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Human-human-computer triads in institutional encounters

M.L.C. (Marloes) Herijgers*, T.C. (Tessa) van Charldorp, H.L.W. (Henk) Pander Maat

Utrecht University, UiL-OTS, Trans 10, 3512 JK, Utrecht, the Netherlands

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ABSTRACT

This paper presents an analysis of human-human-computer triads (HHC triads) in institutional settings, more specifically of the way in which advisor, customer and computer cooperatively generate the maximum loan amount in mortgage orientation consultations (MOCs). HHC triads involve a participation framework in which three actors collaborate in order to fulfill a specific consultation goal. We argue that the computer, despite its restricted interactional repertoire, is a full participant in this framework, considered in terms of the turn-taking system. First, we will focus on the global organization of HHC triads, on how these triads emerge in the course of institutional interactions and how they are closed. Second, we analyze the interactional dynamics of HHC triads in the MOC. We demonstrate how turn-taking rules apply, how turn-taking is managed by the participants and how the participants, including the computer, collaborate to perform a task. In the final section we will describe the local sequential structure of HHC triads and identify the actions of the participants, including the computer. The use of HHC-triads not only facilitates easy transitions for the advisors between activities in the consultation, it also cleverly combines the advisor's computer use and customer-centeredness. As the computer becomes an actual "participant" in this institutional goal-oriented participation framework, both advisors and customers show that they make use of the interactional affordances the framework creates.

1. Introduction

When prospective Dutch home-buyers require a mortgage, they often initiate a mortgage orientation consultation (MOC) at a financial institution, such as a bank, to become familiar with the most important mortgage terms, and more prominently, to learn how much money they can borrow. In order to generate an amount, the mortgage advisor, customer and computer engage in a joint project of entering software-requested customer data into the advisor-operated computer. Subsequently the computer delivers the maximum mortgage loan amount. This amount depends on so many parameters that computer use is indispensable for achieving this particular consultation goal.

During their interaction the customer is a so-called 'incidental user' of the software, who is not familiar with it, nor operates it (Inbar and Tractinsky, 2012a, b). In such a 'Customer-Agent-Computer interaction' setting (CACI) (Olsson, 2007; Kira et al., 2009), the advisor is the system expert who has to bridge the 'gulf of execution' (Norman, 1988) between the

* Corresponding author.
E-mail addresses: m.herijgers@uu.nl (M.L.C.(M. Herijgers), t.c.vancharldorp@uu.nl (T.C.(T. van Charldorp), h.l.w.pandermaat@uu.nl (H.L.W.(H. Pander Maat).

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customers' expression of their wishes and requirements and the computer's 'technical language'. In the MOC's human-human-computer interaction, in contrast to CACI, the computer screen is not only visible for the advisor, but also for the customers; still, the advisor is in charge of the computer.

In the MOC the mortgage advisor interacts with customers and operates the computer on behalf of customers; customers talk to the advisor and respond to the computer via the advisor; the computer demands customer input via the advisor and delivers output accessible for customers and advisor. So, during their interaction the advisor, customer and computer are mutually dependent when they want to fulfill the goal of their joint project: calculating the maximum mortgage loan amount.

The aim of this paper is to argue that the advisor, customer and computer constitute a distinct type of participation framework (Goffman, 1981) that has not been studied by CA-scholars previously: the human-human-computer triad (HHC triad). In the HHC triad (see Fig. 1), the advisor, customer and computer are actors in a *triadic participation framework* in a *triangular face formation* (Kendon, 1990; Tong et al., 2016) working on a single task: calculating the maximum mortgage loan amount (henceforth 'the task').

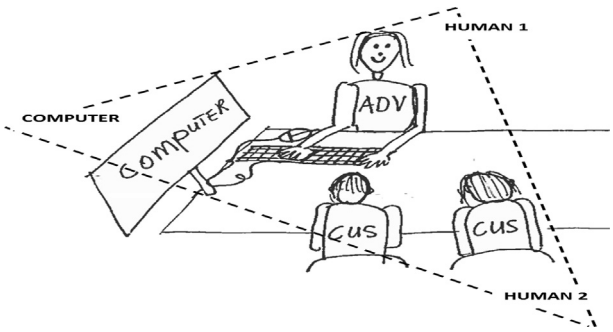


Fig. 1. Triangular face-formation of human-human-computer triad.

By applying conversation analysis (CA) and using the theory of turn-taking systematics (Sacks et al., 1974) we will show that HHC triads in mortgage consultations are a distinct type of participation framework in institutional interactions. Contrary to what previous studies have shown, in HHC triads computer use is not a side sequence that detracts from the main activity (Jefferson, 1972) in a different participation framework. Instead, all the actors in the HHC triad are full participants collaborating in the main interactional activity (Goffman, 1963), despite the restricted repertoire of the computer.

As the use of digital tools in our society keeps expanding, more and more institutional interactions will take place in task-driven triadic human-human-computer frameworks. For instance, in educational settings 'peers' are often collaborating on digital tasks, and teachers may help students with tasks in which the computer generates a certain output; and in health care settings, the computer will be increasingly used for diagnostic purposes.

This paper begins with a brief literature review on the use of artifacts in institutional encounters (section 2). Although triads are conceivable in everyday conversation, we will focus on triads in institutional encounters. These encounters are task-driven, goal-oriented and asymmetrical in their predefined participant roles (Drew and Heritage, 1992). After a short description of the data (section 3), the analysis is presented in three sections through which we will argue that computers are collaborative participants in HHC triads. First, we focus on the global sequential organization of HHC triads, on how these triads emerge in the course of institutional interactions and how they are closed (section 4.1). The next section (4.2) concerns turn-taking. We will demonstrate that HHC triads in MOCs display the general properties of ordinary human-human conversations observed by Sacks et al. (1974), despite the restricted automatic and non-spontaneous nature of the computer. Moreover, we will show that the computer cannot actually take turns itself, but that it does show 'turn-like' characteristics, because the other participants manage its turns. In the final section (4.3) we will describe the local sequential structure that occurs in HHC triads and the specific actions of the participants, including the computer.

