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Interaction and Interaction Skills

in an

Integrated Operations Setting

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Integrated operations (IO) is in the oil industry looked upon as a strategic tool to achieve safe, reliable and efficient decisions. Integrated operations involve using technology that brings competence, data and tools together in real time, regardless of distance, and which has the potential to enable improved and faster decisions. Interaction in an IO setting may happen both face-to-face, and across distance. Most oil companies have managed to find efficient solutions with respect to technological tools and their usage. The main challenge for IO today, is how the participants are interacting – more precisely, the participants' interaction skills. In this paper, theoretical and empirical foundations for interaction will be presented. A method for observing interaction and interaction skills will be described, and general recommendations from an observation study will be presented.

INTRODUCTION

The petroleum industry is undergoing a transition made possible by new and powerful information technology. Traditional work processes and organizational structures are challenged by more efficient and integrated approaches to offshore operations. The new approaches is taken into use to overcome traditional obstacles – whether they are geographical, organizational or professional – to efficient decision making (Ringstad & Andersen, 2007). This way of working together is in the petroleum industry referred to as *Integrated operations.* Integrated operations (IO) can be defined as:

"the enabling of new ways of working in operations through implementation of innovative technologies"

(Rindahl, Torgersen, Kaarstad and Drøivoldsmo, 2009, p:5).

IO intends to enhance the experience of integration and common understanding between the onshore and offshore organizations. This may result in faster and better decisions, because both the onshore and the offshore personnel have in-depth knowledge about the situations and challenges that arise. Several companies on the Norwegian continental shelf have implemented IO as a strategic tool to achieve safe, reliable and efficient operations. The IO collaboration technology consists of high-quality video conferencing, shared work spaces and data sharing facilities. These arenas include so-called collaboration rooms (operation rooms) for rapid responses and decision-making. The design includes video walls to share information and involve people in discussions with each other both onshore and offshore.

IO is believed to be gradually more implemented in the petroleum companies. The first generation IO, which is where most oil companies is today, integrates processes and human beings onshore and offshore by the use of technology solutions and onshore operation centres. The second generation IO, which is gradually being implemented in the petroleum organizations, builds on the core knowledge of vendor and service companies in the work processes and is intended to make problem solving more efficient by integrating these actors' operation centres as well (Norwegian Oil Association, 2005).

In order to succeed with cooperation in such a complex environment, certain skills or abilities for interaction are needed. In this paper, a method for studying interaction and interaction skills in an IO organization will be described, with some examples from observing a dispersed team on a Norwegian oil field (ibid.).

The outline of the paper is as follows: We will first describe the new work principles of Integrated Operations and how this changes the traditional ways of team work. Further we elaborate on collaboration and interaction, with special focus on interaction in an IO context. In our studies we have identified interaction skills that are important for successful teamwork in this setting, and we will describe these in a separate chapter, before introducing a new method for continuously assessing and improving these interaction skills. Finally we will discuss the results of applying this method in an IO organisation.

INTEGRATED OPERATIONS IN THE PETROLEUM INDUSTRY

Collaborating in an integrated operation setting may happen both face-to-face, and across distance. With the invention of technology supporting videoconferences, people may communicate easily with each other and accomplish difficult work processes even though they are located remotely from each other and/ or rarely overlap in time. The socio-technical conditions required for effective distance work

are discussed by Olson and Olson (2000). In order to succeed with remote work, they claim that groups need to have a high common understanding, loosely coupled work, with readiness both for cooperation and for using the technology that support cooperation. The factors they mention as most commonly working against success, is a lack of common understanding and trust, that people cooperate within different time zones, and that people from different cultures cooperate.

For teams who interact across distance, Assmann (2008, p 151) offers the following general advice, with a special focus on conflict prevention:

- Whenever possible, the team members should be allowed to meet physically before the work starts, getting to know each other better
- Make the competence of each individual visible to the rest of the team
- Make sure to let everybody have the same information at the same time
- Create a dialogue on cultural differences in the team at an early stage
- Create a common collaboration structure in the team by being clear on expectations, and agree on the teams behavioural norms
- Facilitate open dialogue when conflicts arise, and have frequent discussions on how the collaboration can be improved.
- Ensure that there is a common understanding of the aim of the meeting

The introduction of IO implies that the tasks involved in petroleum production are redefined and reorganized, and many tasks are relocated (typically from offshore to onshore). In addition, a range of new information and communication technology (ICT) systems, such as decision support systems and collaboration technologies, is being introduced. This impacts the work practices applied within the industry. Ringstad and Andersen (2006) present a vision of how IO will change the ways of working in petroleum companies (see Table 1).

