

## Teaching an Ethnographic Approach to Requirements Elicitation in an Enterprise Architecture Course

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**Abstract.** Requirements elicitation is an important part of information systems development. It is often performed as a technical task, but from a close look it is mainly a social activity. The main work consists of interacting with stakeholders in order to understand their work practices and how these would change with the introduction of a new IT system. Engineers are often not trained in the necessary social skills. Most elicitation techniques focus on the technical issues rather than the social issues. In this paper we describe a trans-disciplinary collaboration in which students of social sciences help to explain the ethnographic approach to Master's students in an Enterprise Architecture course taught in an engineering school.

### 1 Introduction

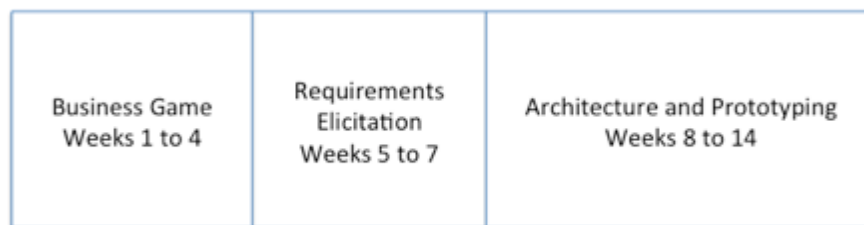
Requirements elicitation for the purpose of introducing a new IT system in an organization requires a detailed understanding of existing work practices, how these practices will change with the new system and what features the system must exhibit to support the new practices. Researchers who have studied elicitation techniques have concluded that observation of work practices is the best way to uncover these details [3, 21]. Despite this knowledge, IT engineers mostly rely on interviews and workshops, elicitation techniques that are known to produce abstract, superficial understanding. They are seldom trained in observation. Despite the early use of Ethnography techniques in Requirements Engineering as reported in [8, 9, 21] and their early consideration as basic elicitation techniques [6, 15], they are hardly known by IT engineers. They are mostly confined to usability studies and Human Computer Interaction (HCI) research, with some work still being done for elicitation, e.g. [18].

We believe that IT engineers can greatly benefit from techniques that have been developed in the social sciences. In this paper, we describe our experience in inviting students of social sciences to teach ethnography techniques to IT engineering students at Ecole Polytechnique Fédérale de Lausanne (EPFL). This was done in the requirements elicitation part of an enterprise architecture course called Enterprise and Service Oriented Architecture (ESOA) [16, 17]. In Section 2 we give a quick overview of

the ESOA course. In Section 3 we describe the ethnographic techniques we used. In Section 4 we explain the lessons we learned from this experience. In Section 5 we reflect a bit on the possible use of ethnographic techniques in IS development. In Section 6 we conclude the paper and formulate future actions we believe need to be taken.

## 2 The ESOA Course

The first and last authors of this paper (whom we call the teachers) joined academia in the 1996-1997 academic year after spending many years in industry. One of their first preoccupations was to design a course that would give the engineering students a feel of what it would be to do an IT project in a real company. Back in 1997, the teachers have embarked on a first attempt to teach the messy aspects of IT system development in a course called “Information Systems” [16, 17]. Sensing that it is impossible to teach these kind of aspects using the traditional lecture style, they began experimenting with a business game and role-play as pedagogical devices. Both business game and role-play were centered on the case of a fictitious airplane engine manufacturer. The role-play was designed to attract the students’ attention to observation as the best way to elicit requirements from stakeholders [17]. A new course was offered in 2007 as a full enterprise architecture course. Today, the course is made of three distinct modules: (1) Business game; (2) Requirements elicitation; (3) Architecture and prototyping, see Figure 1. This has changed from the structure we had in 2007 and 2008 as described in [17]. The course lasts for one semester, 14 weeks, each academic year with 6 hours in two separate sessions each week.



**Figure 1** The ESOA course structure

The pedagogical method used in the course is experiential learning as proposed by Kolb [12, 17]. Kolb’s experiential cycle has 4 dimensions Concrete Experience, Reflective Observation, Abstract Conceptualization and Active Experimentation. In the ESOA course we call these dimensions role-play, Debrief, Theory and Preparation for next role-play. We use this pedagogy mostly in modules one (business game) and two (requirements elicitation). In module two, the engineering students must define the requirements for an IT system that the company they work for (the fictitious airplane engine manufacturer) desperately needs to get out of deep financial troubles. The teachers and several teaching assistants play roles in the simulated company such as Investor in the company, CEO, CIO, COO, airplane repair mechanic, shipping clerk, sales representative, air club president and pilot from whom the engineering students must elicit the requirements for this IT system.