2. The use of computers in institutional encounters

Ever since the introduction of new technology, workplace studies demonstrate how interactions are affected by machines, computers and other artifacts. An entire body of research discusses institutional interaction in offices, airport operation rooms, emergency dispatch centers and medical settings (Suchman, 1987; Whalen, 1995; Heath and Luff, 2000; Luff et al., 2000; Whalen et al., 2004), along two different lines. A first aspect studied was how humans interact with computers (Human Computer Interaction); a second aspect concerns how computer presence affects interactions between humans.

Our study continues along this second line of workplace studies on computer presence in interactions. In healthcare interaction studies, this topic has received particular attention because the computer was considered to be a threat to patient-centered care, for instance in the general practitioner's consulting room (Scott and Purves, 1996). Various CA papers supported this idea; they concluded that computer use negatively affected the patient-centeredness of the doctor-patient

interaction (Heath, 1986; Greatbatch et al., 1995; Robinson, 1998; Margalit et al., 2006; and Swinglehurst et al., 2014), the duration of the consultations (Chan et al., 2008), or that the computer became a competing voice (Swinglehurst et al., 2011). Not only in medical settings has the computer been considered to hinder the interaction's course; studies on police interrogations (Komter, 2006) and emergency dispatch calls (Whalen, 1995) point in the same direction.

However, in the institutional interactions studied so far, the computer has not been present as a third participant in a joint project. In studies by, for example, Nielsen (2016), Komter (2006), Robinson (1998), and Ruusuvuori (2001), the computer was only available in the institutional agent's interactional space. In the case of doctors, their 'home position' (Sacks and Schegloff, 2002) was frequently in front of the computer; when addressing the patient, they turned the upper body to engage in interaction with the patient. This is the first point on which our consultations differ; we find that at a certain point, the mortgage advisor turns his computer screen towards the customer.

Using a jointly accessible information carrier during interaction is not unique in itself. For instance, Dolata and Schwabe (2017) provide an intriguing study on what they call 'the choreography of paper' during mortgage consultations at a Swiss bank. The advisor structures the interaction by handing over certain papers to the client, or by placing them in the middle of the table for closer inspection. That is, both the material and the textual affordances of paper are used. A combination of these resources is evident when the customer is presented with two sheets of paper next to each other in order to compare two mortgage options.

However, our interest here lies not with ready-made information, but with an information carrier operated in real time. There are several studies on how paper or computer screens are used in collaborative, interactional text production. Kunitz (2015) shows how students in a second language acquisition context cooperate on the outline of a presentation, written down on a piece of paper, thus producing an 'emergent artifact'. Similarly, Mortensen (2013) details how Post-It notes are used during a collaborative design session, including how the participants co-attend to the actual writing process, and put the interaction on hold until the publicly available text is completed, or until the written words have been read aloud by the writer. These collaborative writing processes may use paper but also computer screens. Asmuβ and Oshima (2012) discuss two-party meetings in which a CEO and an HR manager jointly produce new strategy proposals. The HR manager operates a laptop connected to a large whiteboard attached to the wall. The CEO makes suggestions that are typed up by the HR manager, and subsequently discussed and modified.

These studies show how joint attention to evolving text is interactionally accomplished. In our MOC context however, the role of the computer goes one step further than retrieving or documenting information. First, the computer does not provide a white sheet, but asks for specific information inputs. And second, it is used to produce new information, namely the maximum mortgage loan amount which is one of the highlights of the consultation. It is this 'consultancy role' that makes the computer at least a potential third participant in the interaction. We did find one study on a constellation similar to the MOC, as it involves a sustained orientation to a computer screen providing new information: the execution of an ultrasound echo examination (Nishizaka, 2014). However, ultrasound echo examinations do not require interactional participation by pregnant women, as the only input needed for the examination is their belly.

Table 1
The role of the computer in MOCs versus other institutional settings.

Computer: Setting	Is equally accessible to participants	Asks for spoken input	Provides new output	Triggers explanation by its output
MOC	+	+	+	+
Ultrasound echo examination	+	−	+	+
Medical consultation	−	+	−[a]	−[a]
Collaborative writing	+	+	−	−
Police interrogation	−	+	−	−

[a] In future medical consultations, the computer might come to produce new output (i.e. diagnoses) which will probably also trigger explanations.

Table 1 summarizes a number of institutional human-human-computer interaction settings and compares the MOC's potentially triadic constellation with them.

In most of these interactions, an expert computer user (e.g. the institutional agent) faces an incidental user (e.g. the customer/patient/suspect). (Collaborative writing is less asymmetrical in that the role of the writer is often not institutionally pre-defined.) Our MOC activity is special in that the role of the computer exhibits all four properties indicated in the columns of Table 1: It is equally accessible to both the institutional agent and the lay customer, it asks for input from the customer, it offers new output, and its output requires explanations. Now, although these properties clearly create favorable conditions for a participant role for the computer, we need to look at the consultations to see how this interactional potential plays out in terms the participants' behavior and their orientation to the activity they are involved in. Before turning to the three analysis sections, we will describe our data.

3. Data

For this study we used 16 mortgage orientation consultations that were video-recorded with three cameras at one of the largest Dutch banks in 2013. All recordings were conducted with the written consent of advisors and customers. One camera focused on the customers (camera 1), another recorded the advisor (camera 2) and the last one focused on the computer screen (camera 3). Screenshots in this paper display three camera angles similar to Fig. 2 below.

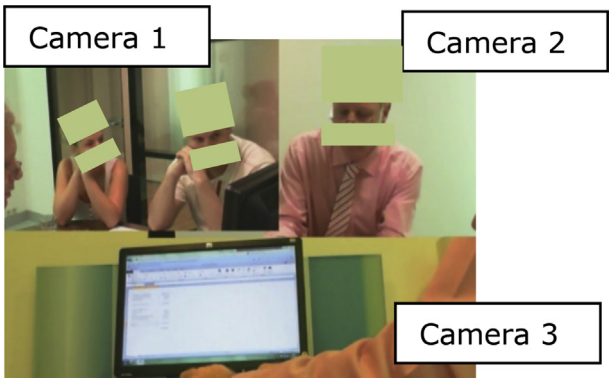


Fig. 2. Camera angles when recording the mortgage consultations.