Table 1. How IO may change the ways of working in petroleum companies (from Ringstad and Andersen, 2006).

Traditional way of working	IO way of working
Serial	Parallel
Single discipline	Multi discipline
Dependence of physical location	Independence of physical location
Decisions are made based on historical data	Decisions are made based on real-time data
Reactive	Proactive

The way of working in petroleum companies will change from serial to parallel (simultaneous and interactive) decision making, from involving single disciplines to multiple disciplines, from being dependent of physical location to being independent of physical location, from making decisions based on historical data, to make decisions based on real-time data, and from being reactive to be more proactive.

The introduction of IO further implies that decision making increasingly is carried out by distributed or virtual teams. These teams will be either dispersed or co-located, they will come from different organizations and/or different departments within the same organization. They may have different nationalities and first languages, different professional backgrounds and, accordingly, different professional languages, and their level of familiarity with their team members may vary substantially. People may enter and leave the team during the task performance process, depending on the particular tasks and needs in the situation, and on the work schedules of the individual team members.

These team members will be depending on collaboration and interaction, and in the next section these concepts will be elaborated.

ON THE CONCEPTS OF COLLABORATION AND INTERACTION

The concepts *collaboration* and *interaction* are related, but they still differ in important aspects. Collaboration refers to a group of people working together or the act of working jointly. Collaboration usually occurs when two or more people interact and exchange knowledge in the pursuit of a shared, collective goal. A classic definition of *collaboration* is (Beyerlein & Harris 2004:18):

> *...the collective work of two or more individuals where the work is undertaken with a sense of shared purpose and direction that is attentive, responsive, and adaptive to the environment*

Collaboration thus focuses on the collective part of the interaction process, meaning teamwork or co-operation. The actors join forces towards a shared goal, which can be a sufficient process for simple work tasks. In IO, the tasks are characterised by more complexity. The environment and the conditions may be unstable or unpredictable, and the enablers or support tools (e.g. technology) that serve to mediate the process (e.g. video conferencing) are challenging. In such situations there is a need for the persons participating in the process to complement each other, to learn from each other during the process and to unite their competences towards a common goal (Rindahl et al, 2009). This represents something qualitatively different from cooperation and is with a Norwegian term called “samhandling”. The more complex type of process will focus more on interactivity and the activities as such than on the collectivistic aspect of teamwork. Torgersen and Steiro (2009) have, based on studies of a range of interaction-processes in several different organisations developed the following definition of *interaction* (ibid., chapter 7):

> *Interaction is an open and equal communication and development process between actors with complementary competence who exchange competences and are working, directly face-to-face or mediated through technology or manual power, towards a common goal, and where the relationship*

between the actors at any time is founded on trust, involvement, rationality and knowledge of the trade.

Complementarities are central in this definition, i.e. knowledge exchange, supplementing each other and developing and learning through this process. In Figure 1, the interaction concept is illustrated related to the concepts of cooperation and collaboration. The foundation for interaction lies in the technological literacy. It incorporates cooperation and collaboration, as well as the collective perspective and the idea of a team competence. In addition, it also includes much more, as the idea of complementarities, dealing competence and continuous learning through knowledge exchange and specialised competence. The more integrated operations is included in the petroleum organisations, the more prominent the concepts on the right hand side of the Figure will be.

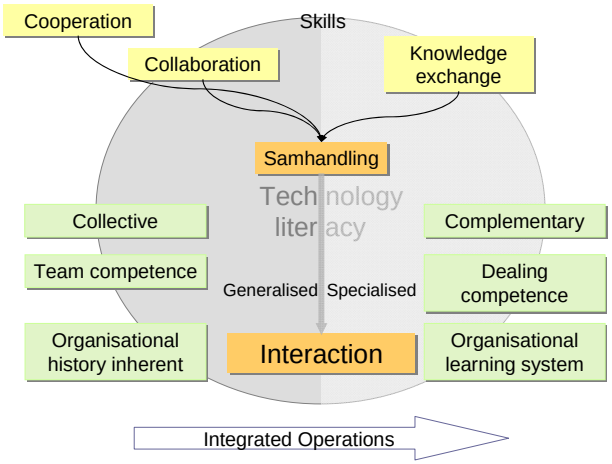

Figure 1 The concept of interaction and how it relates to collaboration and integrated operations (Rindahl et al, 2009).

