the characteristics of ST3 that had not been previously analyzed in the help-seeking literature. As far as the frequency of occurrence of ST3 is concerned, the results (58.5% of the help-seeking exchanges included two speaking
Running head: NATURALLY OCCURRING HELP-SEEKING EXCHANGES

turns while 41.5% of the exchanges included three speaking turns) lend support to the SRL oriented (rather than the communicational) hypothesis according to which students do not systematically return to the forum after receiving the teacher’s answer, but rather do so only when necessary (i.e., when they have not succeeded in putting the help provided by the teacher to use; cf. Puustinen, 1998). However, another interpretation seems plausible in our computer-mediated situation, and based on the communicational hypothesis: The anonymous nature of the online help-seeking exchange might, in fact, have led some students to only weakly commit to the interaction and, consequently, to not react to the teacher’s answer (i.e., to interrupt the help-seeking exchange after two speaking turns, without informing the teacher whether or not their request had been satisfied). In line with this interpretation, previous research on anonymous help-seeking exchanges (i.e., situations in which the teacher is physically absent and the interlocutors remain unknown to each other) has suggested that when students have the opportunity of asking for help anonymously (and free of charge), some of them simply “test” the system. They may, for example, type in vague requests simply to find out what kind of a reply they will receive, thereby demonstrating a low level of commitment to the interaction (Puustinen et al., 2011)\(^\text{10}\). Other interpretations might also exist, including the possibility that most of the students did not return to the forum due to their understanding of how a homework help forum functions (i.e., their “role” is to formulate requests, that of the teachers is to answer the requests, and, once the answer has been received, the pedagogical contract is fulfilled).

From the communication pragmatics viewpoint, this finding means that Grice’s (1989) cooperative principle is not always respected: When there are only two speaking turns in a help-seeking exchange, the students do not inform the teacher as to whether or not he or she has understood their request (i.e., they respect—through omission—the maxim of manner

\(^{10}\) Anonymity, however, can also contribute to facilitating the expression of ideas (Ainsworth et al., 2011).
“make yourself clear”). This, in turn, means that it will be difficult to build common ground (i.e., in the case of a homework help forum in mathematics, the mathematics notions to be acquired): When there are only two speaking turns, the teacher does not know whether the student has taken his or her answer into account. In other words, the teacher does not know what is shared between the student and the teacher. Within this context, the question arises as to whether the functioning of homework help forums in general allow for the creation of common ground—a necessary element of the learning process between an expert and a novice (cf. Clark & Bernicot, 2008).

The results concerning the content of ST3 seem to lend support to the SRL oriented hypothesis (rather than the communicational hypothesis). This is because students almost exclusively returned to the forum in order to ask for more help—only one student formulated a third speaking turn “simply” to thank the teacher. At the same time, however, the fact that the SoS-Math teachers also act as forum moderators might have had an impact on this result. Indeed, a forum moderator may decide, among other things, not to display an undesirable message on the forum (cf. Procedure). Could it be that some teachers adopt a “SRL oriented” viewpoint and consider messages in which students simply thank the teacher as unnecessary and, consequently, undesirable? In order to answer this question, more research is necessary; questionnaires or interviews will need to be used to gather information on the real use of the forum by the teachers.

As expected, ST3 was shorter and simpler (i.e., it contained less constituent categories) than ST1. This confirmed our analysis according to which asking for more help and thanking the teacher simply supplement the more complete information contained in ST1. Finally, with regard to an eventual evolution of the self-regulated learning attitude between ST1 and ST3, our results did not confirm the SRL oriented hypothesis according to which there would be more non-self-regulated than self-regulated students in ST3. In ST1, students
were non-self-regulated far more often than they were self-regulated, whereas in ST3, the difference between self-regulated and non-self-regulated students was not statistically significant. In fact, more than one fourth of the students shifted from non-self-regulated to self-regulated behavior between ST1 and ST3. In other words, ST3 enabled many non-self-regulated students to become self-regulated. The role of ST2—the teacher’s answer—is of particular interest and needs to be analyzed in more detail in future studies: Was it the help these students received from the teacher that contributed to their learning attitude shift from non-self-regulated to self-regulated between ST1 and ST3? In any case, this result is quite encouraging from a pedagogical viewpoint as it shows that a student who is non-self-regulated in one learning situation can become self-regulated in another situation. This result should be taken with some reserve, however, as it could also be interpreted as reflecting Brown’s (1987) thesis of the relatively unstable nature of self-regulation. Interestingly enough, and in an apparent refutation of Brown’s (1987) thesis, the results further revealed that very few students shifted from self-regulated help-seeking behavior to non-self-regulated help-seeking behavior (i.e., those who were self-regulated in ST1 tended to remain self-regulated in ST3).