First, the recordings were transcribed using the Jefferson principle of notation (2004). Then we added extra lines for multimodal annotations, in accordance with Mondada's multimodal conventions (2013 and also see appendix), dedicated to gestures, gaze and body movements for advisors (AD) and customers (CU or C1/C2 in case of multiple customers) and computer (PC). For reasons of efficiency, we will only present multimodal transcription when necessary in order to make our claim. English translations are our own and follow the Dutch lines in the transcriptions. For this paper's analysis, we focused on triadic participation frameworks that occur when advisors, customers and a computer cooperatively calculate the maximum mortgage loan amount, i.e. collaborate on 'the task'. Performing 'the task' is the main activity in all these 16 consultations. Our selection contains excerpts involving three different advisors.[1]

4. Analysis

4.1. Global organization of hhc triads

4.1.1. The introduction of the HHC triad

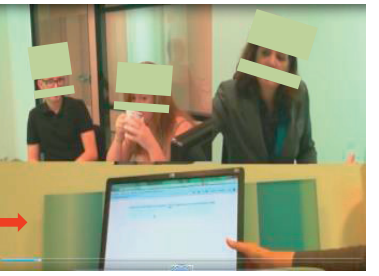
In the introduction stage of the MOC, the customer and advisor introduce themselves, the customers display their reason for coming and expectations are discussed. Then, the advisor sets up the triadic participation framework of the HHC triad. This is required to fulfill 'the task'.

In the vast majority of our MOCs the HHC triad is introduced by the advisors through announcements of a joint activity in which the computer will be involved. These announcements contain three important features to let customers know what is expected from them. Excerpt 1 below first of all illustrates that advisors announce the collaborative triadic activity by producing a collective 'we' that brings the advisor and the customer together in the next activity. Furthermore, we will show that the advisor involves the computer program into the next activity and that advisors display an embodied orientation towards the computer screen, that may include gestural behavior. Consecutively, customers respond with an embodied computer orientation.

Excerpt 1 is a prototypical example of how advisors announce the HHC triad in the consultation. The advisor introduces the computer software supporting the consultation's progress and then involves the customers in the activity and assigns the participants' roles.

[1] We would like to mention that not all customers who request a maximum mortgage loan amount, actually want to borrow that full amount of money. Sometimes, they only want to know if a certain house that they fancy is affordable. However, the only calculation the computer can deliver, is the calculation of the maximum mortgage loan amount. This calculation can cover all the frequently displayed customer requests, such as informing customers whether a specific house is affordable or informing customers in what price range they can search for a house.

Excerpt 1.



01 AD: **oké. #nou, wat ik wat ik &ga doen- ik ga het**
okay. well, what I what I will do- I will
#turns head towards computer
C2: &turns head towards computer

02 AD: **#hypotheekprogramma opstarten* en dan lopen we**
start up the mortgage program and then we will
#arm reaches for screen and slightly turns screen
C1: *turns head to computer

03 AD: **eigenlijk gewoon alle velden door,**
actually just address all the boxes,

04 **#komen we #&heel veel eh dingen tegen *e:hm ja dat ja,**
we will run into many eh things e:hm yeah that yeah,
#shifts gaze to customers again
#lifts up mouse and moves it
C2: &shifts gaze to adviser and back to screen
C1: *nods

05 AD: **&dan *zal ik ook gaandeweg even wat dingen uitleggen &over**
then I will also along the way just explain some things about
C2: &shifts gaze to adviser &nods--- >
C1: *shifts gaze to adviser

06 AD: **wat bijvoorbeeld wat voor *hypotheekvormen mogelijk zijn**
for example what kind of mortgage forms there are available
C1: *nods --- >

07 **en &eh ja eh waar *waar je &bijvoorbeeld op moet letten**
and eh yeah eh what what you for instance have to notice
C2: --- >& &nods --- >
C1: --- >*

08 AD: **eh *dus ja dan komen we heel veel dingen tegen dus &dan *eh**
eh so yeah then we encounter a lot of things so then eh
C1: *nods--- > --- >*
C2: --- >&

09 AD: **geef ik vanzelf wel &[informatie=**
I will provide naturally all the [information=
C2: &turns head towards computer

10 C1: **[((smiles))**

11 AD: **#=die eh,**
that eh,
#shifts towards computer ((smiles))

12 C1: ***ja ((lachende stem))**
yes ((smiley voice))
turns head to computer ((smiles))

13 AD: **die jullie nodig hebben en #als jullie vragen hebben dan,**
that you need and if you have questions then,
#clicks on mouse

14 **eh ja stel ze vooral.**
eh yes do ask them.

15 C2: **((nods three times))**

The advisor (AD) closes the introduction stage of the consultation with 'okay' in line 1 after the customers have displayed their reason for coming. Then she launches the new activity with a shift of her body towards the screen accompanied with *nou* ('well') (Mazeland, 2012, 2015) and *wat ik ga doen* ('what I will do') (line 1). The male customer (C2) reacts to the advisor's computer orientation by turning his head and gaze at the computer. The advisor displays her right to operate the computer, with: 'I will start up the program' (line 2). She turns the screen (see screenshot) to prepare the artefact (or technology) so that it is visible to everyone. Her motion is answered with a bodily shift of C1 towards the computer screen (line 2). All participants are now gazing at the computer screen. Then, in line 2 the advisor shifts from 'I' to 'we', thereby involving her customers in the subsequent activity: 'we will just address all the boxes and run into lots of things'. She explains her own role as informer on topics such as their mortgage options and the things they need to be aware of and other information they need (lines 4–7). Throughout this explanation, there is no motion on the screen, the adviser turns her gaze back to her customers (line 4) and the customers consequently turn their gaze back to the adviser (line 5).

C2 projects the end of the advisor's turn by turning towards the computer again (line 9) before the adviser does so herself. As soon as C1 also provides an acknowledgement token by smiling (line 10), the advisor turns physically towards the computer, returns the smile and simultaneously invites the customers to ask questions whenever they want to. That is, she distributes the roles and makes her customers responsible for asking questions about things that are unclear to them and she also makes them responsible for their understanding of the process.