It is in this module two that we teach the ethnography techniques. Until 2013 the teachers used Contextual Inquiry [3, 8] as a set of observation techniques. Contextual Inquiry is a well-known method for eliciting requirements by observing users in their context of work, doing what is called contextual interviews. It is based on ethnographic observation techniques. It can be seen as light ethnography for engineers.

In 2013 the teachers invited students of social sciences to present an ethnography method to the engineering students. In-line with the experiential pedagogy, this presentation is given after the students have done their contextual interviews, so that the students can better understand the theory after having practiced it. The presence of the social sciences students inspired us to change the requirements elicitation part of the course so that the social sciences students now coach the engineering students when they redo the contextual interviews.

The teachers set up the role-play so that initially the students do normal interviews of the company's top management (CEO, CIO, COO), collecting some information about the problem the company is facing. They then have to formulate a solution in a hurry and present it to an investor. The investor asks them for more concrete examples, the root cause of the problem, and a description of the complete process. After debrief of this session, the students understand that they need to do observation in the field to really understand the problem and formulate a relevant solution. The teachers then present them with the Contextual Inquiry method [3, 8] that they put into practice during the next session of the course. In this session they do observation of the complete process, as proposed by the investor. The observation brings together people who are directly involved in the maintenance of the airplane engines, which is where the company loses most of its business.

The role-play is done to be as close as possible to what happens in practice in a normal repair process, albeit a dysfunctional one. As we described in [17], the process is played-out in real-time. Each role played by one of the teachers or a teaching assistant resides in a different room. The students must split their groups so that they have at least one person observing each role. Each teacher or teaching assistant playing a role is dressed for that role and has a surrounding that fits the role. The pilot has a pilot hat and comes frequently to the air club president asking for the airplane. The president responds by frequently calling the repair shop to inquire about her airplane. The mechanic attempts to diagnose the problem with the engine and to obtain a spare part from the manufacturer. The repair shop is simulated with LEGO bricks showing airplanes, cars, motorcycles and other vehicles in different states of repair, much like you would see in any shop (see Figure 2). Everybody is frustrated by the delay in the repair. A very general script was written for each role so that much room exists for improvisation. In this way, the role-play is somewhat different each year and much unexpected things happen.



**Figure 2 The simulated mechanic in his simulated shop**

Through the years of teaching this course and interacting with numerous students, the teachers have identified several beliefs that are shared amongst most engineering students: All problems have a technical solution; Stakeholders know what the problems are, they need us to identify the solution; Stakeholders give us facts about a situation; There is no need to take notes during interviews, we will remember everything later.

Inviting the social sciences students to the course was a major part of our on-going preoccupation with addressing these issues. In the following section we describe the ethnographic techniques that were explained in the course to enrich Contextual Inquiry from the point of view of the social sciences students.

### **3 Ethnographic techniques**

Ethnography, as practiced today, was, partly, conceptualized by Bronislaw Malinowski [13]. According to him, useful data could only be acquired in the field, and not in secondhand accounts. For Malinowski, interpretations must be “informed” by “actual experiences” [13 p. 3]. It is also important to specify how this information has been collected. Moreover, the reader has to be able to “draw the line between, on the one hand, the results of observation and of native statements and interpretations, and on the other, the inferences of the author...” [13 p. 3].

The methodological tools that have been developed in ethnography enable their users to understand specific social phenomena. A substantial part of the theoretical material described here and in the ESOA course were taken from a Bachelor course taught at the University of Lausanne (UNIL) on ethnography methods<sup>1</sup>. This course taught a sociological approach to ethnography, which includes the writing of synthesis and the search for patterns.