The idea of complementary functions and competences is not new. As far back as Homer's history of the Trojan War, teams with complementary roles have existed. The Greek victory could not have been possible without the powerful King Agamemnon, the mighty warrior Achilles, the tactician Odysseus, and the wise elder Nestor (Miles & Watkins, 2007).

More recently, Belbin (1998, 1999) has been carrying out an extensive work on team roles, and made a proposal of which team roles should be present for efficient teamwork and management. The relationship to and the utilisation of the participants' diverse background experience and situational understandings are central in the understanding of complementarities associated with interaction.

Integrated operations changes how people work together across disciplines, organisations, teams and locations in many industries. Traditionally, collaboration has required the establishment of common ground or shared knowledge and understanding in the team prior to collaboration. Interaction must on the other hand involve the ongoing establishment of a common understanding during interaction, and requires a diversity of initial understandings and viewpoints.

Interaction and teamwork in IO cannot assume common understanding as a pre-established condition, but must seek to profit from the existing diversity. This is also stated in Torgersen & Steiro (2009, chapter 7):

"... each participant contribute with their own unique situational awareness, among other factors based on their own position in the organisation, their experiences, cultures, attitudes, feelings and job satisfaction (...) among these their attitude towards the interaction process itself. On this basis, consensus or shared understanding is built during the actual interaction"

Different interaction situations call for different competences. Whereas a continuous development of a common understanding is necessary for all interaction processes, the additional competences needed in an integrated operation environment can be identified and trained. In the following paragraph these competences will be further described.

INTERACTION COMPETENCE AND SKILLS

Integrated operations have introduced a new structure to teams and interaction. As IO is evolving, *fixed* teams will increasingly be replaced by *ad hoc* teams with a frequent change of actors, a continuous development of and introduction of new support tools (e.g. tools for interaction and data visualisation), less obvious management structures in meetings and work sessions, as well as variation in sessions, subjects and frequency (Rindahl et al, 2009).

Individualistic professional and interaction knowledge will in such situations not be sufficient for efficient interaction, and skills in adapting to the ad hoc structure will also be required. This means that the actors need to possess certain qualities or interaction competences. These competences need to be conscientizised, developed or learned, and they will differ based on the type if interaction or work task at hand. In the context of digitally mediated meetings, competences in four different areas are important (Rindahl et al, 2009):

- *Presentation techniques*
- *Team, role and communication*
- *Technological literacy*
- *Institutional language and culture*

The four categories contain several nuanced types of competences, skills or techniques. The participants' mastering and performance of these, both as individuals and as team is what contributes to efficient interaction meetings. This means that the individual participant must develop skills within these four main groups, including the ability to select and deploy the relevant technique, belonging to the right situations and meeting processes.

Presentation techniques

Presentation techniques are the ways a message is conveyed so that the recipient(s) perceive, understand and remember the message in a best possible way (Rindahl et al. 2009). This also encompasses the adaptation of the team environment (context) that enables the message to get through,

including assurance, inclusion and trust. In order to ensure that a message is getting through to the participants, one should minimize the number of words used, and try to use exact phrasing in order to transmit the message as clearly as possible. Personal features of the speaker also have a major impact on how a message is received. There are four important aspects, i.e. gesture, voice, eye contact, and breathing. Gesture can be used to highlight points or to make additional emphasis when needed. The speaker should use sufficient volume of the voice to be heard. Modulation, the process of varying the pitch or level of the voice, is also important. Eye contact is the process of looking towards the eyes of the participants as often as possible, which make the speaker to gain trust, involvement and interest.

For video conferencing, which is a digitally mediated communication process, some techniques need to be adjusted and accommodated to the mediation form, and additional specialized techniques need to be employed (Gibson & Cohen, 2003). Senge (1999) describes a range of detailed techniques that can be used in communication settings, and Nemiro et al. (2008) and Torgersen (2005) offer an overview of central techniques when employing video conferencing and net meeting solutions in an educational perspective. These techniques are the foundation for the techniques used in this observation study.

