Legitimate Participation? Instructional Designer - Subject Matter Expert Interactions in Communities of Practice

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Abstract: This paper addresses the question of how instructional designers work with subject matter experts (SMEs) in unfamiliar content areas. It is suggested that working as an instructional designer in an unfamiliar content area is similar to an anthropologist working in a foreign culture. Instructional designers enter communities of practice and attempt to understand the context as well as complete learning designs for specific audiences. It is suggested that unlike new professionals who work toward full participation and full acceptance in the community of practice, the instructional designer aims for legitimate participation within the sub-culture. To successfully achieve legitimate participation the instructional designer will need to utilise a number of communication strategies to optimise the interaction with the SME.

Introduction and Personal Background

My personal experience in the field of instructional design has been meaningful and professionally rewarding. I have worked in three different countries and numerous content areas and professional sub-cultures. Some of these areas include: the oil and gas industry in Canada; open-cut coal mining and alumina processing in Central Queensland, Australia; and medicine, nursing, dentistry, psychology, physiotherapy in Melbourne, Australia. I am now working in Hong Kong, China where both the culture and language challenge my instructional design skills. As an instructional designer I enjoy the challenge and 'mental gymnastics' of working in these unfamiliar content areas. My focus has been on the design and development of technology-based projects in the areas of multimedia and online learning. In addition to working on over three hundred different projects over the last ten years I have also facilitated several workshops in the area of optimising instructional designer – subject matter expert interactions in the design and development of online and multimedia projects. I am constantly surprised by the consistency of the issues and perceptions of instructional designers in relation to subject matter experts. Figure 1 provides a summary of some of these perceptions by instructional designers.

As can be seen from Figure 1 some of these perceptions are not necessarily conducive to optimal instructional design. My own experience in working with subject matter experts has been largely successful; however instructional designers do not always have harmonious interactions with subject matter experts because this is one of the most difficult aspects of instructional design. An expert's knowledge structures are highly organized, well integrated and are a rich source of information on the content area. In the education and learning context, one of the content expert's functions is to provide accurate content to the design team by providing a clear description and explanation of the content area being examined. In addition another role is to assist the designer's conceptualisation by clarifying and verifying the content (Keppell, 2001). This paper attempts to answer how instructional designers work in unfamiliar content areas within communities of practice and suggests that working in unfamiliar content areas is similar to an anthropologist working in a foreign culture. Instructional designers need to be aware of their participation within a community of practice as this may explain some of the inherent difficulties in the interaction with subject matter experts.

Communities of Practice

Communities of practice (Lave & Wenger, 1991) are fundamental to our daily living. We are all part of communities of practice, many of which are so informal and "so pervasive that they rarely come into specific focus" (Wenger, 2002, p. 7). Many of these communities of practice do not offer formal membership, some are central to our lives whereas others are more peripheral. A community of practice could be defined as "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger, McDermott, Snyder, 2002, p. 4).

Instructional designers must address the unique influence of communities of practice on their work and must conceptualize the sub-culture of practice, language, processes, procedures and system. Roth (1998) suggests that communities "are identified by the common tasks members engage in and the associated practices and resources, unquestioned background assumptions, common sense, and mundane reason they share" (Barab & Duffy, 2000, p. 10). Without an understanding of this milieu it is almost impossible for the instructional designer to be effective. For instance an instructional designer working with several faculties in a university setting will often find it difficult to work in a similar way with each faculty. Some faculties are more accepting of the role. Each faculty has its own boundaries of practice and their idiosyncratic professional language and customs similar to a foreign culture. When we travel to a foreign culture we experience some of these difficulties but we do not necessarily expect major differences working with different content areas in one University. However, "unquestioned background assumptions" (Barab & Duffy, 2000, p. 10) may explain the reason for this difficulty.