The ethnographical method is, originally, based on observation and the description of social interactions and discourse. During the ethnography course taken by the so-

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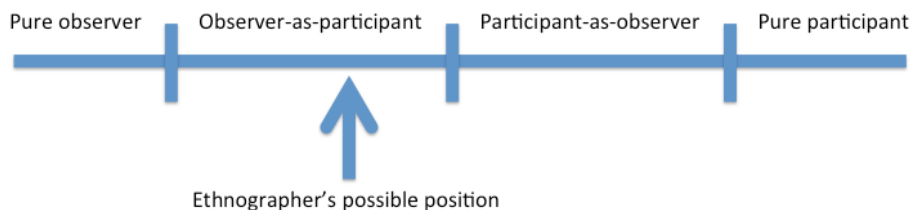
<sup>1</sup> This course is called “Approches ethnographiques de la culture et des médias” and is taught by Philippe Gonzalez at the University of Lausanne.

cial sciences students, they experimented with what engineers would call long-term observation of social phenomena that funnily enough is called a short-term fieldwork (about 2 months). This *short-term* study helped them to better coach the engineering students in the ESOA course.

### 3.1 The reflexive position of the ethnographer

To accurately observe and describe social situations, the ethnographer must pay attention to her position in the field. This analysis is called *the reflexive position of the ethnographer*. The way the ethnographer is introduced in the field, the way she talks and behaves have significant effect on her relationship towards the people in the field and the data the ethnographer will be able to have access to. For example, Lila Abu Lughod, in a study of a Bedouin society in Egypt, was introduced as the “daughter of an Arab and a Muslim” [1 p. 140], and not as an American woman, though both were true. This had much influence on the way she was perceived by her neighbors in the village: she was considered as an insider to the group, which came with advantages and disadvantages, as she had access to information that ethnographers considered as ‘outsiders’ could not have, but also left her with a sense of awkwardness as she had to ‘hide’ a part of her identity to her interlocutors.

This example shows that the ethnographer has to reflect upon his status in the field, as it gives her indications about the way she was considered, which says something important about the people she is studying, but also says something about the kind of data the ethnographers has had access to. This is important to avoid bias concerning the type of data that was gathered and the way it was gathered. Another element that is important to take into account about the ethnographer’s status is the positions she held during her field study.



**Figure 3 Ethnographer's position in the group**

According to Gold [7], the ethnographer can hold four different positions in the field (see Figure 3). The pure observer is the position in which the ethnographer does nothing else but to observe what is going on in front of her. This position excludes all contact with the informants, as well as all risks of “going native”<sup>2</sup> [7 p. 344]. At the

<sup>2</sup> The expression “to go native” expresses the risk of “becoming the other”, that is to say to take up the group’s discourse and implicit norms without questioning them.

same time, it can result in misunderstandings that would lead to ethnocentrism<sup>3</sup> if taken to its extreme. The observer-as-participant is less risky in terms of “going native” than the two next positions. The contacts with the informants are brief and often happen once. However, this position can be the source of misunderstandings, which can also result in ethnocentrism, in the analysis that the ethnographer makes of what she sees. The participant-as-observer is the position in which the ethnographer participates in the various activities of the group she studies and spends a considerable amount of time with them. The group knows who the ethnographer is and why she is there. This implies that the ethnographer establishes friendly relationships with the people she lives with. However, neither the ethnographer nor the informants forget the distance between them, as the ethnographer is still an ‘outsider’. Finally, the pure participant is part of the group she is studying and imitates the habits and behavior of her comrades. The most important thing to keep in mind when one takes this position is to remember that one is simulating a role without letting the other ones know. This position enables the ethnographer to grasp every aspect of the group’s social behavior. However, it also demands a clear distinguishing between the identity in the group and the identity as an ethnographer. Moreover, this position contains a strong risk of “going native”.

Often, the ethnographer takes the position in which she feels the most comfortable but also in which she can understand the informants and put herself in their shoes. However, the ethnographer’s position also depends on the field and the kind of data that she wants to gather. She also has to find a balance between “going native” and ethnocentrism. In practice, in the field, the ethnographer mostly goes from one position to another depending on the circumstances. However, she needs to be aware of it in order to know how she had access to the information.