In face-to-face meetings some challenges exist which can be intensified when employing mediating technologies. An example is that messages can be imprecise, which may lead to misunderstandings. In technology mediated communication, the cues we use in order to verify a message, like facial expressions, gestures and tone of voice, are much more difficult to interpret. In addition, digitally mediated communication has other constraints in that the participants conceive the information and time as more concentrated, which again will affect the interaction and yield requirements for slower and more salient communication. Communicating through technology also make it easier for participants to "hide" and adopt a passive role during the interaction. Digitally mediated technology can also make the leader's role less prominent or visible.

Teams, roles and communication

A team leader has traditionally been seen as a role that was responsible for developing and mobilising the team members' effort. In a complementary work environment, like an IO organisation, more focus need to be placed on the *relation* between the participants. In integrated operations, a great proportion of the tasks are complex in nature, and the time available to solve them is often scarce. Therefore, the need for succeeding with complementary teams is essential in the IO setting (Rindahl et al, 2009). The task for the team leader in such a setting will not be to stimulate *one* person to contribute with his talent and his views, but to make the other persons in the team understand the contribution and to utilise this in the further interaction and teamwork. Roles in teams can be both formal and informal in nature. Some roles the team members take due to their formal positions, other roles they take because of their personality or position in the group.

Belbin (1998) presents some team roles that have been found at work. He describes eight complementary roles; two leading roles, two action oriented roles, two introspective evaluation roles, and two outgoing, interaction roles. Belbins work has shown that these roles together give a unique foundation to construct the necessary complements that seems to be present in efficient teams.

Complementary teams represent diversity and differences, and have been found to be more efficient and better to solve complex problems than teams consisting of people with the same competences (Belbin, 1998). If, however, the task is clear and simple, the task will be solved faster in a homogeneous group. Complementary teams can thus be both a challenge and strength; It is a challenge as the persons in the team have different background and different codes for interaction. The strength is that the complements give a better foundation for valuable interaction.

Communication within the group is important in order for the complementarities to work. Communication between people is the glue or the vital pulse in every organisation. There are many barriers for efficient communication. These barriers could be personal feelings, time-pressure, non-verbal cues, degree of information, cultural differences and selective perception. As communication is important in a normal setting, it cannot be stressed enough that it is almost not possible to be precise and clear enough in an IO setting; due to the complexity, the different disciplines represented, and possible different cultural backgrounds.

Technology and technology literacy

As pointed out by Bowers, Salas & Jentsch (2006), challenges of ad hoc teamwork and communication can not be addressed only through training of teams and individuals, but should also have significant effects on the shaping of new tools and technologies. *Groupware*, a term coined on group software and hardware is defined as (ibid., p 12):

"any type of technology that is designed to (or unintentionally has been found to) support or enhance the performance of groups and teams"

Groupware technology is rapidly evolving. Well known examples of systems frequently used as groupware but originating as single user technology are project management tools, accounting systems, spreadsheets and scientific visualisation tools. Common for many such systems is that they have been developed based on the assumptions that if the technology is excellent from the engineering point of view its excellence as groupware will follow. Tools like e-mail, video conferencing and net meeting technology are examples of technology developed uniquely for interaction. Only rarely are human factors expertise and approaches involved in the early development of groupware. When IO collaboration tools started to get implemented it was frequently assumed that buying the "best" (often meaning latest or most expensive) available collaboration equipment would facilitate extensive and successful dispersed team interactions. This often did not happen, because the technology had a higher user threshold than expected, because the established work practice did not require such tools, because equipment was not available for the right people at the right time and for a number of other reasons (Larsen, 2008). A question posed in the context of IO collaboration and interactions were then for quite a while

-"How can we start using our advanced collaboration rooms better?" Presently it seems the time has finally come when organisations ask themselves the question "What kind of work practice should our technology support and encourage?" (Rindahl et al 2009).

Technology literacy as introduced by Tyner (1998) is not necessarily a conscious competence – or incompetence. The so-called *digital native users* (i.e. the generation born into extensive use of digital tools) will have several advantages when collaborating in a high end technology environment, as described by Prensky (2001) and further discussed by Skraaning and Rindahl (2008). However, Rindahl et al (2009) also indicate that those who have consciously mastered the new setting may have further advantages still, in being able to share their skills and using them tactically.