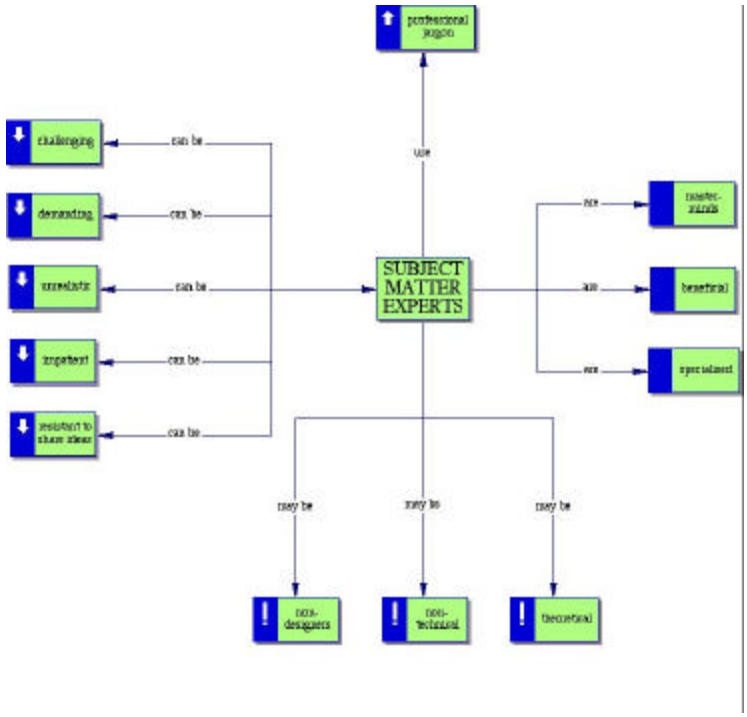

Figure 1: Common perceptions of subject matter experts by instructional designers

Barab and Duffy (2000) also suggest a number of characteristics of communities of practice. They have common cultural and historical heritage with shared goals, belief systems and collective stories. Learners need to access and inherit this heritage to become enculturated into the community of practice. This assures the continuity of the community through the acceptance of new members. "For example, it is through stories (narratives) that community members pass on casual accounts of their experiences to replace the impoverished descriptions frequently codified in manuals and texts" (p. 37). Secondly, "a community is an interdependent system in terms of the collaborative efforts of its members, as well as in terms of the greater societal systems in which it is nested" (p. 38) The individual transforms and maintains the community by learning the practice while at the same time the community transforms and maintains the individual by allowing them to become gradually enculturated. A third characteristic includes a reproduction cycle as newcomers move from peripheral to core membership through a process of enculturation. Legitimate peripheral participation appears to be a "primary motivation for learning and involves participating in authentic activities and creating an identity that moves an individual toward becoming more centripetal to a community of practice" (p. 39)

Legitimate Participation of the Instructional Designer

Learners study a field of knowledge within the university setting for a significant period of time. For example, medical students through the process of enculturation gradually learn what is expected of them within their field of practice. In studying a problem-based learning curriculum they learn the process of how to make a diagnosis and work with patients. "Problem-based learning is an example of one approach to creating practice fields" as students "are presented with real historical patients to diagnose" (Barab & Duffy, 2000, p. 30). The medical

students have the status of legitimate peripheral participation when they begin their degree program and work toward attaining full participation within the medical profession. They may also specialise and enter other communities of practice and work toward attaining full participation as a radiologist, dermatologist, psychiatrist, paediatrician, etc. In this case learners will need to master knowledge and skills and "move toward full participation in the socio-cultural practices of the community" (Lave & Wenger, 1991, p. 29). Through this process newcomers become part of the community of practice and eventually attain the status of core members or full participation which tends to be the accepted avenue for becoming a full member of a professional community of practice.

However, although instructional designers attain this status in their own field of instructional design and follow a similar process in their profession, there is one major difference to many other professions. Instructional designers specifically apply their skills in other communities of practice as a core function of their role. I suggest that instructional designers never fully attain full participation in the communities of practice in which they work. This is because they have never learned the skills of the profession as a newcomer and worked toward full participation as an active member of this community. This is the same whether the community of practice consists of coal miners or medical doctors. Instructional designers are process-oriented individuals who despite having no content expertise (in the community of practice) have a set of representations based on a "design model". The design model includes general experience, educational background and instructional experience, and can be seen as analogous to a script (Schank & Abelson, 1977). Scripts are knowledge packages in memory which allow us to understand routine activities (e.g. eating in restaurants, visiting the dentist). The designer has a generic script which can be applied with variations to new educational problems. This suggests that there are a number of generic skills that instructional designers must possess to work in unfamiliar content areas. A brainstorming session with a number of instructional designers suggested that the following attributes were required by the instructional designer. It is important to note the number of times the concept of communication was mentioned by the group.