This excerpt demonstrates that advisors announce a variety of activities that will all be taking place within the HHC triad. The triad allows the advisor to shift freely between activities; for instance, the computer can be abandoned because the advisor has to explain things, also, the customer can be abandoned to gaze at the computer screen again. This is not problematic, however, because they will reach their joint goal nevertheless. In this HHC-triad-beginning announcement, the advisor refers to all the different activities that may occur during 'the task' in the HHC triad, but also reassures the customers that all activities are leading to their shared goal: 'along the way' (line 5), 'just' (line 5), 'encounter a lot of things' (line 8), and 'naturally' (line 9). All these words signal activities that may occur within the HHC triad and make it possible to not account for them when they occur.

It is important for advisors that customers display an orientation towards the computer screen during the announcement of this phase within the MOC. We have an excerpt in our data (not shown here) where customers do not display an orientation to the computer after announcing the new phase. In this case, the advisor explicitly solicits a display of computer orientation and triadic HHC activity by checking with the customers whether the screen is visible.

Excerpt 2 demonstrates once more the importance of the distribution of roles within the announcement of the triadic activity. The advisor self-repairs his own utterance in order to invite customers to participate in the following activity.

Excerpt 2.

07	AD:	heel goed. eh zometeen in in de *very good. eh later in in the*
08		berekening die ik ga maken *calculation that I will make*
09		eh als we een berekening gaan maken, *eh if we will make the calculation,*

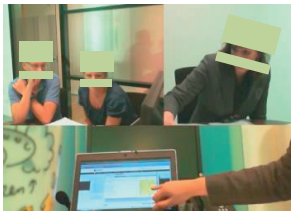
In line 7 the advisor announces that he is about to make a calculation, however, he changes from 'the calculation that I will make' into 'if we will make the calculation', including his customer in the triadic participation framework.

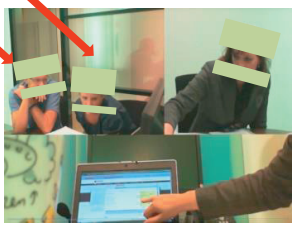
To sum up, the computer is brought into the consultation to fulfill 'the task'. The announcement of the triadic activity is always a verbal accomplishment, accompanied by body shifts towards the computer at some point. These shifts display computer orientation. Very often the advisors reach for the keyboard, set their eyes on the computer screen or grab the computer screen to turn it in order to make it visible for the customers. Customers seamlessly follow the adviser's announcement as well as the adviser's body and gaze shift and so the HHC triadic activity begins.

4.1.2. The ending of the HHC triad

The HHC triad ends when the computer has fulfilled 'the task' by displaying the maximum mortgage loan amount. In most cases, the advisor addresses the outcome of the calculation by pointing at the maximum mortgage loan amount and/or vocalizing the amount displayed on the screen. This is illustrated in excerpt 3. Just prior to where this excerpt starts, the adviser is scrolling through the information on her screen for about 10 s and mumbles 'let's see' while the customers are looking at the moving screen.

Excerpt 3.





```
01  AD:   >> #scrolling through screen
    C1:   >> *looking at screen
    C2:   >> &looking at screen

02  AD:   hij *geeft hier aan dat wat jullie &maximaal *kunnen
          he says here that what you can maximally can
              *((points with pink at screen-->
    C2:                                      &leans forward--- >
    C1:                                                *leans forward --- >
03  AD:   lenen aan hypotheek &tweehonderdzesennegentig*
          borrow as a mortgage is twohundredninetysix
    C1:     ------------------------------------------>))*
    C2:                    --- >&
04  AD:   duizend zeven honderd euro is.
          thousand seven hundred euro.
          (0.8)
05  C1:   *het tota:le *hypotheekbedrag?
          the total:  mortgage amount?
                  --- >*
          *looks at adviser
06  AD:   ja=
          yes=
07  C1:   =ja.
          =yes.
```

In line 2, the advisor refers to the computer as ‘he’ while physically pointing at the mortgage loan amount with her little finger (screenshot 1). After ‘you’ (line 2), the male customer (C2) leans slightly forward with his arms and head and after ‘maximally’ the female customer (C1) leans forward more explicitly to take a closer look at the screen (screenshot 2). The advisor vocalizes the amount as displayed on the screen (lines 3—4) and the male customer leans back just before the total amount is made verbally explicit. The female customer is still leaning forward and receives the total mortgage amount with a request for confirmation (line 5). During this request she moves her gaze to the adviser and finally leans back. The computer has now fulfilled its main task and is no longer asking for input. When the advisor confirms the customers' understanding in line 6, the customer acknowledges the amount with a ‘yes’ (line 7). Generally, customers acknowledge the amount that the advisor vocalizes with minimal tokens, such as nodding, ‘yes’ or ‘hmhm’. Such tokens may display that the information that the computer provides was already more or less expected by customers. This is likely because customers often made some rough internet calculations at home, before visiting the mortgage provider. However, sometimes they display surprise when the amount is delivered by the computer, such as: ‘can we lend that much?’ (excerpt not shown here).

Generally, after vocalizing the maximum amount the advisors press a button generating an orientation report that displays the customer details concerning income and savings and all the details on the loan. Loan details include the maximum amount that customers can borrow, consequently the maximum price of a new house and a monthly repayment schedule, which is based on for example the interest rate period and the mortgage form. From this moment on, the computer is no longer a full participant in the HHC triad.

4.2. Turn-taking in hhc triads

In this section we will show that HHC triads display almost all turn-taking properties Sacks et al. (1974) mention as characteristics of interaction between humans, such as ‘speaker change occurs and recurs’, ‘one party talks at a time’ and ‘number of parties can vary’. We will show that computer use in the HCC triads is the main activity in our consultations and that computer interaction is not treated as a side sequence (Jefferson, 1972); the human participants in the MOC display a shared orientation to the computer as a participant.

Excerpt 4 demonstrates how the advisor and customer adhere to the turn-taking system as described by Sacks et al. (1974) and orient to the computer as a participant that has a right to speak and to whom they can respond. However, strictly speaking, the computer's turns are allocated by the human participants, because their turns reveal how they understood the computer turns (Sacks et al., 1974). After all, the computer cannot take turns by itself, because of its restricted nature. In this extract, the advisor and customer collaborate on the computer program in which customer data should be entered in order to proceed with maximum mortgage loan amount calculation.