An IO interaction session will typically consist of something between two and twenty people. Making every person feel like an integral part of a meeting can be made easier by selecting the right shape for the room. As reported by Larsen (2008), the ability to interact not only through the video screen, but also with people in the same room requires a seating arrangement were eye contact is possible with all participants. This means that the room needs to be shaped so that everybody can look easily into the camera (without turning the head too much) and look over the table at each participant on their own side.

Institutional language and culture

Language is a term most commonly used to refer to so-called natural languages - the forms of communication considered particular to humans. A common progression for natural languages is that they are considered to be first spoken, and then written, and then an understanding and explanation of their grammar is attempted. Languages live, die, move from place to place, and change with time. Any language that ceases to change or develop is categorized as a dead language. Conversely, any language that is in a continuous state of change is known as a *living language* or modern language. Language is essential for communication. The social aspect of a language is an important influencing factor on how language is developed.

In some institutions, technical groups or teams, a certain way of communication, also called institutional or cultural language, is developed. In an IO organisation, there will be participants who have been working together for a while, and cultural language or extensive use of abbreviations can be established. For activities that need the participation of external parties, there is a risk that such institutional language will not be understood. It is thus important to be aware of this internal language, and to try to avoid it if other people not familiar with this language is participating in discussions, or if the language that has been developed is not precise enough and misunderstandings can develop.

To ensure that a lapse into internal institutional language use does not occur in a sharp and hectic situation, the best advice is to avoid institutional and imprecise language in all interaction.

Another important prerequisite for fruitful interaction is a common and thorough understanding of the organisation's guiding principles. In the case of IO, the principles for this new division of work and way of working must be clarified and adhered to. IO also means that more people need to assume responsibility, and the collaboration sessions should be actively used to build up IO awareness in the team. The IO work processes are also new and it is vital to make sure that all actors have understood both the work process and how the technologies that the meeting uses shall enable it. Everybody concerned should therefore participate in establishing ground rules and a list of expectations, and it is important to marshal training and IO consciousness in the interaction sessions.

STRUCTURED OBSERVATION AND FEEDBACK IN INTEGRATED OPERATIONS

The method "Structured Observation and Feedback in Integrated Operations" (SOFIO) was developed in order to identify successful IO collaboration techniques, and to continuously improve a team's interaction skills in an IO setting. The method is based on fundamental methodological principles for assessing virtual team effectiveness (i.e. Lurey & Raisingham, 2001), and is a development of the power factors "Group", "Task", "Context", and "Technology" (ibid.). The SOFIO approach is, to our best knowledge, unique to the extent that a large quantity of sharp meetings and collaboration sessions (in total 28) were observed over time (3 months) from a third party video laboratory (Rindahl et al. 2009).

Observation of an IO organisation

The petroleum organisation observed is known in the industry as one of the organisations that have made significant progress with IO implementation. They have the collaboration environments in place, the work processes have been analysed and changed and even IO work practices have been established. All of these were – and are – continuously evolving, as should be the case in IO. The *result* of high quality IO collaboration is in this petroleum organisation defined as

"..high production and clear focus on HSE"

The investigated team is generally a well trained team, but when this study was initiated there was no corporate training available on IO team work and interaction. People working in this organisation had been experiencing that some meetings and work sessions were better than others, but often they had a hard time defining the factors that made up these differences.

One of our focus tasks during these observations was to observe and emphasise successful techniques for team interaction, and also to provide advice on how to become even better. The meetings were not video taped, but were observed online. The reason for not videotaping the meetings, were that they were real work meetings, where strategic decisions often were taken, and the fact that video recording might have affected the content of the discussion as well as the way the participants interacted.

Procedure

This section describes the methodological concept of the SOFIO method, as illustrated in Figure 2.

Based on a theoretical foundation, the four earlier mentioned observation categories were selected: *presentation*

techniques, team, role and communication, technological literacy, and *institutional language and culture*. For each category, observation checklists were developed. These checklists were elaborated during a couple of pilot observations. When the checklists were finalised, the observation team was presented and introduced to the observed team, and then the observations started.