### 3.2 Transforming observations into syntheses

During the fieldwork, the ethnographer takes notes while observing. This is then transformed into reports which detail the interactions, often described by keywords in the field notes. The next step is the commentaries, in which we come back on the reports and synthesize them. This is where the analysis appears. Finally, the memos are the final step before writing the paper. The commentaries, when taken as a whole, make a series of analyses, which answer or contradict one another. This is where we see different recurrent themes appearing, which will be the focus of the study. This process enables the ethnographer to select the elements of her observations that will be representative of her analysis<sup>4</sup>, as well as helping her see what themes appear and are problematic. These different themes and elements come from the realization that a

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<sup>3</sup> Ethnocentrism consists in placing one’s own culture as comparative reference, in which the other is compared to the ethnographer’s own values and norms. This places the other in a position of inferiority, which is extremely dangerous for ethical and scientific issues [5 p. 83].

<sup>4</sup> These elements are pertinent and exemplify the argument. They are what Katz calls “luminous descriptions” [11], this article was translated in [4], which was one of the key references for the course taught by Mr. Gonzalez.

certain pattern emerges in the field notes. This is when it is possible to see the main dimensions of the phenomenon we are studying.

### **3.3 Understanding the informant's language**

Thus, the necessity of understanding the point of view of the informants, the social group that the ethnographer studies, is extremely important. According to Smith [19], there are three levels in language and writing. The first level is the kind of talk we hear in the course of observation [19 p. 323]. Thus, it is the language that the ethnographer's informants use in everyday life. The second level of language is the talk that is used when the ethnographer and her informants speak together, either when the ethnographer asks questions during observation or during interviews. The third and final level of talk is the one that is part of the ethnographer's own language. It is part of the 'academic' discourse.

In other words, the ethnographer should be able to speak of what she has studied to her peers. In order to do this, she has to start from the observations, mediate them with what the informants say about their actions and translate this into her study.

It is necessary to look at the matter from the informants' point of view in order to understand it better. Numbers and theories do not suffice. In order to grasp the full phenomenon, we need to set ourselves at the social actors' level. The social phenomena we study have a multitude of dimensions that are necessary for understanding them. Moreover, not taking into account the informant's point of view can result in forcing elements to fit in categories that the ethnographer invented and not the informant, and therefore, can result in a biased analysis.

### **3.4 Summary**

The theory we presented in this chapter is part of what was given to the engineering students. For future presentations, we would like to add some more references like Abu Lughod's example. We would also like to show the students how they can solve a problem by using ethnography, mainly by using a particular vision of the field in which it is said that the solution and the problem comes from the field and the people who evolve within it.

## **4 Lessons Learned**

Over the years of giving this course, we (the teachers and students of social sciences) have made the following casual observations about the Engineering students and ourselves.

### **4.1 The tools of the ethnographer**

From the point of view of the teachers the intervention of the social sciences students brought several benefits. The theory they brought from the ethnography course ena-

bled us to anchor the observation part in much more substantial ground. The range of tools differs from Contextual Inquiry even though they have the same purpose. Indeed, the ethnographer's main tool for synthesizing is text whereas in Contextual Inquiry it is affinity diagrams (see Figure 4). Affinity diagrams are built by writing single concepts on post-it notes and grouping individual notes by similarity. This creates clusters of notes that are then assigned a category [8]. In the ESOA course we use both tools, text and affinity diagrams, to describe observations and create synthesis. The engineering students begin by writing text transcripts of their observations and then move to affinity diagrams such as the one in Figure 4.

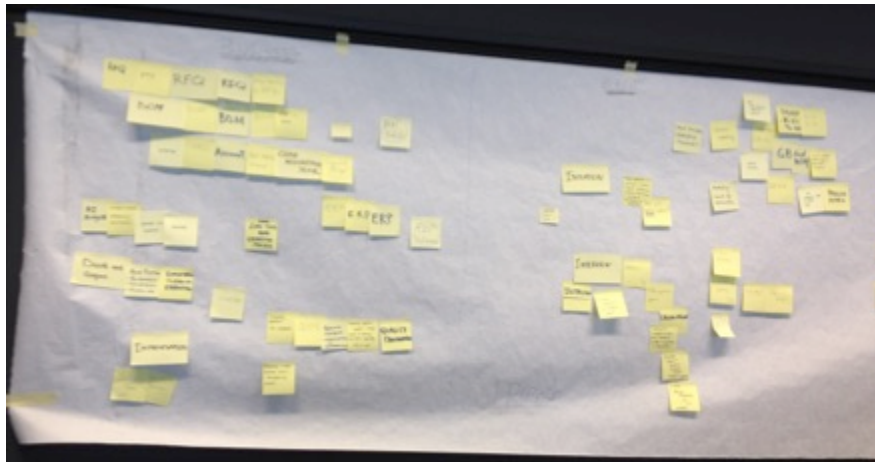


Figure 4 Affinity diagram produced by the 2012 ESOA class

## 4.2 The Time Element

Research publications such as [10, 22] report problems with the lengthy aspect of ethnographical studies as well as the amount of data they produce. This apparently contrasts with the need of corporate projects to quickly produce results. We have seen the same impatience with our students. Year after year they want to get to the core answers as quickly as possible.

