

A Group Support System for Military Mission Analysis

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Abstract

Due to the changing nature of the threats to the United States, the US Army is in the process of changing the way it is organized, equipped, staffed, and even how it fights. This new Army is called the Objective Force and incorporates distributed, collaboration technologies as a force multiplier. To research how to effectively use these technologies, the Army Research Laboratory, the Battle Command Battle Laboratory – Leavenworth, and instructors of the Command and General Staff Officers Course exposed two sections of a core course in tactics to a group support system to perform mission analysis. This paper details the mapping of the mission analysis to the group support system and summarizes the experiences of these officers.

1. Introduction and Background.

In 1999, the United States Army leadership provided a vision of how the Army will meet the Nation's requirements of today and of the future. Key to this strategy is the Objective Force. "The Objective Force is the future full spectrum force; organized, manned, equipped and trained to be more strategically responsive, deployable, agile, versatile, lethal, survivable and sustainable across the entire spectrum of military operations from Major Theater Wars through counter terrorism to Homeland Security [1]." Units of the Objective Force will use collaborative, distributed decision aids to enable leaders to maintain uninterrupted situational understanding. An essential part of the decision process will be the analysis of the mission. A Group Support System (GSS) may improve a distributed mission analysis because of its ability to provide simultaneous viewpoints from remotely located individuals. This paper reports on trials of a repeatable process for using GSS to support military mission analysis.

1.1. Military Decision Making Process

The repeatable process for Army mission planning is the Military Decision Making Process (MDMP). The US

Army is organized into echelons such as a division, brigade, battalion, company, and platoon. Platoons are aggregated with other units to form a company. Companies are aggregated to form a battalion, and so forth. A typical division may be as large as 18,000 individuals. Brigades are about 3,500 depending upon the type; companies are around 100. Each echelon has a staff consisting of personnel, intelligence, operations, logistics, communications, and other specialized individuals as necessary. All staffs use the MDMP for planning. The MDMP "is a single, established, and proven analytical process. The MDMP is an adaptation of the Army's analytical approach to problem solving. The MDMP is a tool that assists the commander and staff in developing estimates and a plan [2]." The primary steps of the MDMP are shown in Figure 1.

The entire MDMP is too cumbersome and complex to react to the modern mobile and dynamic battlefield. The use of a GSS for parallel planning is an attempt to increase speed and quality of the plans for the Objective Force. For this effort, the GSS was only applied to Step 2, Mission Analysis. Mission Analysis allows the commander to begin visualizing the battlefield and overall operation. Mission Analysis contains 17 sub-steps to include a formal briefing to the commander. The sub-steps do not have to be performed sequentially and are shown in columns one and two of Table 1.

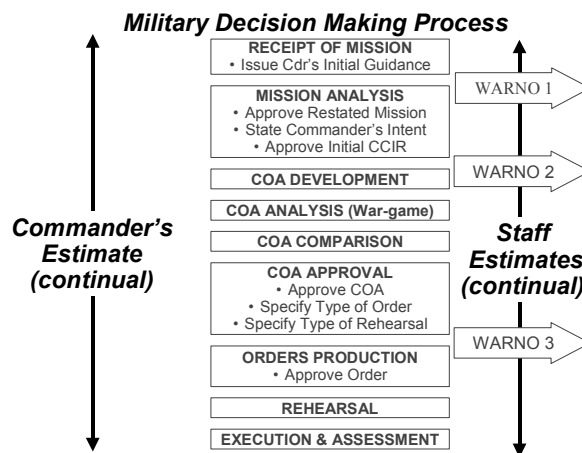


Figure 1 - Military Decision Making Process

1.2. Research sponsors and roles

This work was performed under the Collaboration Technology for the Warfighter Science and Technology Objective (C-STO) [3]. A key goal of the C-STO was to reduce the reentry of information needed in today's systems by applying a group support system (GSS) to enable collaboration and decision-making. The Command and General Staff Officer's Course (CGSOC) is a ten-month course in Army tactics and decision making for field grade officers. Short of a military exercise, CGSOC was deemed an outstanding environment for exploring the C-STO issues.

Therefore, in the Spring 2001, the Battle Command Battle Laboratory – Leavenworth (BCBL-L) and the US Army Research Laboratory (ARL) approached instructors of the Command and General Staff College (CGSC) to allow a section of CGSOC to explore a GSS for military use. The GSS was introduced to students of an elective course of CGSOC, Medium Brigade Tactics (A311) and were allowed to use the GSS software for all portions of the MDMP, including planning and execution. In general, students liked the environment and felt it assisted them in their work [4].

