

13th ICCRTS: C2 for Complex Endeavors

“Assessing the order process”

C2 Assessment Tools and Metrics, Organizational Issues, C2 Concepts, Theory and Policy

Ian Whitworth, Geoff Hone PhD, Andy Farmilo

Andy Farmilo (POC)

Cranfield University

Department of Information Systems, Cranfield University at the Defence Academy of the United Kingdom, Cranfield University, Shrivenham, Swindon SN6 8LA, UK

+44 (0) 1793 785687

afarmilo.cu@defenceacademy.mod.uk

Assessing the Order Process

Abstract

Key to the success of an operation is clear, accurate, complete and timely dissemination of orders, plans to effect those orders, and the encapsulation of command intent. A focal requirement within current army doctrine is that orders are recorded and passed in written form, yet our investigations have found that this is frequently not the case, neither within exercises or live missions. Other forms of communication, particularly verbal, are used to varying degrees although this appears to have led to a lack of consistency in approach. The situation for multi-national and multi-force efforts is even less clear. At the 12th ICCRTS an approach to assessing the transmission of command intent was presented (Hone, Whitworth and Farmilo, 2007). This approach, including the assessment software, have received positive feedback, particularly for their ease of use. This paper will discuss its potential application as an impartial method of post-exercise assessment in the training of junior officers and cadets. Plans to research into the use of different forms of communication for transmitting orders, and the implications for multinational and coalition operations will also be described.

Keywords: order transmission, command intent, C2 tools, communication, mission command, coalition BML, order assessment tool

Introduction

Key to the success of an operation is clear, accurate, complete and timely dissemination of orders, plans to effect those orders, and the encapsulation of command intent. The accurate awareness and interpretation of the above are even more important in the 21st century, where the operational environment is far more complex.

“The enemy is less transparent (i.e. Disguised gunmen infiltrate secure Iraqi site, killing five Americans in Baghdad), technologically savvy (roadside bombs), and surprisingly agile.”

Thomas, Pierce, Dixon and Fong (2007)

Coalitions and multinational endeavors are now commonplace in modern diplomatic and military efforts.

“Nations will seek to join or establish coalitions to maximize collective military power and establish legitimacy for the objectives they seek”

Gahlinger (2007)

When considering multinational and coalition operations the orders must be even more explicit as differences in language and doctrine mean that orders are not as clear to everyone involved. For this purpose some feel that it would be easier if all orders were

recorded and passed in written form. Indeed in Hone, Whitworth and Farmilo (2007) a method was discussed for assessing the transmission of command intent by using a tool to review the orders passed by different levels of command with a higher ranking commander. However, on a visit to Command and Staff Training South (CAST(S)) in Warminster, UK, it was discovered that the order process does not tend to follow the requirements of doctrine – that orders be communicated in writing – far from it, and the findings are discussed later in this paper.

The tool itself was well received and may have applications within army training and is therefore also discussed. There is also a review of further findings with regards to the order process and research development in the area, with a particular bias on cultural issues and multi-force or multinational operations.

Order Transmission

Doctrine requires orders to be produced and transmitted in written format. The format of orders is defined by the NATO standard STANAG 2014 “Format for Orders and Designation of Timings, Locations and Boundaries.” An Operational Order is divided into five sections 1) Situation, 2) Mission, 3) Execution, 4) Administration and Logistics, 5) Command and Signal. Section 3 is possibly the most crucial as it describes the core of the order, namely to “summarize the overall course of action,” “assign specific tasks to each element of the task organization,” and “give details of coordination.” (Schade and Hieb, 2006). This is where our research has been focused.

Mission Command

Mission Command is a concept that is as applicable today as it has been since its inception 200 years ago. Mission command is based upon the exercise of local initiative within the framework of command intent (Stewart, 2006). It is based on the premise that subordinate commanders should be given the freedom to make decisions in the conduct of an operation based on their own knowledge and not plans forced upon them by their superior.

Part of this concept is displayed visually in Figure 1. The commander has a preferred COA (Course Of Action) that they would like the subordinate to carry out. But it is not necessarily the best or only COA. The subordinate would ideally select a plan that is within the overlap area of the diagram, which is both a good choice and attractive to the commander.