Figure 2: Skills required by instructional designers to work in unfamiliar content areas

A Communication Model for Optimising ID-SME Interactions

A previous paper (Keppell, 2000) outlined a number of key principles at the heart of an instructional designer – subject matter expert interaction. This paper elaborates a number of these key principles which can be utilized in the interaction. As can be seen from the above discussion instructional designers need to account for the nuances of the community of practice when interacting with the subject matter expert. A lack of attention to this milieu could result in non-acceptance of the instructional designer as a change agent or ineffective learning design. The following discusses several principles which can assist the instructional designer in the interaction with the SME.

Determining the Philosophical Assumptions of the SME

In the author's interactions with SMEs, one of the most important principles has been to clarify the roles and expectations of the client/SME. Many projects fail due to an inappropriate consideration of what the client/SME expects from the project. For instance the SME may not understand that they need to be constantly involved with a project. A project will not be successful if the SME has irregular contact with the instructional designer and development team. It is therefore essential to establish a successful working relationship with an SME by determining the philosophical assumptions of the SME before beginning the instructional design. The ideal method of interaction between the designer and SME is a collaborative approach. This requires the designer and the SME to assist each other in the elicitation and conceptualization process. It focuses on "a process directed towards the achievement of some mutually agreed and valued instructional result" (Davies, 1975, p. 355). The communication process between the designer and SME cannot be overemphasized. The designer must be aware that SMEs will have different characteristics in different communities of practice.

Using a Combination of Interview Methods when Working with the SME

Novak (1998) suggests that "the personal interview is the most powerful tool for capturing the knowledge held by an individual or groups of individuals" (Novak, 1998, p.101). Three interview methods with particular promise are informal conversational interviewing, ethnographic interviewing and the teachback interview. These have been selected as viable methods as they can be utilised at different stages of the instructional designer-SME interaction. The informal conversational interview technique should be used in the initial meeting with the SME, whereas the ethnographic interview provides detail once rapport has been developed with the SME. The teachback interview strategy is utilised in conjunction with the concept map at the beginning of client meetings.

Informal Conversational Interview

"The informal conversational interview relies entirely on the spontaneous generation of questions in the natural flow of an interaction" (Patton, 1990, p. 280). Characteristic of this method of interviewing is that the conversational style of the interviewer is utilised in such a way that the SME may view the interaction as a general conversation about the area of interest. This method of interviewing is particularly useful in the first meeting with the SME when you wish to develop rapport and determine general information about a topic. "The conversational interviewer wants to maintain maximum flexibility to be able to pursue information in whatever direction appears to be appropriate, depending on what emerges from observing a particular setting or from talking to one or more individuals in that setting" (Patton, 1990, p. 281). The interviewer needs experience in conducting this type of interview as they need to 'go with the flow'. "Depending upon how the interviewer's role is defined, the people being interviewed may not know during any particular informal conversation that the purpose of the conversation is the collection of data" (p. 282). This method of interviewing allows the interviewer to be highly responsive to the person involved and allows an individualized attention to the immediate needs of the SME. Indicative of this approach is the ability to 'think on ones feet'. The interviewer may need to develop skills that emphasise and encourage easy interaction with people in different settings, the ability to generate rapid insights, formulate questions quickly and smoothly and be responsive to the SME.

Ethnographic Interview

The ethnographic interview involves conversations with the client which have the explicit purpose of focusing on the tacit knowledge of a culture. Davenport and Prusak (2000) suggest that "tacit, complex knowledge" has been "developed and internalized by the knower over a long period of time" (p. 70). Three broad types of questions are utilized in an attempt to examine this tacit knowledge: descriptive, structural and contrast questions. Spradley (1979) outlined these general types of questions for eliciting knowledge from a person in a foreign culture using an ethnographic interviewing technique. An example of a descriptive question would involve

asking a SME to give you a real or virtual grand tour of an area so that you can obtain a macro-perspective of the content area. Structural questions are more micro and may focus on the procedural steps involved in a task or the workflow process. Contrast questions ask the SME to contrast one concept with another in order to clarify the specific meaning of the concept. Asking the SME to suggest how one concept is related to or different from another allows the tacit knowledge of the expert to become more explicit.