Excerpt 4.

01 PC: **((visual: empty box called 'year of birth'))**

02 AD: **en dan wordt hier gevraagd om uw geboortejaar?**
and then here is requested your year of birth

03 CU: **negentien zevenenvijftig**
nineteen fifty seven

04 AD: **#zevenenvijftig**
#fifty seven
#enters year of birth#

05 PC: **((visual: empty box called 'alimony'))**

06 CU: **geen alimentatie**
no alimony

07 PC: **((visual: empty box called 'financial obligations'))**

08 AD: **nee heeft u financiële verplichtingen?**
no do you have financial obligations?

Excerpt 4 shows that speaker change occurs and recurs, since the turns of different participants follow each other; the advisor offers the institution's paraphrase of the brief computer text (line 2), the customer responds to the advisor (line 3) and the advisor confirms what the customer just told him by repeating the customer and entering the data into the computer (line 4). We can also observe that one party talks at a time and that there are no occurrences of more than one speaker at a time. The excerpt furthermore shows that turn order in the triads is not necessarily fixed. The advisor and the customer both take turns if they are allocated by the computer software; the advisor by voicing a question, the customer by responding to the computer's request for information spontaneously or elicited by the 'vocalizing' advisor in two different ways.

When the advisor has entered the customer's year of birth in the computer program, the next field on the screen (line 5) requests information. In line 6 the customer selects herself to speak next (self-selection) in response to this turn by providing the requested information 'no alimony', which is acknowledged by the advisor (line 7) and then the advisor continues by asking if the customer has financial obligations. This time, the customer does not respond to the computer's turn by providing an answer to whether or not he has financial obligations. Instead, the advisor vocalizes the input required by the computer program.[2] Excerpt 4 also demonstrates in line 1, 5 and 6 that the computer visually displays turns that are pragmatically complete (Ford and Thompson, 1996), ending in transition relevant spaces. In line 2, the advisor mediates the computer turn with an expansion of the computer's first pair part (visual: empty box called 'year of birth'). The customer then responds by providing the computer-requested second pair part: his year of birth (line 3). We will elaborate on these mediation practices later on. In line 5 the computer launches a new request for information. This time the computer question is not mediated by the advisor; the customer immediately answers the computer question: 'no alimony' (line 6).

Excerpt 5 demonstrates that the customer can self-select in a transition relevant space that originates from a lack of response by the computer software, because the computer is slow. The excerpt also illustrates that turn gaps are dispreferred and also that participants avoid overlap.

Excerpt 5.

53 AD: **of een nieuw#bouw?**
or a newly #built house
#turns head to gaze at screen-->

54 C2: **geen *nieuwbouw #**
*no *newly built house*
*turns head to gaze at screen-->

AD: #clicks button on screen to move to next field

[2] We'd like to remark that the rest of the data shows that this question is always explained by the advisor due to its ambiguous nature; the question can project a yes/no answer, an amount or an open answer. So, the customer could not have spontaneously responded to this question.

55 PC: **@PC is 'thinking'-->**

56 **(.)**

57 C2: **.hh**

58 **(.3)**

59 C2: **e:hm**

60 **(.3)**

61 **wat- *#(.) wat verschilt t voor jullie tussen een**
*what- *# what difference is it for you between an*
*turns head to gaze at advisor-->

AD: #turns body to gaze at customer -->

62 C2: **bestaande en een nieuwbouwwoning?**
existing or a newly built house

Excerpt 5 starts with a question-answer sequence (line 53–54) about whether the customer wants to buy an existing house or a house that has just been built, since this has consequences for the costs of a house. As soon as the advisor enters the data she clicks a button on her screen that is supposed to take her to a next screen (line 54). The advisor already mentioned earlier in the consultation that she is experiencing some system delays today, so when the computer starts 'thinking' in line 55, displayed by a symbol on the screen, the customer hesitates and subsequently launches a question in the transition relevant place (line 61). Putting this question out here is an example of how customers display sensitivity to the turn-taking system in handling the computer as a third participant in the triad; this customer avoids overlapping the computer's next turn and he also avoids large gaps. Furthermore, this shows that the distribution of turns is not specified in advance, i.e. the advisor could also have initiated a turn whilst the computer is thinking.

As shown, the participants in HHC triads adhere to the rules for turn-construction and turn-allocation that Sacks et al. (1974) presented, such as not specifying distribution of turns in advance, one party talks at a time, etc. This is illustrated by the two excerpts above. However, the computer cannot initiate its own turn, therefore turn-taking in the HHC triads is slightly different from turn-taking in other settings: the turns of the computer are managed by the other participants, mostly through mediation. Moreover, in the HHC triad the computer screen is visible for both agent and customer, but only the advisor has the right to operate the computer. This asymmetrical relation to the computer leads to computer mediation practices.

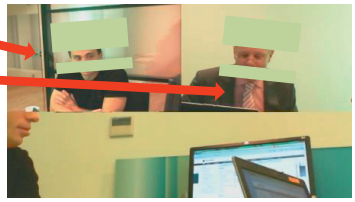
4.2.1. Computer mediation practices

Mediation refers to speaking for another participant to make a third participant understand something. Within CA, mediation practices are not a new phenomenon; for example, Knapp-Pothoff & Knapp (1986) studied interpreters' mediation practices in a multilingual context, with German legal advisors, Turkish guest workers and bi-lingual interpreters. More recent CA studies on mediation in multilingual contexts include Raymond (2014); Davitti and Pasquandrea (2014); Estrada et al. (2015). Furthermore, Hynninen (2011) studied mediation practices in an 'English as lingua franca' context where non-native students helped other non-native students. Finally, Houtkoop-Steenstra (2000) observed mediation practices in survey-interviews where interviewers mediated their survey-questions for interviewees. Our study seems to be the first to discuss mediation in human-human-computer contexts, with the computer being the mediated participant.

In HHC triads advisors can take up three different mediation roles and they can shift between these three roles, which was also noticed by Houtkoop-Steenstra (2000:45).