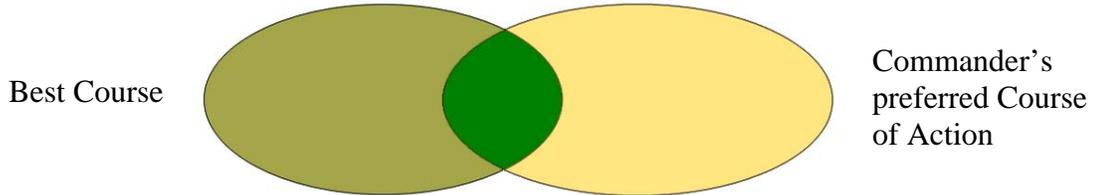


Figure 1. Overlap between perceived and best COA

However, it may be that the subordinate selects a COA that is not within the shaded area at all at which point they have made a mistake. Or they may choose a method that is actually very good (left ellipse) but not one the commander would have chosen. Alternatively, the commander may exert enough pressure for the subordinate to select the commander's preferred COA (right ellipse) that will be acceptable for training purposes but not necessarily good in the long term.

It is all very well saying that the Mission Command principle will be followed but as Storr (2003) points out:

“Research and substantial anecdotal evidence indicates that, in the Army at least, there have been occasions where commanders talked Mission Command, but in practice allowed their subordinates little freedom of action.”

Furthermore, there is no point in allowing subordinates the latitude to take action if they don't know what to do. Therefore, there must be an adequate provision of training in the conception and communication of orders.

The idea of Mission Command is further complicated when working within a multinational headquarters. Frequently, different nations have alternative interpretations of Mission Command. There have been occasions where forces from other nations have not been able to understand the concept of freedom of operation as afforded by the British practice. Conversely Storr (2003) discovered that the Bundeswehr interpreted the idea of Mission Command surprisingly literally, but this can be traced to the doctrine developed by the Wehrmacht between the two World Wars (OKW, 1933).

The decentralized approach of Mission Command cannot be forced onto an organization it requires a long-term shift in ethos, beginning with a culture of trust. This includes an allowance for subordinates to use their initiative and for this behavior (and support of it by the commander) to be rewarded (Stewart, 2006). It would also be easy to punish any mistakes made as a result of subordinates making their own decisions but this would only destroy the trust that exists between the two and deter them from having the courage to devise their own orders again. Good commanders can tolerate a well-intentioned mistake, despite any pressures that may exist to get it right, and will get “brownie points” for

allowing their subordinates to learn from their mistakes. As Storr (2003) puts it, Mission Command, and decentralization, can lead to better, more adaptable, commanders in the future:

“People who are allowed to exercise their own judgement are generally well-motivated compared with those who are not. They tend to make better subordinates, better superiors in due course, and where appropriate learn from their mistakes because they have (within reason) been allowed to make them. A subordinate who is never allowed to make decisions may never make mistakes, but equally surely will never learn from them”

Volumes of communication and information, such as within the order process, is another good reason for decentralization, as Storr (2003) explains:

“The amount of information passed between a group of people increases roughly with the square of the number involved (a consequence of many-to-many information strategies), whilst their ability to deal with it only increases linearly”

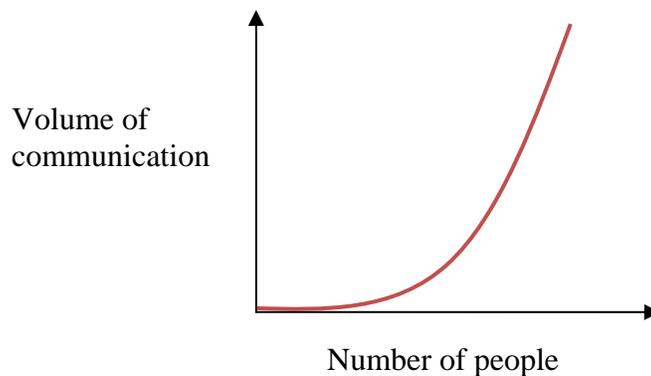


Figure 2. The cause of information overload

Figure 2 shows this relationship diagrammatically. The result of this is that increasing the numbers of people involved in a situation will lead to information overload. Information Technology can help, at least with the transmission and storage of data, if not the management of information, but the best strategy is to opt for decentralization, i.e. allowing decisions to be taken locally within the overall intent (Storr, 2003).