Teachback Interview

The teachback interview strategy is based on the "conversation theory" of Pask (1975). This theory is not concerned with general conversation, however, but with the "processes of meaning exchange that underlie all language" (Gregory, 1986, p. 839). There are four advantages of the teachback interview which include: (1) verbalizing a concept for understanding, (2) externalizing private knowledge, (3) active participation, and (4) addressing misconceptions. A basic premise of the teachback interview is that the very act of teaching a concept back to the SME assists the designer to conceptualize the instructional content. In addition the private knowledge of the instructional designer is externalized for the SME which promotes active participation by the SME and instructional designer. There is a constant process of explanation, clarification, translation and re-explanation throughout the interview. The interview begins with the expert talking about the topic and the designer re-constructs and re-translates the appropriate information, teaching it back to the expert. The teachback interview may also help to prevent misconceptions by dealing with each concept in turn until a mutual understanding occurs. This process of examining concepts until both share the same concept will almost guarantee both the designer and the SME are on the same wavelength regarding the content being elicited in the designer–SME interview and will help to prevent the formation of misconceptions.

Utilise Generic Questions

Novak (1998) suggests that the "key to successfully probing and capturing how the interviewee thinks, feels, and acts toward an idea, thing, or experience is for the interviewer to ask the type of questions that reveal as spontaneously as possible the interviewee's thoughts, feelings and actions" (Novak, 1998, p. 101). In order to optimise the time spent with the SME, the designer may find it useful to use a series of generic questions to assist in interacting with the SME. A schema of questions provides some means of scripting the interaction. Initial questions should focus on the construction of a conceptual infrastructure, whereas clarification questions should be used in subsequent interviews to elaborate the content. Questions may include asking the SME to imagine a competent person completing a task. Other questions may focus on the sequence of steps for a task. More elaborate questions may focus on the characteristics of each step in the sequence or examples, analogies or comments about the task. In interacting with SMEs these questions assist in focussing the SMEs attention and allow the designer to approach unfamiliar content in a logical and systematic manner (Keppell, 2000). Other questions more specific to the project may include: What is the project about? What do you want students to learn? How is it taught now? How do you think it should be taught? Why multimedia/online? What is the learning design (eg. problem based, directed, case based)? What are you doing now and why do you want to change it? What factors within the organizations will influence the design of the modules? What are priorities in the current situation? Is there appropriate technical and educational support for the innovation? Who are the main stakeholders? Who is the audience? What are the demographic characteristics of the trainees (age, gender, IT familiarity, attitude to topic)? What are the trainees preferred learning styles? How will trainees learn most effectively? What are the demands of trainees' work and lifestyle? How long will they spend learning at one time? What is the estimated number of users?

Using a ConceptMap as an Intellectual Scaffold

Ausubel (1963) suggested that knowledge is acquired when it is meaningfully related to, and subsumed under, an already existing concept or body of knowledge. He suggested that the essential factor in the acquisition of knowledge is that propositional knowledge must be linked to what was previously known. This process "involves the subsumption of potentially meaningful propositions under more inclusive and general ideas in existing cognitive structures" (Ausubel, 1968, p. 52). Ausubel developed the concept of an advance organizer. "Advance organizers consist of introductory material at a higher level of abstraction, generality and inclusiveness than the learning task itself" (Ausubel, 1963, p. 29). The advance organizer was Ausubel's scaffold for teaching and learning. He suggested that the use of advance organizers should assist the integration of knowledge into the cognitive structures by creating an intellectual scaffolding (Ausubel, 1960). Intellectual scaffolding refers to the creation of an infrastructure of information which will allow the anchoring of new material. It acts as an infrastructure for new material which facilitates solid construction. This concept represents a powerful visual metaphor which could be useful to the instructional designer in their interactions with subject

matter experts. When dealing with difficult or unfamiliar content, it is important to think about the relationships between the content and its overall structure. The use of mapping strategies by the designer such as graphic organizers (Barron, 1980), concept maps (Novak & Gowin, 1984) or knowledge maps (Lambiotte, Dansereau, Cross, Reynolds, 1989) provide a means of 'portraying' conceptual relationships. The use of visuo-spatial representations such as concept maps and knowledge maps operationalize the intellectual scaffolding concept of Ausubel (Keppell, 1997). However, instead of attempting to create the intellectual scaffolding in the learner, the instructional designer uses the knowledge map as a metacognitive tool for approaching the unfamiliar content. In other words, the designer is attempting to create their own scaffold which will allow the attachment of further information elicited from the SME. It is suggested that information could be progressively added to a scaffolding to assist in the conceptualization of the unfamiliar content. The progressive interviews with the SME would gradually fill the gaps of the existing scaffolding. The designer would need to obtain an overview and gradually hang more information from the structure until it was complete. It would require a number of progressive sessions to achieve this goal.