The impatience of engineers with ethnographic studies is very visible in works such as Hughes et al. [10]. They report on the difficulty of dealing with the extensive length of field studies in the face of time pressure [10 p. 28]: “There seems to be a point in time - and it often comes quite early on - when no new insights or information are being uncovered.” They resort to what they call a “quick and dirty” approach where short field studies are used to uncover the *most important aspects* that inform design. This, for us, misses several points. How can you know what is important? How do you know when to stop the observation? What if some major learning point happens just after you stopped the observation? Fieldwork means indeed spending a lot of time waiting for something to happen. When something does happen, which eventually is always the case, the observer is happy to have invested the necessary time. This, however, can be only known in retrospect. Experienced observ-



ers know that it is worth their while to wait for something to happen. Novice, impatient observers tend to try to cut corners, missing much of the action, the learning and the requirements.

The time element has another dimension. On the one hand, ethnographic methods were not designed to be taught in such a short time and in a sanitized environment. On the other hand, it is difficult to propose a full ethnography course in an Engineering Curriculum. Our purpose is therefore only to draw the attention of the engineering students to these methods with the hope that they will be wary of secondhand information and will not be afraid to go in the field if given the opportunity.

That said, we acknowledge that it is a major challenge, in practice, to obtain the funds that are necessary to spend time with stakeholders. Depending on the nature of the work, it may be difficult to get access to the field. Nevertheless, we do our best to help the engineering students see the necessity to invest the necessary time to uncover as many details as possible. With enough students who have been exposed to the benefits of observation, it may be possible to transform practice.

When the engineering students learn that students of social sciences spend a “long time” just observing social phenomena without asking any questions, they usually show more patience towards stakeholders. We can sense this clearly in the second role-play session that follows the social sciences students’ presentation.

### **4.3 The reflexive position of the engineering students**

We make the engineering students aware of the notion of reflexive position during the debrief session that follows the role-play. Our observation on the reflexive position of the engineering students is that they are very uncomfortable at the beginning of the interviews. They don’t know what is their identity and tend to mix the identity of the teacher or teaching assistant with the role he or she plays. This makes for awkward encounters, with students who do not present themselves at the beginning of the interview, who begin firing questions rapidly and who may have attitudes that can be seen as socially inadequate in a business setting. This may seem like a secondary issue, but it creates a climate of unease and suspicion with the stakeholders that can prove difficult to overcome. This “problem” is probably due in part to the teachers’ rapid introduction of every role-play phase, which we do in order to introduce an element of hurry that is very often present in real business settings. While debatable as a learning strategy, it is part of our implementation of the experiential learning pedagogy whereby an active and fast-paced experimentation comes before an emotional and technical debrief.

Another side of the reflexive position is for the engineering students to appreciate the relationships between the stakeholders they observe and interview. These relationships sometimes constrain what the stakeholders can say about one another, and so the engineering students should not take what the stakeholders say at face value, but rather dig deeper into why stakeholders say what they say. We had the example of the president of the air club who is very nice and positive about her experience with the engine that is at the center of the role-play and that is giving her a lot of trouble. The students, believing that stakeholders give them facts, interpret this positive attitude as a fact that there are no problems with the engine. They have a problem reconciling

this “fact” with the “fact” that all during the role-play the engine has been in repair. They fail to see that the president is a friend of the main investor in the engine manufacturer, that it is this investor who has sent the students to the president. The president may, therefore, be reluctant to complain about the engine.

#### **4.4 Relationships with stakeholders**

We have noticed that the engineering students have great difficulty letting go of their engineering vocabulary and changing to a language comprehensible by the stakeholder. At every role-play the mechanic must tell them repeatedly to talk in a language he can understand. The students of social sciences insist on this aspect during their presentation and when we redo the role-play, we can see some improvement. This shows that when they are made aware of this issue, the engineering students correct their behavior.