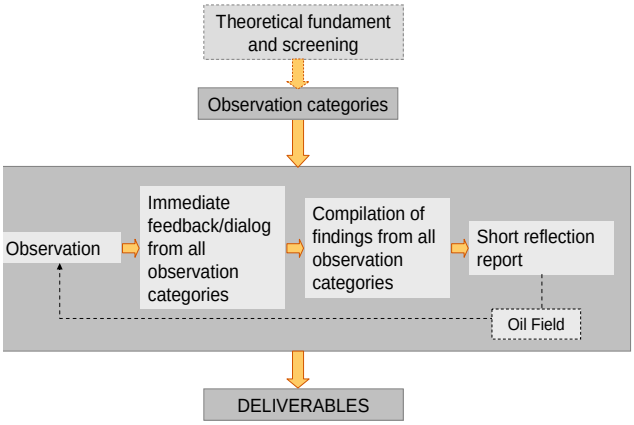

Figure 2 Procedure of the SOFIO method (Rindahl et al, 2009).

The observers were typically observing several aspects simultaneously. At least three observers were needed for each meeting as the amount of information is quite extensive. To ensure the reliability in the observations, different fields of observations and topics were divided between the observers – after a system based on the principles of the SOFIO method. One observer concentrated on oral presentation techniques, while another focused on the use of digital tools. A third observer particularly focused on body language, signals and expressions concerning the team and the interaction. After each observation, short direct feedback was given to the IO team. The next phase in the process was to write a *short-reflection report*. Each observer reported from the topic she or he was focusing on during the observations. These reports were sent to the participants, and made a foundation for continuously evaluation and selection of observation topics and nuances within these, for the next observations. Also, the short point reflection reports was working as a basis for a total evaluation and reporting at the end of the study.

Observation categories

The main areas of observation are sorted under the four different main categories as described in Table 2. The table also gives some examples of interaction skills which the study focused on.

For the **Presentation techniques**, as shown in Table 2, *Body language* is an important aspect, and consciousness of body language - both towards the participants in the same room, and the participants behind the camera is of great importance. The *expression forms* for transmitting messages can be emphasised in different ways - with vocal pitch, varying speeds and pauses before the main message. *Matching* is the process of adjusting the language, expressions, jargon and arguments to the participants qualifications, and to ask follow up questions and clarify unclear expressions. Also, the *dialogue techniques* can be varied. Interruptions in a discussion may be necessary, but must then be clear. Separate discussions during a meeting are not desirable.

Table 2: SOFIO Observation Categories and examples of Interaction Skills

Observation Categories	**Interaction Skills**
Presentation techniques	• Body language • Expression forms • Matching • Dialogue techniques
Teams, roles and communication	• Common understanding • Team communication • Complementarities • Meeting leader
Technology literacy	• Video and audio • Sharing information • Decision visualisation and documentation
Institutional language and culture	• Guiding principles • Precise language • Work process awareness

The observation category **Teams, roles and communication** concerns e.g. creating a *common understanding*, which should be sought through common goals, and through focus on a common interaction surface. Team communication should seek to exchange information across distance. Internal discussions are allowed, but one should talk clearly so that everyone can hear, and so that complementary contributions from the different groups can be taken into account and a common solution could be sought. *Complementarities* are best utilised if the participants are aware of each others' functions and formal roles. The team members must also be conscious on utilising each others' informal and complementary roles and competences.

The *meeting leader* should be prominent, but not too dominating, focus on involving *all* participants and encourage them to contribute. The leader must also keep the meeting focused and follow the agenda, and clarify issues through frequent summaries and noting of actions.

Technology literacy may vary in the team, but any meeting leader also needs to know the *video and audio* technology well, including the procedures for when something does not work as expected. When *sharing information* on screen, surfaces and mouse must follow and support verbal communication, over-elucidating when shifting surfaces or moving the mouse cursor in order to compensate for lag and allow all participants time to follow. When the meeting makes a decision, this *decision* should be formulated verbally on the shared screen, and information saved (again with salient mouse movements) as consensus is reached.

Based on **Institutional language and culture, a**n important prerequisite for fruitful interaction is a common and thorough understanding of the organisation's *guiding principles*. These must be clarified and adhered to, also meaning that teams need to build up competence on these principles. In meetings everyone needs to put higher focus on

precise language, and to adapt the use of terms to the participants virtually present. More people need to assume responsibility, and the collaboration sessions should be actively used to build up *work process awareness* in the team, and it is important to marshal training and heightened consciousness during the interaction sessions.

DISCUSSION

The SOFIO method proved useful for observing IO interactions. There were several advantages of this method, including the fact that it is used online and across distance. This makes it possible to make a large number of observations compared to what would have been achievable if the observers had to travel to each location to make their observations. This also made it possible to use the same key researchers for the whole study, over a four month period. The observations through video conferences were a key advantage for the observed team as well, who have a busy schedule, and would not have been able to set aside much time for interviews or a more intrusive study.