Our final research question concerned the structure of the speaking turns. The results were twofold: The teachers’ speaking turns followed the three-part structure of traditional social interaction (i.e., opening, message, closing; Goffman, 1967; Herring, 1996), whereas the students’ results (i.e., only 19% of ST1 and 12% of ST3 contained a closing) yielded support to the analysis that the technically asynchronous homework help forum situation can be regarded as (quasi-) synchronous by the interlocutors, thus leading to the omission of openings and/or closings (cf. Panckhurst & Moïse, 2012). It should be noted, however, that in about 50% of the cases, a politeness marker (e.g., “Thank you”, “Thank you in advance for your help”) closed the speaking turn in place of a real closing. Our results (i.e., the fact that
the students frequently did not use closings) should therefore not be interpreted to mean that the students did not close their speaking turns at all: They simply did not employ the traditional closing marks.

In conclusion, our analyses concerning the help-seeking exchanges (i.e., ST1, ST2, and ST3) taking place on a homework help forum showed the importance of the dynamics between ST1 and ST2. In particular, the characteristics of the students’ initial speaking turns seemed to determine whether the pedagogical process between the student and the teacher got off to a good start. This result, together with the various other findings reported above, needs to be replicated in the future. Some of this study’s results could be explained by examining the everyday practices of “digital natives” (Baker, Bernard, & Dumez, 2012; Bennett, Maton, & Kervin, 2008), including the use of SMS messages, blogs, and tweets. With regard to ICT, these practices are unlike those of the older generation of teachers, and are different from standard written and spoken communication, tending towards abbreviated form, content, and politeness (Kemp, 2011).

We considered that a binary theoretical framework (i.e., SRL and communication pragmatics; cf. Puustinen et al., 2011) would be ideally adapted to the analysis of naturally occurring help-seeking exchanges. At the same time, natural data has its limitations (such as the inability to obtain further information about the students, e.g., their gender, level of academic achievement, or technology skills). Therefore, “alternating studies using natural data with those opting for an experimental approach” (Puustinen et al., 2009, p. 1046) might constitute a good compromise.

Finally, our results may have implications for the design, running, and management of educational online help forums. As we have discussed above, in our study, most students did not formulate targeted requests for help to the online teachers, and only returned to the forum if they needed more help than was initially given. This could point to inadequate shared
knowledge concerning the expected rules of conduct of the forum. Stated simply, it could be that the students expected the teachers to straightforwardly give them the answer, whereas the teachers had instructions to give guidance in the form of “scaffolding” (Wood, Bruner & Ross, 1976), so that students would be led to find out the answer for themselves. Other online communities, such as Wikipedia have now developed extensive publicly available rules for collective work and discussion (Reagle, 2007). It is therefore possible that students could be led to be more self-regulated, and the help given to them to be more satisfactory, once such educational forums develop over time into veritable “communities”, with explicit and commonly understood rules of educational interaction.
Acknowledgements

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Running head: NATURALLY OCCURRING HELP-SEEKING EXCHANGES

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Running head: NATURALLY OCCURRING HELP-SEEKING EXCHANGES


Figure Caption

Figure 1. Mean frequencies per speaking turn for each constituent category.
Running head: NATURALLY OCCURRING HELP-SEEKING EXCHANGES

Examples of Help-Seeking Exchanges with Two Speaking Turns (Exchanges 1 to 3) and with Three Speaking Turns (Exchanges 4 to 6)