Related to Mission Command is the practice of “back-briefing”, where a commander asks their subordinate to repeat back to him that subordinate’s understanding of the order just communicated. Although this could be regarded as a useful check (that it conforms with the commander’s intent and for coordination purposes) it can also be seen as a dangerous practice, because it encourages the commander to impose his favored method of action onto the subordinate. Not only that, but it breaks the trust which should be formed

between the two echelons, particularly if the senior commander begins to make changes to the plan, and effectively micro-manage subordinate activity.

Orders in Practice

A visit was made to CASTS(S) – a part of the Land Warfare Centre, UK, in the autumn of 2007, to discuss the potential implementation of the software tool for assessing the transmission of command intent (Hone, Whitworth and Farmilo, 2007). It proved to be an extremely valuable meeting because, even though the tool itself was found not to be ready for use by the British Army, it provided an insight into the realities of the order process.

The CAST(S) team described the initial order generation as the commander making an outline decision on how to handle the situation from the initial information, e.g., knowing where enemy is, where they are going, and the time they are likely to arrive. He presents this to his staff, who develop COAs depending on the time available, which can vary between 6 hours and 2 weeks. These are then presented back to the commander who selects a COA and more detailed planning begins. Subordinates are allocated time to develop their own plans although taking less time than that allowed is even better. Any intent is transmitted as part of the initial presentation by voice (and body language, such as facial expressions). The only part of command intent that is written down is in a paragraph that provides an overall summary. Indeed intent within the UK Army can be one single sentence. An international one can span over several pages, because it has to be explicit what the commander wants, as it is not as clear to everyone involved. Improving the structure of the intent can make it shorter, but it still needs to be long for a thorough explanation.

This and other issues with regards communication of orders will be discussed in the Methods of Communication section.

Future Orders

Looking to the future, brings us to the concept of a Battle Management Language (BML). The BML is currently being developed and is intended to be an open standard that unambiguously communicates Command and Control (C2) information, including orders (Hieb and Schade, 2007).

Schade and Hieb (2006) are two of the researchers looking into the development of the BML and, in particular, the formulation of a Coalition Battle Management Language (C-BML). This will certainly not be an easy task as many people see the decision making process of a military commander as more of art than science. However, it is generally accepted that the time when commanders exert their own personality and style on orders, and their delivery, is now coming to an end. If a common language that was understood and communicated by multiple nations could be formulated then that would be a giant step forward for coalition military operations. Of even greater potential benefit would be the ability for computers and electronic equipment to understand and process orders as part of a Network-Centric exchange of information. Other developments in this area

include a Composable Command Language (CCL) emerging in the simulation community

Methods of Communication

An order can be seen as an object, the written word is not the most important part of it, but serves also as an aid to its comprehension. By presenting an order, a commander is providing formal instructions in relation to the task ahead, and it is dangerous to see orders as more than just telling people what to do. It is very rare for the formal presentation of the order to be the sole form of communication. Typically, there will be a series of voice messages beforehand, with information about the situation being “drip-fed” continuously down the chain of command as soon as it is known, and information taking the reverse path. This will be in parallel to the formal Warning Order, Fragmentary Order, (WO, FRAGO) procedure.

Voice messaging is crucial because it gives more time to those people lower down the hierarchy, so that they can start thinking even before having been given a formal order. Yet orders are often received too late when a commander does not value informing people of the situation. This is even more apparent within coalition Headquarters (HQs) where it is sometimes difficult to pass on all information, either because procedures have not been put in place to do so or because a particular nation’s doctrine does not even allow it. Coalition operations are also complicated by the incompatibility of Information Technology (IT) and IT systems (Schade and Hieb, 2006). Also, continuity of staff and relationships between individuals will help with understanding implicit intent and this is another drawback of inadequately arranged coalitions. It is not sufficient that information is made available throughout the network. What is required is a shared logic and “picture” that embodies a common understanding of the commander’s strategy and intent (Donnelly, Bolia and Wampler, 2007).

Furthermore, a brigade commander, or member of his staff, will go to the division to listen to a presentation of the order, to assure that the command intent has been understood (another form of back-briefing, a term discussed earlier). The best presentation paraphrases an order, but this may cause semantic problems for the staff. It may be that written orders on their own would be better for an international HQ, because that removes the use of paraphrasing or words that aren’t as clear to the people who don’t share the same first language.