The observing team were a third party in the video conference, and did therefore not become associated with either side (neither the off-shore nor the on-shore organisation). It is believed that this fact combined with the long period of frequent observations helped cancel out potential "Hawthorne effects" in the participant behaviour, i.e. that the participants' behaviour was not influenced by the fact that they were being observed.

SOFIO ensures direct and practical feedback to the participants, identifying and emphasising their already demonstrated good collaboration techniques and by suggesting improvements. This was important for ensuring informed consent, and also meant that participants were able to learn from their own performance immediately and in their everyday setting. The observers were also able to calibrate their observations, and to iteratively develop the SOFIO method based on additional interaction success criteria identified during the study.

The major strength of this method is that it is being based on a sound theoretical foundation combined with practical experience of similar studies.

Significant performance improvements were registered on all observation categories after several reminders. For presentation techniques one could identify better adaptation of vocal pitch, varying speeds and emphasising pauses to the message conveyed. Teams, roles and communication improved among others in the fact that the meeting leaders became more involving and conscious of their roles as coordinators.

Improved technological literacy was observed as a more deliberate and salient use of mouse cursor and surface shifts. Within the category of institutional language and culture, a key feature was that rotation of personnel between on-shore and off-shore had a positive effect on their understanding of the organisations guiding principles.

As indicated in the SOFIO training scheme in Figure 3, SOFIO analysis should lead up to a training programme, as many of the techniques here described may seem evident but prove difficult to implement in sharp situations. This kind of training programme needs to be performed both as courses and in daily reflections on own interaction. The simpler presentation techniques and chairing of meetings must be trained in actual meetings, whereas the more complex and extensive training issues like work process awareness, involvement and handling of simultaneous situations should be addressed in larger training courses. All techniques should, as stated in SOFIO, be subject to daily reflections on interaction and interaction skills.

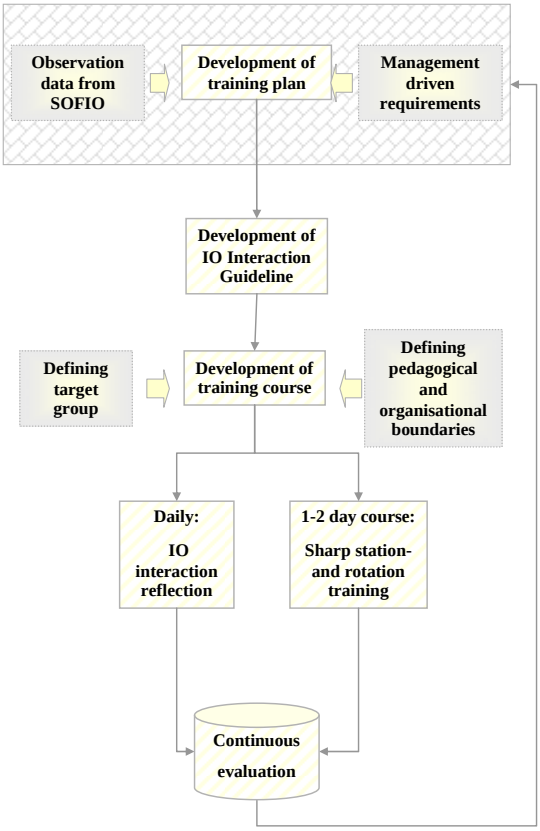

Figure 3 SOFIO training scheme

SUMMARY

This paper has presented theoretical and empirical foundations for interaction, and fundamental criteria for interaction competence have been discussed. The development of an observation method, SOFIO, is described. This method was used in direct observations of digitally mediated meetings between offshore and onshore personnel. There were no intervention from the observers during the observations of the meetings, but feedback to the participants was provided immediately after the meetings. During the series of observations, clear improvements in the participants' interaction skills were observed. Based on this work, successful interaction and interaction skills in an IO setting can be summarised in the following general recommendations:

- *Be conscious of what you understand by interaction*
- *Deploy yourself as a tool for clear communication*
- *Make use of each others competence*
- *Technology shall support and enable a desired work practice, and not the other way around*
- *Understand the work process and put it to good use*
- *Train as you work*

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