The first role we observed is that of 'vocalizer' (excerpt 6), a term borrowed from Clark (1996:20). The advisors skip a lot of fields in the software during the MOC, so customers do not always know to which requests for information they should respond. Therefore, the important ones are vocalized by the advisor. Generally, as a vocalizer the advisor transfers text from customer to computer and vice versa; one-on-one so to say, as can be seen below in excerpt 6.

Excerpt 6.

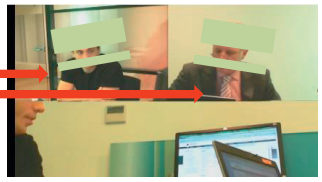


```
02  CU:  >>*gazes at computer screen-->
    AD:  >>#gazes at computer screen-->
03  AD:  0ké. dit is jouw eerste woning?
         0kay. this is you first house?
04  CU:  ja
         yes
05  AD:  e:hh we weten nog niet wat het bouwjaar van de woning is
         e:hh we do not know yet what the building year of the house is
```

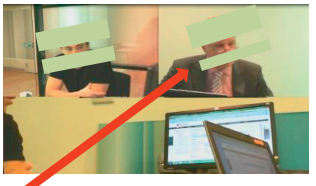
In excerpt 6 the software requires a confirmation about whether this is the customer's first home to buy, vocalized by the declarative question (line 3) to elicit the required customer information. The customer answers with a 'yes' (line 4). As we see in line 1–2, both participants are continuously focusing on the computer screen. They talk to each other via the computer screen.

The second role the advisor can adopt is the role of 'translator' or spokesperson (Houtkoop-Steenstra, 2000, p.47) for the designer of the computer screen and its questions. In this role the advisor translates the screen text to something comprehensible for the customers. In excerpt 7, the advisor explains the '*kosten koper*' that is displayed on the computer screen.[3]

Excerpt 7.



```
02  CU:  >>*gazes at PC screen-->
    AD:  >>#gazes at PC screen-->
03  AD:  kosten koper    #
         buyer's expenses#
                        #turns head to look at CU-->
04       hè dat betekent dat*
         hè[3] that means that *
    CU:                      *turns head to look at AD-->
05  AD:  [de bijkomende kosten voor jouw [rekening zijn
          the additional expenses are on your account
06  CU:                                  [ja
                                         [yes
07  AD:  [*nou #waar krijg je mee te maken, in eerste instantie
          *well#what you will encounter, in the first instance
    CU:   *turns head to gaze at screen again-->
    AD:         #turns head to gaze at screen again-->
08       moet de notaris een akte opmaken #
         the notary has to make a contract#
                                          #turns head to CU again-->
09  AD:  dat je   *eigenaar van het pand wordt.
         that you *become the owner of the house
    CU:           *turns head to look at AD-->
10  CU:  hmmhmm
11  AD:  daar vraagt hij geld voor *
         he will ask money for that*
    CU:                            *turns head to PC screen again-->
12  AD:  dat hebben wij geschat op ongeveer zevenhonderd euro.
         which we have estimated at around seven hundred euro.
13  CU:  ja
         yes
```



[3] Hè is difficult to translate. It is sometimes translated as the tag 'right', and can be placed at the beginning or end of a TCU. We do not know of any literature on the use of hè in Dutch interaction. It is not relevant for our analysis here.

Firstly, the advisor vocalizes the text projected on the computer screen '*kosten koper*'(line 3) and then 'translates' that these are costs that the customer is responsible for himself. Subsequently, the advisor starts elaborating on these specific costs by which he translates the institutional jargon to make it comprehensible in lay terms for customers (line 4–11).

The customer and advisor are both looking at the computer (line 3) when the advisor vocalizes '*kosten koper*' (line 3) and moves his head towards the customer once he starts his explanation. The customer in return looks at the advisor (line 4). In line 6 the customer overlaps the advisors' explanation with a confirmation and moves his head back to the screen again (line 7) to indicate that the explanation that the advisor has provided is sufficient and that they can both return to the computer again. The advisor in response also returns his head (line 7) to the computer, although we can see in the remainder, that the advisor continues to shift back and forth between computer-oriented vocalizations and customer-directed explanations.

The third role advisors adopt is the role of 'software expert'. In this role they provide online comments on computer processes when the computer is 'thinking'. Excerpt 8 illustrates how the system assigns a certain interest rate percentage to the chosen interest rate period.[4]

Excerpt 8.

```
02  CU:  >>*gazes at computer screen-->
    AD:  >>#gazes at computer screen-->
03  AD:  een tien jaar vaste rente. Nou dit doet het systeem die
         and ten years fixed interest. Well this is automatic the
04       #koppelt daar meteen een rente aan
         #system links this to an interest rate
         #gazes at customer-->
05  CU:  ja
         yes
06  AD:  hè dit is op dit moment onze rente.
         hè[4] this is at this moment our interest rate
```

At the beginning of this extract the advisor and customer are gazing at the screen (line 2). The advisor repeats that they have chosen an interest rate of 10 years and he explains where the amount of money comes from that is attached to this interest rate period (lines 3–4). Like a mechanic he explains what happens under the hood of the machine. Importantly, these excerpts show that the shifting of roles within the triad is an unmarked activity; it is never accompanied by explanations or accounts, nor do customers request explanations. This indicates that the customer accepts that the advisor and the computer are both included in the participation framework set up to achieve the consultation's goal.

In sum, the human participants treat the computer as a full participant in terms of turn construction and turn allocation. In the next section we will discuss the local sequential structures that occur within HHC triads and show how the mediation practices of the advisor affect the local organization of the HHC triads.

4.3. Local sequential structures within hhc triads

The most important sequential structure that occurs within the HHC triad is the Question-Answer-Typing structure (QAT) (Komter, 2006; Van Charldorp, 2011a,2011b). This is a Question-Answer adjacency pair with a post expansion of Typing, a sequence closing third by which the Answer is acknowledged. The Q-A adjacency pairs in HHC triads are often interrupted by the advisor mediation insert expansions, after the first pair part computer questions. This always happens to be a 'vocalization' in our consultations. These advisors' post-first insert vocalization expansions draw customers' attention to a question and at the same time elicit customers' second pair part delivery i.e. the requested information. By delivering information the customer responds to both the advisor and the computer. Then the advisor acknowledges the receipt of information materially by typing it into the computer. The customer monitors the screen to evaluate the advisors' typing behavior and in case of problems, the customer interrupts the data entry. However, if the advisor's acknowledgement is correct, the sequence continues without interruptions. Excerpt 9 demonstrates how these sequences generally unfold.