A question and answer (Q&A) session generally follows the presentation and is designed to be a two-way activity, but this isn’t always the case. Different cultures and teams are likely to behave differently, for example in some parts of the British Army it is not generally considered the “done thing” to ask a question, because that could reveal a person’s ability (or inability). Conversely, Israeli commanders, for example, often ask lots of questions, and have a considerable Q&A dialogue! Social permissions to ask questions can also come into play: the popular person might feel able to ask a question everyone wants answered, but no one else feels able to ask. Also, the amount of questions asked varies between different cultures.

We look further at the complexities of translation and its effect on people working in a multi-national (multi-lingual) environment in Hone, Whitworth and Farmilo (2008). Generally there are believed to be more difficulties with vocal communication in multinational HQs than with written, so as other methods of communication (particularly spoken) become more popular, often informally, the potential problems associated with this shift should be taken on board.

Proposed Research

So far, our investigations have focused on command intent and one of the most important findings has been that command intent does not exist on its own but is regarded as inherent in the orders that are transmitted - regardless of the communication media by which they are passed. It would be interesting to investigate further the role that command intent alone still plays within UK and other nation's operations, particularly in the US where the term is used very frequently.

But potentially more impacting will be the effects of changing forms of communication, particularly with the increasing role of multinational alliances and coalitions. For example, the percentage of orders that are written generally increases at higher levels of command. Given the difficulties discussed within this paper this is likely to be an even greater percentage within multinational operations.

Our next proposed direction for research is to gauge the relative importance of written and verbal orders within the command process, and whether it varies with level of command. Intuitively, it is reasonable to believe that verbal commands assume greater importance at lower points in the command chain, and at times where speed is critical (i.e. during contact with the enemy), and that written commands will dominate at higher levels of command, and perhaps at interface points between coalition allies (sometimes via liaison officers). It would be useful to justify this belief by practical measurement. Additionally it would be useful to discover which types of communication commanders preferred, and why.

This study will now move to a series of interviews with commanders at all levels in the command hierarchy (battlegroup down to troop/platoon). The "OSD Tool", described in the next section, will be used to record a subjective result to the following four questions:

1. How frequently do you use written communication within the order process?
2. How frequently do you use verbal communication within the order process?
3. How important to you are written communications within the order process?
4. How important to you are verbal communications within the order process?

The commanders will then be asked to clarify their responses by providing estimates for the percentage of time spent during an operation devoted to written orders and to verbal. They will then be asked which of the two they prefer, and why. This qualitative approach

will reveal the relative contributions of written and verbal communications at different levels of command and make an initial judgement whether our original hypothesis (that written communications dominate at higher levels of command) is true.

It will then be necessary to substantiate the above with quantitative evidence by way of observation. There are several potential quantitative measures – taken from cognitive and social psychology - which could be applied to any communication (from length or frequency of messages, to volume of words, sentences, etc, or the number of pages/seconds used for an order). The work of English and Guppy (1994) suggests that the more effective tank crews use fewer communications, but it is far from clear if this, or the more general measures, can be directly applied to all military activity (Whitworth, Hone and de Looy-Hyde, 2007). It is therefore suggested that the frequency and time taken over communications (and types thereof) are investigated in order to discover which are most used and to what degree.

Acquisition of data to assess the forms of communication may be problematic. The following are forms of communication currently in use, particularly at lower levels of command, that would be appropriate for analysis:

- Written orders, whether in paper or electronic form
- Presentations (nowadays invariably in Microsoft PowerPoint)
- Verbal orders communicated electronically (such as instant messaging)
- Face-to-face communications (verbal and non-verbal)

The assessment tool is appropriate for assessing any or all of these forms of communication, provided they can be recorded for analysis. Those communications using electronic media are particularly easy to record (within the constraints of research ethics), and can be used immediately. The face-to-face communications (and to some extent, the non-verbal components of teleconferencing) are less easy to record reliably, and more difficult to interpret. An important aspect of multi-source, even multimedia communications, is to record the time of communications, and an extension to the assessment tool to allow for synchronization to be examined is being considered. Indeed it should be possible to relate communications events to an operational timeline. By working from "Start" to "H-hour", a plot of the exact timings for the issue of Warning, CONOPS and Confirmatory orders should throw further light on the order process.

It would therefore be important to have a way of time-stamping the events relating to all communications including face-to-face. It is proposed that a simple application will be created that will allow the assessor to press a button when a form of communication is initiated and then to select the type of communication from a drop-down list (for speed of selection). The end of the communication would then be indicated with the click of a stop button. It should also be possible to make adjustments or remove a logged event if it is not order-related.