Using the Concept Map as a Conceptualization Tool

The concept map can also assist the designer's conceptualization of the content by forcing deeper processing of the information and acting to externalize this conceptualization for the SME. The concept map places the designer in the role of a conceptual cartographer who can develop a topographical map of the SME's conceptual terrain. The map can be a useful tool for assisting the conceptualization of the content area with the SME. It provides a structure which facilitates the interviews with the SME and can act as a scaffold for the SME As the designer becomes more conversant with the material, they can use the map in the teachback process with the SME.

Using the Concept Map as a Communication Prop

The use of the knowledge map in the designer–SME interview may act as a communication 'prop' to improve the interpersonal nature of the interview. The map may assist the communication process by providing a common focus of attention while at the same time demonstrating to the SME the designer's understanding of the content. The knowledge map can also provide added efficiency to the designer–SME interaction by helping to focus the attention of the SME on pertinent information. The knowledge map of the elicited content may provide a powerful non-verbal means of communication. It is possible for the designer to point to a concept on the map and help focus the SME on the same information being examined. The SME can also suggest the moving of a step in a sequence by simply pointing and suggesting that it should be moved to a more appropriate part of the map. The time required to verbally explain these changes would far exceed the time required to complete this physical gesture.

Case Study Application with an SME

An application of the communication model exemplifies the importance of eliciting expert medical knowledge for the creation and delivery of a multimedia project on ordering medical tests. This project attempts to teach principles that should assist junior medical doctors to order tests which are based on principles of evidence-based medicine. Multimedia was chosen to assist the learning of this content because it allowed the delivery of cases/clinical scenarios as a guided tutorial to geographically dispersed locations. Within the module, doctors are confronted with medical results and are then asked to make a decision on the most appropriate course of action for the patient. We wanted junior doctors to be aware of the importance of the "context of each patient" they treat and the effect this has on the medical tests they should order. We also wanted the junior doctors to learn principles of rational test ordering which are transferable to other clinical cases. The first meeting involved an in-depth interview between the instructional designer and the medical expert. A needs assessment proforma developed by the author was used to determine the characteristics and factors which limit or enhance the successful adoption of the module in the specific learning context. This needs assessment focuses on five areas including purpose, organisational factors, trainee factors, available resources, teaching and learning design and delivery environment. Beside the obvious intent of the needs assessment, the explicit aim of the instructional designer in this interaction is to develop an initial conceptualisation of the proposed project which is elaborated via the concept map. For example 'the main problem is the time constraints for junior doctors'. This has implications for the design of the modules which should be arranged in 20-minute "bites" to allow the doctors to achieve some