[4] See footnote[3] in excerpt 7.

Excerpt 9.

01	PC:	((visual:empty box called 'name child'))	PC:QUESTION
02	AD:	wat is de naam van jullie oudste dochter? *what is the name of your eldest daughter*	AD:MEDIATION
03	C1:	saar, s- a- a- r	C1:ANSWER
04	AD:	s- a-# a- r?	AD:CHECK
		#advisor types name into computer-->	AD:ACKNOWLEDGEMENT
05	C1:	hm hm	C1:CONFIRMATION
06	C2:	˚hij doet het niet hoor˚ ˚*no offense but it is not working*˚	C2:EVALUATION
	AD:	#grabs mouse and clicks on screen	AD:ACKNOWLEDGEMENT
		#types name into computer again-->	AD:CORRECTION
09	AD:	#het is een beetje onhandig zo *it is a bit inconvenient like this*	AD:ACCOUNT/COMMENT
		#withdraws hand from keyboard	See 1 in figure 2
10	PC:	((visual:empty box called 'date of birth'))	PC:QUESTION
11	AD:	en de geboortedatum? *and the date of birth?*	AD:MEDIATION
12	C1:	[twaalf *twelve*	C1:ANSWER
13	C2:	[twaalf twaalf tweeduizend zes *twelve twelve two thousand six*	C2:ANSWER
	AD:	#types date into computer-->	AD:ACKNOWLEDGEMENT
			See 2 in figure 2
14	PC:	((visual: empty box called 'name child'))	PC:QUESTION
15	AD:	en van jullie jongste dochter? *and your youngest daughter's?*	AD:MEDIATION
16	C1:	lisa, l- i- s- a	C1:ANSWER
	AD:	#types date into computer-->	AD:ACKNOWLEDGEMENT
			See 2 in figure 2
17	PC:	((visual:empty box called 'date of birth'))	PC:QUESTION
18	C1:	zevenentwintig negen tweeduizendelf *twenty seven nine two thousand eleven*	C1:ANSWER
	AD:	#types date into computer#	AD:ACKNOWLEDGEMENT
19	AD:	dus die is bijna jarig? *so she's almost having her birthday?*	AD:FORMULATION
			See 3 in figure 2

In excerpt 9 the advisor vocalizes many of the questions (lines 2, 11, and 15) that are displayed by the computer. This process is evaluated (line 6) by the customers; evaluations are displayed whenever they are negative for some reason - in this case because the computer doesn't respond to the advisors' typing. Once customers understand the questions that need answering in the software, they don't need to wait for the advisors' vocalization, as we can see in lines 16 and 18 where the customer responds to the PC herself. In fact, the customer is asked for their daughter's date of birth by the advisor in line 15 (continuing on the previous date of birth question with 'and'[5]) but C1 answers the question with the daughter's name (line 16) based on the question asked on the screen. Thus, C1 shows an orientation to both other triad participants instead of primarily focusing on the advisor.

Excerpt 9 shows several different sequential paths that occur in our data. We have schematized these paths in Fig. 3; they correspond with the numbers in excerpt 9.

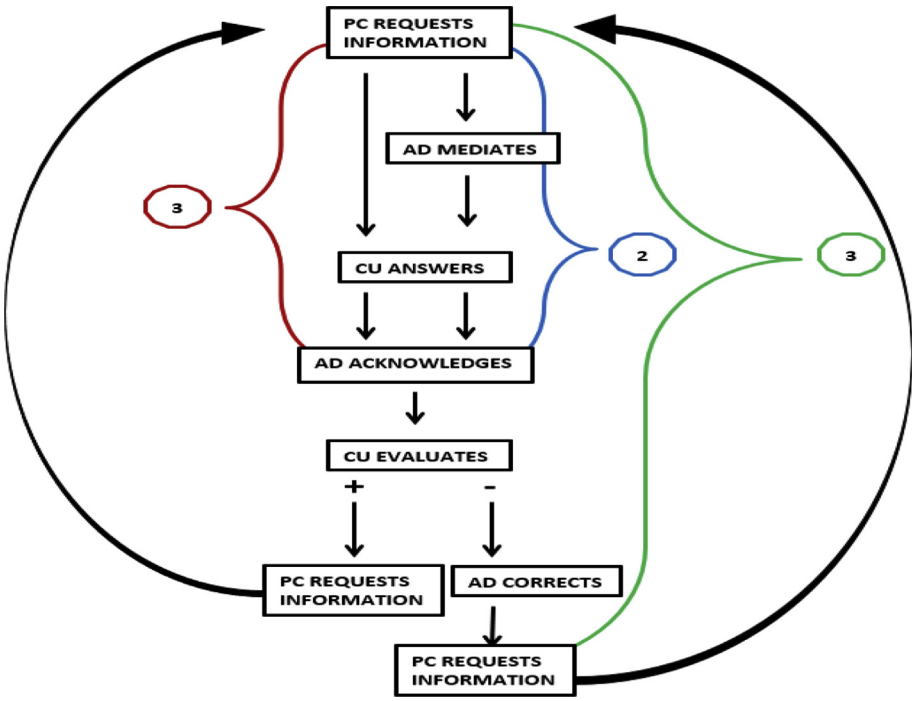


Fig. 3. Sequential structure within human-human-computer triads.

Fig. 2 has illustrated how the PC, the advisor and the customer collaborate in filling computer fields. It all starts when the computer screen displays a request for information. It shows that the advisor can (see 2) but does not need to (see 3) mediate the question displayed by the computer screen. Moreover, it shows that negative evaluations of advisors' typing acknowledgments require a correction before turning to the next question on the computer screen (see 1). Finally, the extended QAT sequences end, when the advisor or the customer continue with the next question on the computer screen.