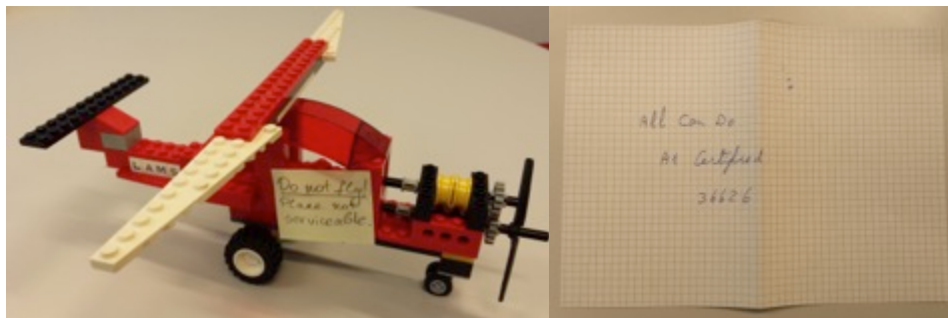
Another example we had a few years ago involved the air club president saying during the role-play that the airplane was at the repair shop for 5 days whereas, at the same time, the mechanic (who is in another room) said that he had the airplane in his repair shop for 2 days. When the two teams of engineering students reconciled the numbers during the technical debrief, they noticed the difference and accused the mechanic of lying. Mind you, they did not accuse the president of lying or even of being imprecise. Their base assumption was that the mechanic was lying. This is a theme we have seen repeating over and over again, consisting of having a different attitude toward people who are at a lower social scale. We have also reported on this in [17].

#### **4.5 Observations and evidences**

The engineering students often seem completely uninterested in collecting evidence during the first contextual interviews. Even during the second contextual interviews they still consider much of the detailed evidence as irrelevant. They are more likely to collect official looking papers than small pieces of paper on which a phone number is scribbled. It is very difficult to make them aware that this apparently insignificant piece of paper may be the key to unlocking the process they are supposed to discover and analyze. We therefore attempt to draw their attention to our claim that ethnography can help in identifying aspects that most engineers would consider unimportant details, but it is these unimportant details that can make or break the acceptance of the final product. Because it is not possible to know ahead of time what details are important and which can be neglected, they would do well to consider all details as important and sort them when they analyze and synthesize their findings.

The social science students noticed that some engineering students do not take notes during the observation or interviews. They may observe the stakeholder or even ask questions but would not register what they have observed or heard. Similarly, they ask questions but do not seem to listen to the answer because they jump from one subject to another without elaborating. The social sciences students helped the engineering students to take notes and pay attention to the available evidences.

The engineering students are also mostly focused on asking abstract questions rather than observing the minutiae details of the process unfolding before their eyes. For example, while the mechanic is trying to find the phone number of the key supplier he needs to call, a number he is sure to have written somewhere on a piece of paper, the engineering students will be asking him how many times a year he gets this particular failure in an engine. The point the teacher who plays the mechanic is making while looking all over the shop for the phone number is that the process is stuck during this time, and that the students would do well to ask for what phone number he is looking, note the problem and later suggest to correct it through some IT system requirement. If they don't pay attention to this small detail (and they usually don't), they miss that requirement while trying to find answers to questions that are not relevant to the process at hand. Hence, the same setting that would see ethnographers harvest loads of details, have engineers yawning with disinterest. It is easy to brush this off as lack of experience, but experienced engineers who have not been sensitized to detailed observation, may also be subject to the same problem. In figure 5, we show two examples of evidences that the engineering students have missed in the class of 2015. The note on the right is the one with the phone number that the mechanic is feverishly looking for, as explained. On the left is a picture of the airplane that is at the center of the role-play with a note saying that it is non-serviceable (a technical term meaning that it is broken) and must not be flown.



**Figure 5 Evidences missed by engineering students in 2015**

#### 4.6 Observations and syntheses

Sommerville et al. [21 p. 169] note that “the ethnographic record of work practice is inherently unstructured.” They argue that it is therefore “quite impossible to fit these observations into structured requirements analysis” and “it is difficult to draw design principles and other abstract lessons from a technique that is concerned with the detail of a particular situation.”