<table>
<thead>
<tr>
<th>Exchange 1</th>
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<tbody>
<tr>
<td><strong>Student:</strong> Hi I’m having trouble solving a problem can you help me. Here is the problem How to prove that if i belongs to [1;n] (n!/((i-1)!(n+1-i)!))+(n!/i!(n-i)!)=(n+1)!!. Thank you in advance</td>
</tr>
<tr>
<td><strong>Teacher:</strong> Hello, here are two equalities that will serve to put the first two fractions into the same denominator: (n+1-i)!=(n+1)(n-i)! So then I calculated the first eleven terms of (Vn) and the first ten terms of (Un). I then showed that when P=1 then P²=1. In the end I can’t demonstrate that Vn+1-P=((P-1)/(P-Vn))/Vn and ESPECIALLY deduct that Vn+1-Pinferior or equal to 0.7/Vn-P. THE LINES MEAN NORMS. THANK YOU IN ADVANCE.</td>
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<th>Exchange 2</th>
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<tr>
<td><strong>Student:</strong> We consider the 4 points A, B, C, D to be non-coplanar 1) construct the points: A’, such that the vector DA’=vector2DA C’ symmetrical to D with respect to C B’ such that vector C’B’=vector 2CB 2) Show that the planes (ABC) and (A’B’C’) are parallel!</td>
</tr>
<tr>
<td><strong>Teacher:</strong> Hello, when you start your next message, do not forget to say hello and to say what you’ve been able to do. Since the vector DA’ = 2vector DA Since vector DC’ = 2vector DC Since vector B’C’ = 2vector BC you must therefore use a geometric transformation of center D of the ratio 2 which transforms M into M’ with: vector DM’ = 2vector DM I’ll let you find its name and use it. Good luck.</td>
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<tr>
<th>Exchange 3</th>
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<tr>
<td><strong>Student:</strong> Hello, here are some trigonometry exercises Exercise 1 -Determine the sign of 2 cosx – 1 on [0;</td>
</tr>
<tr>
<td><strong>Teacher:</strong> Hello 1) No, your method is clumsy. This is how to solve the inequation: 2cosx-1&gt;=0 &lt;= cos(x)&gt;=1/2 The values of x solutions can be read on the trig circle and imply the use of pi/3. The same goes for 2sinx+1) Factorize the derivative in 2(1-root2)*cos(x)(1+racine(2)*cos(x)) by again using the simplification of your derivative. Each factor can be studied as in 1 A table of signs to finish Good luck</td>
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<tr>
<th>Exchange 4</th>
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<tr>
<td><strong>Student:</strong> how to demonstrate that x1^3=2x1+1 thanks alot</td>
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<tr>
<td><strong>Teacher:</strong> Hello you need to send the whole text in order for us to help you SOS Math</td>
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<th>Exchange 5</th>
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<tr>
<td><strong>Student:</strong> Hello I am currently studying in class the chapter on series but the teacher gave us an exercise that I started but that I can’t finish solving. This is the exercise: We call the series of Fibonacci the series (Un) defined as follows: U0=1, U1=1 and for any natural whole n, Un+2=Un+1+Un. We then define the series (Vn), for any natural n, by: Vn=Un+1/U1. So then I calculated the first eleven terms of the series (Un) and the first 10 terms of (Vn) I then showed that Vn+1-P=((P-1)/(P-Vn))/Vn and especially deduce that Vn+1-Pinferior or equal to 0.7/Vn-P. THE LINES MEAN NORMS. THANK YOU IN ADVANCE.</td>
</tr>
<tr>
<td><strong>Teacher:</strong> hello, V(n+1)-P=1+1/Vn-P, (P-1)(p-Vn)/Vn=(p²-p+pVn+Vn)/Vn. Then you just need to remember that p²-p=1 and that’s it. 2) V(n+1)-P = (P-1)(p-Vn)/Vn so(Vn+1)-P=((P-1)(p-Vn))/Vn it is easy to demonstrate that Vn&gt;0 so Vn&gt;1 so V(n+1)-P&lt;V(n-1)(p-Vn) then you demonstrate that p-1&lt;0.7 Good luck carefully demonstrating everything.</td>
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<th>Exchange 6</th>
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| **Student:** Hello, thank you for all your instructions but I have some trouble with math and I don’t understand how you demonstrate that Vn is superior to 0. And why you take
away the division of \( V_n \) at \( V(n+1) - P \) inferior to \((P-1)(P-V_n)\) THANK YOU