The instructors were very pleased with the work and requested the GSS for next year's class in tactics, C300, Fundamentals of Warfighting. C300 is composed of six major lessons and four major military planning exercises. In these exercises, the students analyze how corps, divisions, and brigades fight and sustain themselves on the battlefield. C300 is an execution-oriented course with

students generating combat plans using the MDMP and fighting a group developed combat plan on a simulated battlefield [5]. Of interest to this research, the students performed one exercise at a division level, one at a brigade level, and another in urban terrain. All required a Mission Analysis: The capstone of the class was a one-day execution of the brigade plan using specialized exercise rooms complete with sophisticated simulation software.

2. Approach

This case study was conducted in conjunction with another study with two sections of C300. This study required a special classroom within the Futures Lab of BCBL-L. The same instructor was used, but in C300, the curriculum and timeline were more tightly controlled than in A311 [4]. This limited the instructor's flexibility and he requested the GSS to be used only for Mission Analysis and the After Action Report. The instructor also desired that the students first perform a Mission Analysis for the division exercise without the GSS to learn the traditional process. Then, he allowed the students to use the GSS for Mission Analysis in the brigade exercise and the urban terrain exercise. To truly see the "collaboration" nature of the GSS, the instructor requested the students use the GSS for the actual command briefing instead of viewgraphs. This dovetailed nicely with the C-STO's goal of minimizing rework of material.

Table 1 - Mission Analysis steps as mapped into the GSS

Step	Description	GSS Representation	Stage
1	Analyze the higher headquarter's order	This was located in Preliminary Bucket.	A
2	Conduct initial intelligence preparation of the battlefield (IPB)	Since this required maps, a placeholder was created in the Preliminary Bucket for any text.	A
3	Determine specified, implied, and essential tasks	In buckets labeled: Specified, Implied, and Essential	A
4	Review available assets	Assets are usually represented by a hierarchical structure which for the purposes of the class was better represented outside the system.	A
5	Determine constraints	In a bucket labeled: Constraints	A
6	Identify critical facts and assumptions	In buckets labeled Facts and Assumptions, respectively	A
7	Conduct risk assessment	In a bucket labeled Risk	A
8	Determine initial commander's critical information requirements (CCIRs)	This varied based on the commander. Sometimes they were in the Preliminary bucket or sometimes in a bucket by themselves.	A
9	Determine the initial reconnaissance annex	Performed outside the system.	A
10	Plan use of available time	Performed outside the system on flipcharts.	A
11	Write the restated mission	This was often done earlier by the commander, but was finalized during the Commander's Guidance.	D
12	Conduct a mission analysis briefing	This was conducted by reviewing the material in the buckets.	C
13	Approve the restated mission	Done by HQ – played by the instructors of C300	C
14	Develop the initial commander's intent	In Preliminary bucket or Commander's bucket	A
15	Issue the commander's guidance	In Preliminary bucket or Commander's bucket	D
16	Issue a warning order	Done via an exported Word document report from the GSS system	D
17	Review facts and assumptions	Done during the analysis of tasks.	B

2.1. Group Support Systems (GSS)

Since the 1980s, ARL has sponsored research at the University of Arizona in GSS. The GSS used by this effort was GroupSystems, a commercial system developed from that research. The system consists of brainstorming, organizing, and evaluation tools to assist individuals in meetings, develop strategic plans, and create other products. Folders, shown on the extreme left in Figure 2, represent meetings. The primary meetings used for this report are under the overall folder, "X C300 Header." Each folder is comprised of activities or tools organized into an "Agenda" shown as the second column in Figure 2. Three activities of the "C300 Fall 1 All" folder are shown. The primary activity (tool) used for this application was Categorizer.