As we have seen above, the ethnography techniques to which we were introduced by the social sciences students include synthesis techniques that are precisely what the engineers are looking for. Thus, current ethnographic methods provide tools for summarizing and generalizing the detailed record. Social sciences students are trained to seek patterns of behavior, which is the Holy Grail sought by IT engineers. This re-

sembles more the techniques proposed by Contextual Inquiry [3] than the ethnography techniques used by software engineers in the 1990s (e.g. [9, 10, 20, 22]). The main difference seems to be in the tools used as we described in the beginning of this chapter.

#### 4.7 The opinion of one of the students

An interview of one of our ex-students who took the ESOA course in 2013 produced the following information:

- The student felt that his group didn't benefit much from the ethnography techniques because they were obsessed with finding a problem to justify the solution they identified during the first (non-contextual) interview session.
- The engineering students didn't know how to transfer the knowledge they gained during the ethnography presentation because the social sciences students showed how to observe and describe social situations but not how to identify problems and solutions.
- During the ethnography presentation the engineering student realized that they needed to observe more and interrupt less. Seeing that the social sciences students spent such a long time just observing a situation was an eye opener to the engineering students who were oriented toward quickly finding the problem and solution.

The teachers were aware of the difficulty the engineering students had in identifying the problems, but it is a difficult issue to solve. In future courses we intend to put more emphasis on problem identification.

### 5 Ethnography and IS Development Methods

Information Systems development seems to be shifting toward the adoption of so called agile methods, mainly XP [2] and Scrum [20]. These relatively new methods prescribe less upfront investment in requirements elicitation and more continuous contact with stakeholders as a way of providing requirements in the form of stories to the development team. Both XP and Scrum place high value on involvement with stakeholders in general and customers in particular. In XP this is called the principle of Real Customer Involvement [2]. In Scrum it is this responsibility is assigned to the Product Owner role [20]. As we see it, this is an opportunity rather than a threat to the use of ethnography in IS development. Both XP and Scrum do not say how to create and maintain this on-going relationship with customers. Ethnography can be seen as providing some of the tools necessary for this long-term involvement. How this can be done in practice is an open question. As we have mentioned in Section 4, obtaining resources for long-term observation is a challenge. In Scrum this means that the Product Owner should have the time and budget to invest in long-term relationship with his customers. If the Product Owner is assigned to too many projects, probably the first aspect of her job to be removed will be this on-going relationship.

Beyond the tools for eliciting requirements, ethnography can improve the use of the socio-technical design [14] by showing that the design of work processes by only

the work team may result in sub-optimal solutions because the work team may be blind to some problems and possible solutions. In our experience, field workers usually know more about their work than managers or IS engineers. However, they are also often blind to some possible improvements because the norms governing their behavior are tacit and considered... normal. A non-native and nevertheless benevolent observer can be of great help in proposing but not imposing improvements. By adding a non-native ethnographer it may be possible to identify unseen problems and suggest better solutions. This means that IS engineers should not go too native with one group of users at the expense of another. They need to maintain a balance of native and non-native. Being too native with one group can result in being perceived as alien in another, a situation that actually happens in practice.

Finally, long-term field studies may not be considered useful in situations where management envisions to radically change the work practices. In these situations, other humanistic approaches, such as socio-technical design would not be considered either, as reported by Mumford in [14].

## 6 Conclusions

We presented the case of an Enterprise Architecture course in which social sciences students were invited to teach ethnographic techniques to engineering students. We hope that this will have an effect on both research and practice.

Information Systems research is a fairly closed, self-referencing field. It is mostly based on software engineering and computer science techniques. Whereas the development and maintenance of information systems is indeed an engineering discipline, the adoption of these systems is mostly a social problem. The social sciences should be a lot more represented in IS research than they are now.

Most of our engineering students will go on to work in an organization where they will be involved in IT systems development. If our experience is of any value, it shows that development is becoming increasingly automated, through the use of turn-key systems bought and used as-is. In this context, building good relationships with stakeholders is becoming nearly as important as possessing technical skills. Our hope is that this course will help these future engineers to be more aware that IT projects should not be seen from a purely engineering point of view, and that ethnography can offer them some useful methodological tools.

**Acknowledgements:** We thank Philippe Gonzalez, Gorica Tapandjieva Aarthi Gopal and George Popescu for their help with shaping this paper.

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