---

Exchange 6

**Student:** hello my exercise is the following: 1/ convert into radians the angles given in degrees: a/ -200°, and b/55° a/ for -200 I found -10\(\pi\)/9 b/ but for 55 I can’t figure out its measure. how should I do it? 2/ then they ask me to find the principal measure of: a/-200° I concluded that the principal measure is: pi b/ for -49\(\pi\)/4 I found -\(\pi\)/4 is that correct?? 3/ I have to convert 5\(\pi\)/6 into degrees as well as -7\(\pi\)/12 for 5\(\pi\)/6 I have 150° for -7\(\pi\)/12 I have -105° is that correct?? Thank you for your help See you soon!

**Teacher:** Hello For question 1), it is an exercise of proportionality: one degree corresponds to \(\pi\)/180, so 55 degrees correspond to …. 2) Correct answer 3) correct answers

**Student:** hello, I didn’t follow your explanation very well! what do I do to bring 55° into radians? can you tell me more about it? thank you

---

*Note.* The original French speaking turns figure in the Appendix.
### Table 2

**Example of the Propositional Analysis of the Constituent Categories (Exchange 6, Table 1)**

<table>
<thead>
<tr>
<th>Proposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>hello</td>
</tr>
<tr>
<td>my exercise is the following:</td>
</tr>
<tr>
<td>convert into radians the angles given in degrees: a/ -200°, and b/ 55°</td>
</tr>
<tr>
<td>a/ for -200° I found -10π/9</td>
</tr>
<tr>
<td>b/ but for 55 I can’t figure out its measure.</td>
</tr>
<tr>
<td>how should I do it??</td>
</tr>
<tr>
<td>2/ then they ask me to find the principal measure of: a/ 21π, I concluded that</td>
</tr>
<tr>
<td>the principal measure is: π</td>
</tr>
<tr>
<td>b/ for -49π/4 I found -π/4</td>
</tr>
<tr>
<td>is that correct??</td>
</tr>
<tr>
<td>3/ I have to convert 5π/6 into degrees as well as -7π/12 for 5π/6 I have 150° for -7π/12 I have -105° is that correct??</td>
</tr>
<tr>
<td>Thank you for your help</td>
</tr>
<tr>
<td>See you soon!</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>ST1 (student)</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>ST2 (teacher)</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Constituent category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
<tr>
<td>x</td>
</tr>
</tbody>
</table>

---

Good luck
<table>
<thead>
<tr>
<th>ST3 (student)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>hello,</td>
<td>x</td>
</tr>
<tr>
<td>I didn’t follow your explanation very well!</td>
<td>x</td>
</tr>
<tr>
<td>what do I do to bring 55° into radians?</td>
<td>x</td>
</tr>
<tr>
<td>can you tell me more about it?</td>
<td>x</td>
</tr>
<tr>
<td>thank you</td>
<td>x</td>
</tr>
</tbody>
</table>

Note. a The coding scheme is available from the first author upon request. b Student constituent categories: 1 = opening, 2 = context, 3 = problem, 4 = personal work, 5 = request for help, 6 = politeness marker, 7 = closing. Teacher constituent categories: 1 = opening, 2 = reminder of the forum rules, 3 = request for clarification and remarks, 4 = procedural suggestion, 5 = evaluation of student work, 6 = encouragement, 7 = closing.
Table 3

*Relationship between Student Self-Regulation and Teacher Difficulty: Number of Observed Occurrences*

<table>
<thead>
<tr>
<th>ST1</th>
<th>ST2</th>
<th>ST3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-regulated (SR) student vs. non-self-regulated (non-SR)</td>
<td>Easy vs. difficult situation for the teacher</td>
<td>SR vs. non-SR student</td>
<td></td>
</tr>
<tr>
<td>SR</td>
<td>Difficult</td>
<td>SR</td>
<td>1</td>
</tr>
<tr>
<td>SR</td>
<td>Easy</td>
<td>Non-SR</td>
<td>12</td>
</tr>
<tr>
<td>Non-SR</td>
<td>Difficult</td>
<td>SR</td>
<td>4</td>
</tr>
<tr>
<td>Non-SR</td>
<td>Easy</td>
<td>Non-SR</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>SR</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-SR</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>51</td>
</tr>
</tbody>
</table>
### ST1: Student