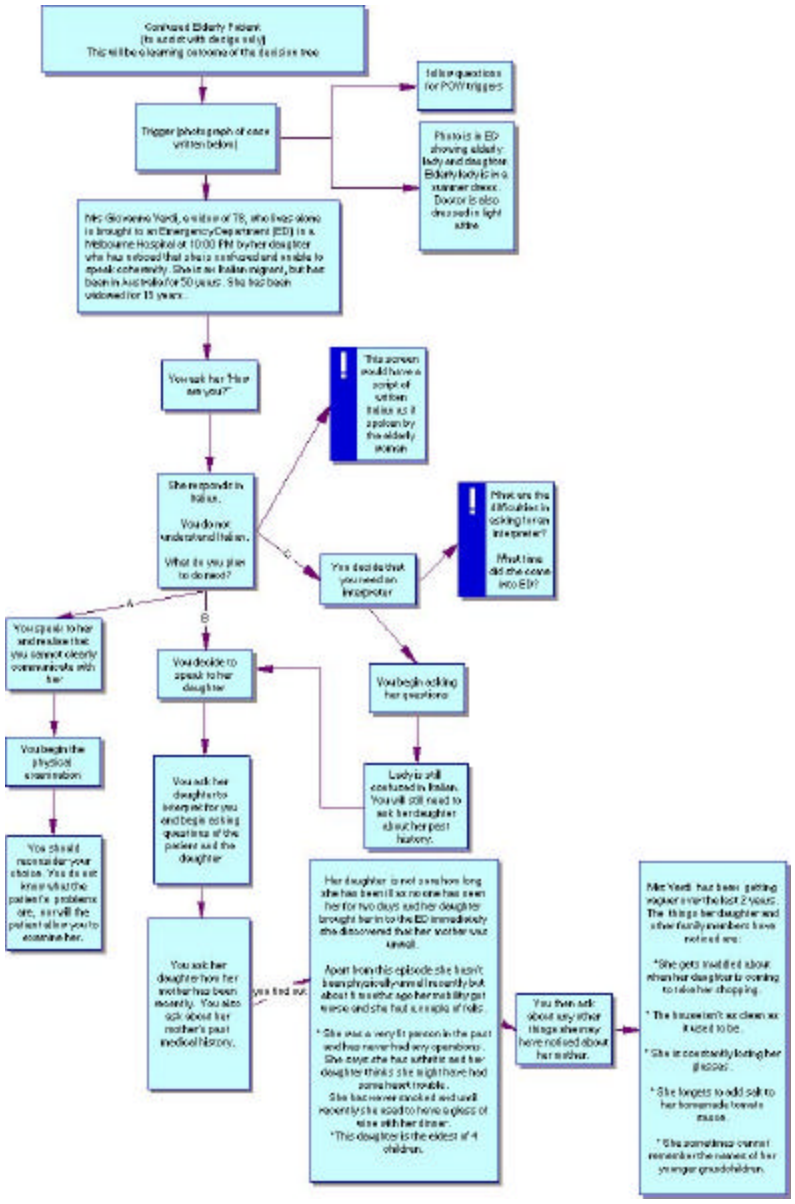

Figure 3: Concept map created as a result of the Instructional designer – SME interaction using the communication model outlined in the paper

useful learning within a busy schedule. Initially the meetings with the medical expert focused on outlining the steps that junior doctors currently use to order medical tests. This process focused on one specific medical case – an elderly lady. During the designer-SME interaction the instructional designer questioned the medical expert in relation to the order of events, procedures and tests that may be considered in this particular case. The next step in this process involved the instructional designer creating a concept map of the interaction. This allowed the designer to represent the case in a visual diagram which provided a number of advantages. The map provided a focal point for the interaction by highlighting key information to the medical expert. It also provided a communication tool for the interaction. Both the designer and medical expert could quickly scan the map to evaluate key information and recognize gaps in the content. The concept map provided a valuable means for clarifying and verifying the "case". A further efficiency was added to the process when the medical expert utilised the concept mapping software (Inspiration) to finetune the flow and sequence of the concept map. The designer and medical expert were then able to email the maps to each other until the content and flow of information for the case was deemed sufficient. Four concept maps were created for the first scenario. Figure 3 above outlines the first map created for the case. In addition to using the concept maps, a Powerpoint template was devised to storyboard the sequence for the project. This format allowed the medical expert to view a more

realistic representation of the content while at the same time it provided a means to continue the medical expert's direct input into the storyboard. The next step in the process was the development of the prototype HTML version of the case. As can be seen by the above description the communication model outlined in the paper provided the basis for the interaction.

Conclusion

This paper has outlined some of the inherent challenges instructional designers face in working in communities of practice with SMEs. Instructional design by nature utilizes generic strategies to design rich learning experiences and must rely on experts to assist with the process. Instructional designers are inquisitive people who learn new ideas and concepts working with SMEs on diverse projects. On a personal note the challenge of working with SMEs in different communities of practice has motivated me to travel, live and interact in numerous foreign cultures. To assist this enculturation into the community of practice I have learned to utilize a number of generic strategies for optimizing the interaction with the SME. The following strategies should assist any instructional designer to attain legitimate participation in the community of practice and ensure successful project development.

- Research the community of practice or milieu before you begin the project
- Think of yourself as a foreigner working in a culture where you do not understand the language
- Learn how to be an inquisitive anthropologist in the community of practice
- Determine the philosophical expectations of the SME early in the project
- Utilise the informal conversational interview in the initial interview with the SME
- Elicit tacit knowledge from the SME using ethnographic interview principles
- Use the teachback interview in conjunction with the concept map at the beginning of SME meetings
- Develop a schema of generic questions to ask the SME at different stages of the project.
- Use the concept map as a scaffold to gradually build a rich understanding of the content area
- Utilise the concept map as a springboard for elaborating content
- Think of the concept map as a cognitive tool for assisting you to conceptualize the content
- Utilise the concept map as a communication tool for negotiating meaning with the SME.

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