Each assessor would observe just one commander at a time during an operation and the results for each could be analysed in the form of a sequence diagram or Gantt Chart, like that shown below, or as a pie chart showing the overall frequency with which each form of communication was utilised. The results could then be compared with those at different levels of command to judge whether non-written forms of communication are indeed more frequently used at lower levels of command than written. Furthermore, these quantitative results could be compared against the subjective assessments made earlier.

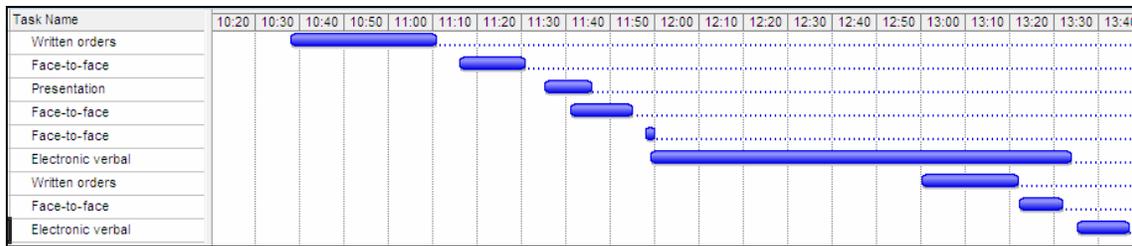


Figure 3. Example Gantt Chart for recording events

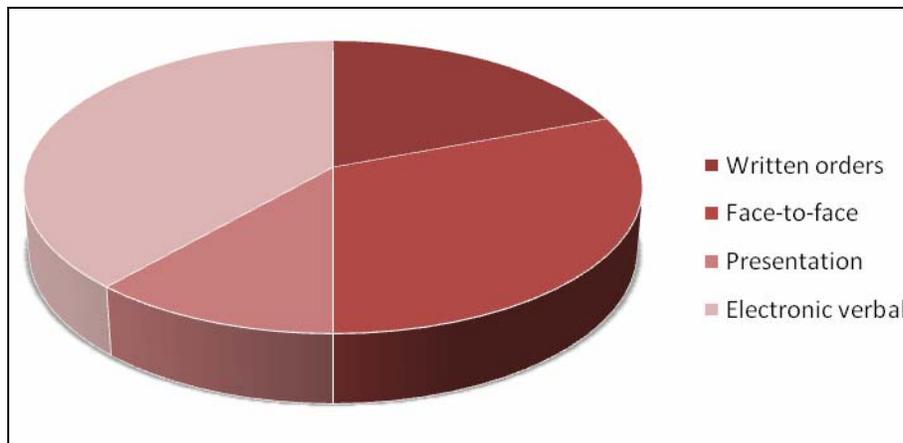


Figure 4. Example Pie Chart to show time spent using communication types

The final assessment is the most problematic but potentially also the most revealing. This would follow the process proposed in Hone, Whitworth and Farmilo (2007) whereby commanders would be asked to give a post-exercise assessment of the orders given by their subordinates. Provided that all of the communications could be recorded (and this is discussed further below) they would be replayed to a senior commander and he would be asked to assess the order transmission of his direct subordinate to sub-commanders, i.e. in Figure 5 the Commander would assess the orders passed by Sub-commander 1 to Sub-commander 2.

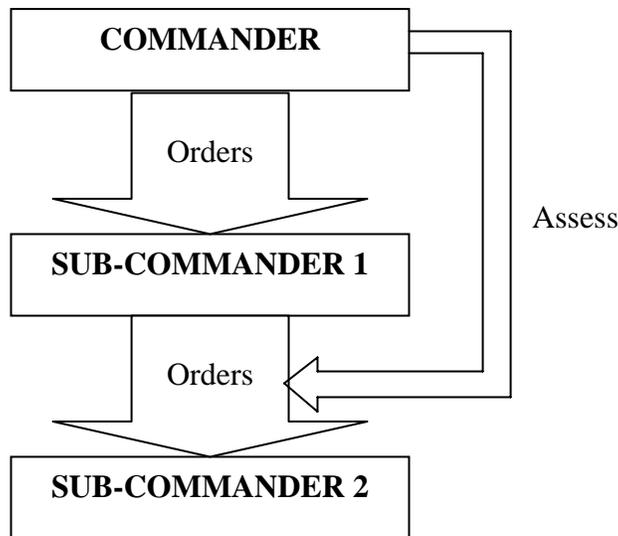


Figure 5. Commander assessing sub-commander's orders

The assessment would be made using the Order Assessment Tool (based on the OSD Tool, below). This would require answering a series of questions related to the order process. It would be necessary to have a question set tailored to a particular operation or exercise in order to retrieve the most useful information.