- **Constituent Categories**:
  - Problem
  - Politeness
  - Context
  - Explicit request
  - Openings
  - Personal work
  - Closings

### ST2: Teacher

- **Constituent Categories**:
  - Openings
  - Suggest.
  - Closings
  - Rules
  - Encourag.
  - Precision
  - Evaluat.

### ST3: Student

- **Constituent Categories**:
  - Politeness
  - Explicit request
  - Context
  - Personal work
  - Openings
  - Problem
  - Closings

The charts illustrate the mean frequency per message for different constituent categories in each of the three student (ST) roles. The categories include various aspects of the interactions, such as problems, politeness, contexts, explicit requests, openers, personal work, and closings. The data suggest varying frequencies of these elements across the different roles.
Appendix. Examples of Help-Seeking Exchanges (cf. Table 1): Original French Speaking Turns³.

---

**Exchange 1**

**Student:** Salut J'ai du mal à faire une question pouvez-vous m'aider. Voici la question Comment Prouver que si $i$ appartient à $[1;n]$ $(n/[(i-1)!((n+1)-i)!]+(n/(i!(n-i)!))=(n+1)!(i!(n+1-i)!))$ Merci d'avance

**Teacher:** Bonjour, voici deux égalités qui vous serviront à mettre les deux premières fractions au même dénominateur: $(n+1-i)! = (n+1-i)(n-i)!$ $i! = (i-1)!$ A vous de poursuivre et bon courage

---

**Exchange 2**

**Student:** On considère 4 points A, B, C, D non coplanaires 1)construire les points: A’, tel que vecteur DA’=vecteur2DA C’ symétrique de D par rapport à C B’ tel que vecteur C’B’=vecteur2CB 2)Démontrer que les plans (ABC) et(A’B’C’) sont parallèles?

**Teacher:** Bonjour, pour commencer ton prochain message, ne pas oublier de dire bonjour et de dire ce que tu as su faire. Puisque vecteur DA’ = vecteur DA Puisque vecteur DC’ = vecteur DC Puisque vecteur B’C’ = vecteur BC il faut donc utiliser une transformation géométrique de centre D de rapport 2 qui transforme M en M’ avec: vecteur DM’ = vecteur2DM Je te laisse trouver son nom et l’utiliser. Bon courage.

---

**Exchange 3**

**Student:** Bonjour, voici des exercices de trigonométrie Exercice 1 -Déterminer le signe de $2 \cos x - 1$ sur $[-\pi/2 ; \pi/2]$. Faut-il procéder ainsi : $0 \leq \cos x \leq 1$ d'où $-1 \leq 2 \cos x - 1$ $\leq 1$ Puis calcul de $2 \cos x - 1 = 0$ ???? - Puis celui de $2 \sin x + 1$ sur $[-\pi/2 ; \pi/2]$. Quelle est la démarche à suivre ? Exercice 2 Etudier le sens de variation de la $f$ définie sur $I = [0 ; \pi/2]$ par $f(x) = 2 \tan x - 4x$. Je trouve $; f'(x) = 2(1 - \sqrt{2} \cos(x))(1 + \sqrt{2} \cos(x))$. D'après le tableau des signes de $f'(x)$, $f$ est strictement décroissante. Je n'arrive pas à trouver les valeurs en lesquelles la dérivée s'annule. Pourriez-vous m'indiquer la démarche à suivre ? Merci !

**Teacher:** Bonjour 1) Non, votre méthode est maladroite. On résout l'inéquation : $2 \cos x - 1 = 0 \iff \cos x = 1/2$. Les valeurs de x solutions se lisent sur le cercle trigonométrique et font intervenir $\pi/3$. Idem pour $2 \sin x + 1$ 2) Factoriser la dérivée en : $2(1 - \sqrt{2} \cos x)(1 + \sqrt{2} \cos x)$ en reprenant la simplification de votre dérivée. Chaque facteur s'étudie comme au 1 Un tableau de signes pour terminer Bon courage.