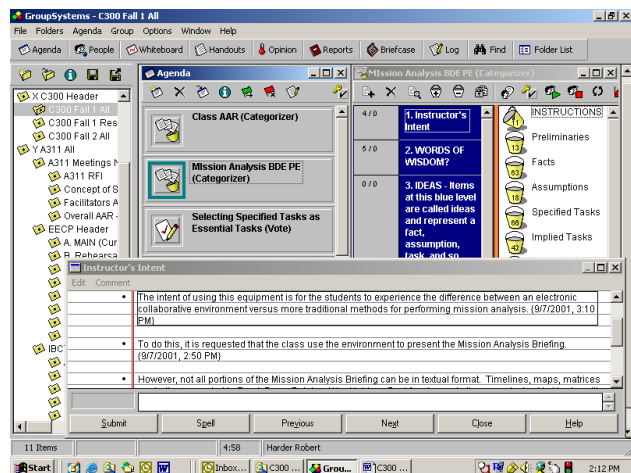


Figure 2 – Major constructs of the GSS tool

Categorizer allows brainstorming ideas, commenting on the ideas, and grouping those ideas into categories. The second box of the Agenda in Figure 2 is the "Mission Analysis PE BDE" Categorizer activity. The column on the extreme right represents the categories (buckets). Double clicking on the bucket tips it to the left and shows the ideas within that category. The category shown is "Instructions" and consists of a number of ideas (second column from the right). Each idea has comments. In this case, the idea, "Instructor's Intent," has been selected and the comment is shown in the white screen at the bottom. Each comment is tagged with the date and time. Comments are made simultaneously from all participants and can be anonymous or attributed to an author or military staff section.

Although GSS has shown significant savings in labor, other studies have shown conflicting results [6] and for whatever reason GSS is not a mainstream technology. Briggs [6] contends that repeatable processes are a key to GSS technology transition that a concept called a thinkLet is an enabler to repeatable processes. "A thinkLet is the

smallest unit of intellectual capital required to create one repeatable, predictable pattern of thinking among people working toward a goal" [6]. The structure for Mission Analysis used in this effort is actually a variation of the LeafHopper thinkLet [6].

2.2. Preparations

To gain user acceptance from the students to use a GSS, their Mission Analysis portion of the division exercise was retrofitted into the GSS. This enabled the researcher to show the students how the brigade end product would look within a GSS. Most of the division briefing contained steps of Mission Analysis as depicted in column 2 of Table 1. The GSS representations are shown in the third column and comprised an initial mapping of the Mission Analysis portion of the MDMP to a GSS. Both classes received a short briefing on collaboration technology before they started and some training on the GSS.

2.3. Class composition and room

Class One met from August to October while Class Two met from October to December. Each class had 18 students and met about 6 hours per day, 5 days per week for 8 weeks. Although the exercises were identical, circumstances forced each class to perform them differently, so that a scientific comparison of factors such as time was compromised. The special classroom consisted of 18 laptops in a U-shaped fashion with some rows in the middle. The front of the room contained a rear-projection Smartboard. A computer was attached to the Smartboard and an internal projector displayed the computer screen on the Smartboard screen. The Smartboard technology allowed the students to manipulate the screen with pointing devices or their finger instead of a mouse. This was extensively used for instructor briefings and proved important for easy use by the students of during their briefings.

3. Class usage of the GSS

Although this section concentrates on the activities of the first class, in general, all mission analyses within the exercises were conducted in a similar manner. The instructor began the exercise by handing out the mission and staff positions. Until that moment, the students did not know the position they would play in the exercise. Each student was assigned a position such as intelligence, operations, engineer, and so forth. This assignment could be interpreted as Step 1 of the MDMP - "Receipt of Mission," shown in Figure 1. Immediately after the assignment, the executive officer (XO) provided very preliminary guidance to the staff concerning class time, schedules, and general approach. The fourth column of

Table 1 shows the rest of the stages the students used to perform mission analysis. For the brigade mission analysis, Class 1 was given one day (about 6 hours). Although they had finished their mission analysis, they were still using the system the next day on 9/11/2001. This was the day of the terrorist attacks on the World Trade Center and the post was closed. This and other factors obviously impacted any comparison between the two classes. The first paragraphs below detail the brigade Mission Analysis (BDE MA) of Class One and are coded to match the last column of Table 1. Table 1 and this section are designed to provide enough documentation so that other “mission analysis” processes could be mapped to any GSS in a similar manner. The subsequent paragraphs describe the urban terrain Mission Analysis and the differences in Class Two.

3.1. Staff/Commander’s work (Coded A in Table 1)

After the initial organizational guidance by the student XO, the participants began reading the operation order (OPORD). As the staff found information related to their area, they entered it into the GSS as a fact, constraint, specified task, implied task, or risk. Each entry could be entered in parallel. Specifically, one of the very first steps of Mission Analysis is to identify specified tasks in the OPOrd. Figure 3 shows the “Specified Tasks” bucket open with 66 tasks. The staff position was coded at the beginning of the line in order to group staff information together. Task number one had one comment and is shown in the comment box in Figure 3. In this case, it was the page number of the OPOrd where this task was found. Most entries did not have any clarifying comments or discussions as shown by the “0/0” numbers on the extreme left of Figure 3. Comment windows such as these were designed to accommodate electronic collaboration such as discussion, arguments, or clarification.