The difficulty will be in recording all of the communication which takes place, indeed this may not even be possible at all when you consider the visual cues and body language which are all a part of communication. However, it should be possible to record any of the communication types listed above (i.e. written, presentations, electronic and face-to-face verbal) particularly in a controlled environment like a simulation.

Order Assessment Tool and OSD Tool

In Hone, Whitworth and Farmilo (2007) an approach was offered for the assessment of command intent. This tool (using the principle of the Osgood Semantic Differential, hence OSD) lends itself to other assessment requirements including the assessment of orders. The approach consisted of a set of continuous scale questions. The OSD Tool presents a basic question above a continuum between two descriptors. The respondent is asked to indicate his/her assessment by dragging a pointer (taking the normal Windows form) along the continuum (using the mouse "click-and-drag" function), and then clicking on a button when they are satisfied that the pointer is correctly positioned. The starting position is shown below in Figure 6 and a typical response in Figure 7. Since the respondent is asked to take a position between the two descriptors, rather than having to choose a given point on an arbitrary scale, the response is fast, and no less accurate than a forced choice.

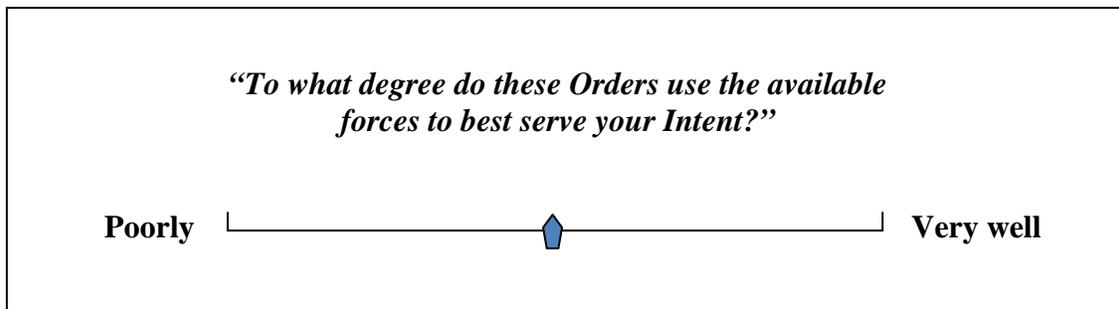


Figure 6. What the respondent sees

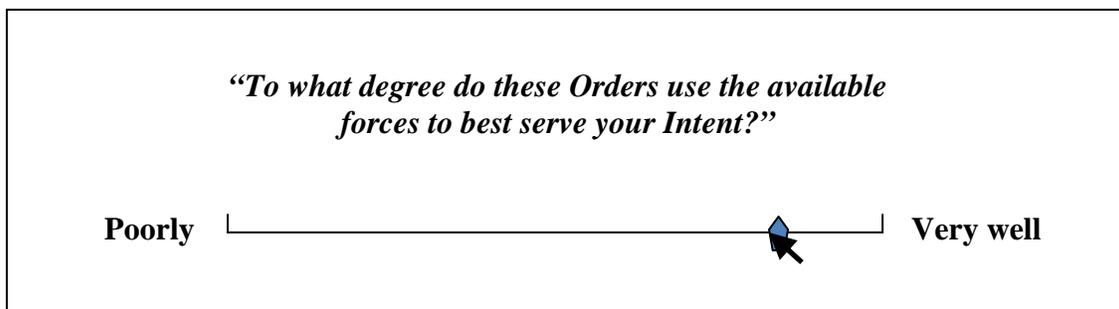


Figure 7. Typical response to a question

From the viewpoint of the researcher, however, the continuum shown in Figure 6 actually conceals a multi-point scale. This scale has a potential range of intervals from 0 to 100, this in turn permitting the use of several statistical analysis approaches. Further, while the scale is initially an equal interval scale, the data can be exported in a form acceptable to modern databases and spreadsheets (we prototyped with Excel) and then related to an unequal interval scale. This, in turn, permits a non-linear relationship between the two descriptors to be explored.