In conclusion, because of the computer's programmed and non-spontaneous nature, the actions the computer can perform within the HHC triad are limited: the computer can ask questions, display waiting behavior and, in the end, show the maximum mortgage loan amount. Nonetheless, the computer performs actions needed for accomplishing the triad's task. Thus, the computer is indispensable as a participant and, the participants also orient to it as such. In addition, because the software requests information that is needed to make the calculation, the most frequently occurring adjacency pairs are question-answer pairs, with typing expansions.

5. Conclusion and discussion

This paper has identified a triadic participation framework of human-human-computer interaction in institutional settings. In this framework the computer is present as a participant that is essential for fulfilling a specific conversational goal. In our paper we distinguished computer use in our institutional setting from computer use in other institutional settings. We

[5] Advisors' vocalizations of questions are very often and-prefaced, which signals customers that questions are part of a routine agenda-based series of questions. By adding and to the question, advisors maintain the activity at hand in which participants collaborate (Heritage and Sorjonen, 1994).

argued that the computer is a full participant in HHC triads, because human participants orient to the computer as a third participant in terms of the systematics turn-taking (Sacks et al., 1974). We then discussed the global organization of HHC triads, and the local sequential structures within the triads and we reflected on the actions of the computer.

The analysis showed that the computer's conversational status in HHC triads differs from the status of artifacts or computers in other settings, because the computer in the triad demands input and delivers output that is 'new' to the human participants. In HHC triads the participants all collaborate in the same activity, and computer use is not a side activity, as it was in earlier studies (i.e. Nielsen, 2016; Komter, 2006; Robinson, 1998; Ruusuvuori, 2001). However, even in triads computers are not equal participants, since they cannot spontaneously self-select, and they only provide contributions that are fixed in length and specified in advance.

Human-human-computer triads are set up by explicit announcements. These announcements contain three features that are present in all of our consultations. In the announcements advisors use a collaborative 'we' that at least includes the customer and the advisor. Moreover, each announcement contains a reference that introduces the computer software or the computer program into the upcoming activity. Finally, announcements are closed by non-verbal behaviors such as gazing at the computer screen or moving the computer screen into the public space. These non-verbal displays show computer-orientation and as such, function as sequence closers and as openers of new sequences too. Through announcements and participants' responses, these human-human-computer triads are talked into being (Heritage and Clayman, 2010).

The explicit introduction of the triadic framework may arise as a response to having to combine computer use and customer-centeredness. Advisors sometimes demonstrate a certain computer 'wariness'; in one of the consultations the advisor explicitly mentions this, "*Actually I hate using the computer a lot in a conversation, but right now I do not have any other option*". At the same time, creating a triadic participation framework allows the advisor to involve the computer at any time in the conversation at hand, without having to account for transitions; i.e. transitions between dyadic interactions (customer-advisor or advisor-computer) and triadic interactions (customer-advisor-computer). We argue that within this type of interaction where the computer is explicitly introduced, used and needed for an output, we can generally speak of a triadic participation framework. Within this framework, the participants take part in dyadic and triadic constellations.

When the advisor and customer have entered the triadic participation framework, there is a lot of flexibility allowed. Advisors, who play a central role in every constellation, shift smoothly between the three different roles they play vis-à-vis the computer. They vocalize what is on the screen, translate the computer text to comprehensible language for customers and explain how the computer software works. The customers go along with the various roles taken on by the advisor and even respond to the computer prompts directly. In other words, participants in the triadic participation framework seamlessly make use of the interactional affordances it creates. These interactional affordances go beyond affordances created by the artefacts used in institutional encounters studied so far (see Dolata and Schwabe, 2017; Kunitz, 2015; Mortensen, 2013; Asmuβ and Oshima, 2012; and Nishizaka, 2014).

One of the main methodological concerns in this study is the presentation of our multimodal data. When analyzing multimodal interaction there is the choice what to transcribe and how to transcribe it, as Bucholtz (2007) also discusses. In our data we find a lot of question-response pairs in which the PC delivers the first pair part; therefore, we have chosen to dedicate a separate line to the computer 'voice'. However, this practice could be questioned, because at the end of the day it is the human participants who decide when to focus on what question on the computer screen. We are aware that the PC does not 'respond' or 'initiate' in the way humans do; but it is clearly an actor that human participants orient to as a participant. In CA first pair parts exist because of second pair parts; therefore, the PC is transcribed on a separate line as a third participant. That is, our representational choice allowed us to begin to make sense of 'computer participantship'—a phenomenon that will play an increasingly important role in institutional interaction in the years to come.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pragma.2019.06.010.

Appendix

Transcription conventions used in this paper based on Jefferson (2004) and Mondada (2014).

Symbol	Use
[text]	Indicates the start and end points of overlapping speech.
=	Indicates the break and subsequent continuation of a single interrupted utterance.
(# of seconds)	A number in parentheses indicates the time, in seconds, of a pause in speech.
(.)	A brief pause, usually less than 0.2 s.
. or ↓	Indicates falling pitch.
? or ↑	Indicates rising pitch.
,	Indicates a temporary rise or fall in intonation.
-	Indicates an abrupt halt or interruption in utterance.
underline	Indicates the speaker is emphasizing or stressing the speech.
:::	Indicates prolongation of an utterance.
(.hhh)	Audible inhalation

(*continued*)

Symbol	Use
((italic text))	Annotation of non-verbal activity.
* *	Gestures and descriptions of embodied actions are delimited between
+ +	two identical symbols (one symbol per participant).
Δ Δ	and are synchronized with correspondent stretches of talk.
*–>	The action described continues across subsequent lines.
––>*	until the same symbol is reached.
>>	The action described begins before the excerpt's beginning.

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Marloes Herijgers MA is a PhD Student in the Language and Communication group within the Utrecht Institute of Linguistics OTS. Her thesis focuses on customer-centeredness with regard to the design of mortgage information in general and mortgage consultations specifically.

Dr. Tessa van Charldorp is Assistant Professor Communication and Information Sciences in the Language and Communication group within the Utrecht Institute of Linguistics OTS. Her research focuses on institutional interaction.

Dr. Henk Pander Maat is a Senior Teacher-Researcher with the group Language and Communication within the Utrecht Institute of Linguistics OTS. His main research interest lies in the usability and readability of documents issued by organizations to inform citizens and consumers.