---

**Exchange 4**

**Student:** comment démontrer que $x^3 = 2x + 1$ je vous remercie bcp

**Teacher:** Bonjour IL faut envoyer le texte complet pour qu'on puisse faire quelque chose pour vous SOS Maths

---

**Exchange 5**

**Student:** Bonjour j'étudie actuellement en cours le chapitre des suites seulement le prof nous a donné un exercice que j'ai commencé mais que n'arrive pas a terminé. Voici l'énoncé:On appelle suite de Fibonacci la suite (Un) définie de la façon suivante: $U_0=1$, $U_1=1$ et pour tout entier naturel $n$, $U_n+2=U_n+1+U_n$. On définit alors la suite $(V_n)$, pour tout entier naturel $n$, par: $V_n=U_n+1/U_n$. J'ai donc ensuite calculé les onze premier termes de la suite $(V_n)$ et les 10 premiers de $(V_n)$. J'ai ensuite calculés les 10 premiers de $(V_n)$ et les 10 premiers de $(V_n)$. J'ai donc ensuite calculé les onze premier termes de la suite $(V_n)$ et les 10 premiers de $(V_n)$. J'ai donc ensuite calculé les onze premier termes de la suite $(V_n)$ et les 10 premiers de $(V_n)$. J'ai donc ensuite calculé les onze premier termes de la suite $(V_n)$ et les 10 premiers de $(V_n)$. Puis que lorsque $P=(1+rac5)/2$ alors $P^2-P=1$. Enfin je n'arrive pas à démontrer que $V_n+1-P=((P-1)(P-V_n))/V_n$ et SURTOUT d'en déduire que $V_n+1-P$ inférieur ou égal à 0.7.$V_n-P.$LES TRAITS VEULENT DIRE NORMES. MERCI D'AVANCE
Running head: NATURALLY OCCURRING HELP-SEEKING EXCHANGES

Teacher: bonjour, V(n+1)-P=1+1/Vn-P, (P-1)(p-Vn)/Vn=(p²-p+pVn+Vn)/Vn. Il suffit alors de se rappeler que p²-p=1 et c'est fini. 2) V(n+1)-P = (P-1)(p-Vn)/Vn donc \(\nabla(n+1)\)-P=(P-1)(p-Vn)/Vn il est facile de démontrer que Vn>0 donc Vn>1 donc \(\nabla(n+1)\)-P<(P-1)(p-Vn)) puis vous démontrez que p-1<0.7 Bon courage pour tout démontrer soigneusement

Student: Bonjour, merci pour toute vos indications mais j'ai quelques problème en math et je ne comprend comment on démontre que Vn supérieur à 0. Et pourquoi vous enlever la division de Vn à \(\nabla(n+1)\)-Pinférieur à \(\nabla(P-1)(P-Vn)\) MERCI

Exchange 6

Student: bonjour mon énoncé est le suivant : 1/convertir en radian les angles donné en deges : a/-200°, et b/55 ° a/pour -200 j’ai trouvais-10pi/9, b/mais pour 55 je narive pas à trouvé sa mesure. comment faire ?? 2/ensuite on me demande de trouver la mesure principale de : a/21pi jen est conclu que la mesure principale est : pi b/pour -49pi/4 jai trouvé -pi/4 est ce correct ?? 3/ je dois convertir 5pi/6 en degres ainsi que -7pi/12 pour 5pi/6 j’ai 150° pour -7pi/12 jai -105° est ce correct ?? Merci pour votre aide A bientot !

Teacher: Bonjour Pour la question 1), il s’agit d’un problème de proportionnalité : un degré correspond à \(\pi/180\), donc 55 degrés correspondent à… 2)Bonne réponse 3) bonnes réponses Bon courage

Student: bonjour , je n’est pas très bien suivit votre explication ! comment on fé pour retrouvé 55° en radians ?? pouvez vous men dire plus ? merci

Note. *The original French speaking turns are presented as such, that is, the spelling mistakes, capitalization, typing errors, etc. have not been corrected.