The tool was developed for use on desktop and laptop PCs, and was then modified to run on PDAs, the intention being that it could be utilized in the field during an exercise, and those asked prefer the handheld version.

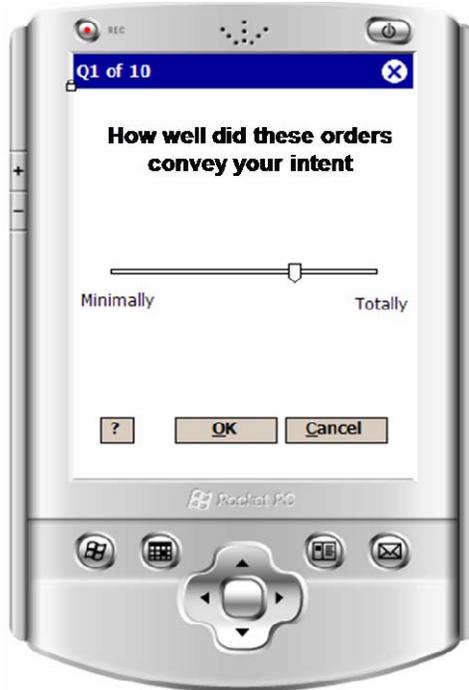


Figure 8. The OSD Tool running on a PDA

This tool was originally designed to assess the transmission of command intent (Hone, Whitworth and Farmilo, 2007) but, as explained previously, discussions with staff at CAST(S) revealed that command intent is not stated as explicitly in reality as doctrine requires, at least in UK exercises and operations. More problematically, orders are generally transmitted by voice and may only be supported in written form later on (although, in any case, not below Company level). Furthermore, the premise that intent is transmitted by a commander to his subordinates, and subsequently from those commanders to their subordinates, and so on, is not the case in reality. Therefore, using our model, we could not go beyond “two-down” assessment, and even then it would require looking at supporting documentation and not at the real orders. The conclusion is that any attempt to assess command intent, with or without the tool, is likely to be a very complex task with inconsistent results.

The assessment tool is properly seen as the front-end tool of any study. The use of a PDA can pose the minimum of interference during an exercise, and PDA compatibility with PC operating systems allows straightforward up- and download of data for more sophisticated analysis and logging.

Applicability

It is not being proposed that a single question set would apply to all assessment cases. The question set is expected to require alteration to take into account the doctrinal

background of the assessor, and the way the assessor is likely to interpret orders him/herself, as well as the nature of the command being assessed. With widely different organizational cultures operating together in a coalition, any overall assessment is likely to require a number of question sets, each of which will need validation within the assessor's organization.

A further issue with using such a tool is how it integrates with the aforementioned values of Mission Command. If the commander is seen to be assessing how closely a subordinate's orders match his own then this could have a negative impact on the trust between the two. However, it may still be possible to take advantage of the tool if the questions are phrased in such a way that the overall development and delivery of orders is being assessed from a subjective point of view rather than its consistency with the commander's own thoughts and expectations. A possible alternative way of asking the questions could be "*to what extent is 'x' consistent with your intent?*" – i.e. would it work to achieve the desired effect.

The tool has already been used for course assessment at the Defence Academy of the UK, and been shown to be an effective way of collecting data (Whitworth, Hone and de Looy-Hyde, 2007). It is being considered for use post-exercise as an aid for After Action Review (AAR) in the training of junior officers and cadets (Hone, Whitworth, Swift and Farmilo 2008).

Conclusion

The orders process is continually evolving. Modern military operations become ever more unpredictable, and multi-force and multinational operations become the norm. Further, improvements in hardware, and the technology to make best use of the hardware, will always require that yesterday's approach be considered for modifications tomorrow. The future probably lies with a formal language, such as BML, to support the order generation and transmission process. In the meantime, processes and communications continue to develop, in a fairly unconventional manner, and our research intends to focus on these changes and their effects, good and bad.

There is room for traditional values, such as Mission Command, which continue to be very successful and indeed support the agile and variable environment, so that commanders can take advantage of new ideas and approaches. But the training to support this and the increasing multi-cultural and international style of operations needs to continue to improve so it is important to look at ways to enhance training, and other opportunities to develop tools which will aid future generations of Defence personnel.

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