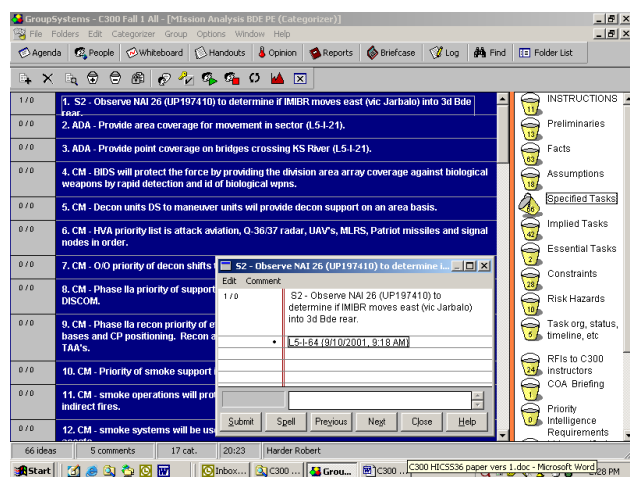


Figure 3 - Specified Tasks

In general, there were few supporting comments and virtually no comments of a “discussion” or collaboration nature for entries. There was much verbal discussion and collaboration, but that may have been because the staffs were collocated.

According to the formal MDMP, as the staff collectively performs their analysis of the mission, the commander simultaneously performs his own analysis [2]. The commander’s analysis was represented by the information in the Preliminary Bucket shown in Figure 4. The original template provided one line for commander’s intent. In this mission, the commander adjusted the headings to suit his style by creating an “intent” line for special areas (Lines 4-8). This illustrates the need for the commander and staff to customize the GSS to their needs.

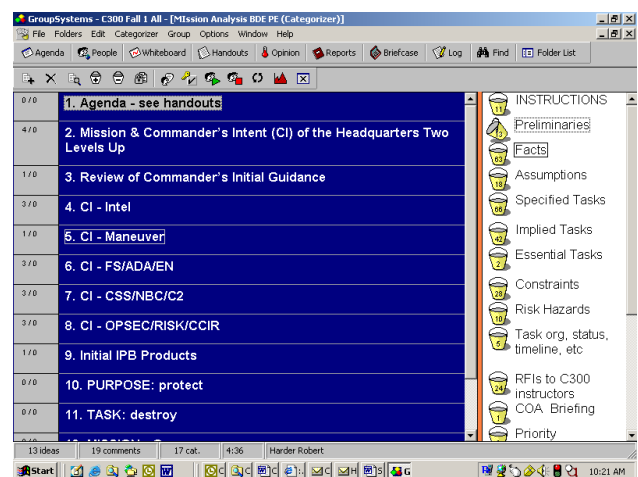


Figure 4 - Preliminary bucket

3.2. Analysis for Briefing (Code B in Table 1)

Using the MDMP in the traditional manner, the XO takes lists of tasks from the staff, reconciles differences, discerns meanings, and creates viewgraphs. The viewgraphs may be separate electronic files or hardcopies. For example, in the division exercise for Class One, individuals created paper copies of lists of tasks for each staff section. These were given to the XO for consolidation and the creation of viewgraphs. This Mission Analysis process was quite different using a GSS. Once the material was placed into the buckets, the XO conducted a group session with the entire staff before the commander’s briefing. As requested by the instructor, the buckets served as the briefing tool. Viewgraphs were not to be used.

The XO also used the GSS as his analysis tool. That is, instead of combining all the material and creating slides and pre-briefing them with the group, he reviewed all entries in the buckets with the group. In this review, shown in Figure 5, the XO discovered that many tasks were too detailed for the commander’s briefing. At first

he intended to delete the material, but the staff pointed out that those were still useful tasks. Therefore, “hide” buckets (seen at the bottom right of Figure 5) were created on the fly to contain this material. During the analysis, these detailed tasks were moved to the hide buckets, thereby preserving information for the staff, but not cluttering the command briefing. The analysis was conducted using a Smartboard, so that the XO moved the tasks from one bucket to another with his finger. For more complex modifications to the tasks, the XO designated individuals to adjust the material during the analysis and notify them when it was complete. This allowed everyone to participate in the process. It also saved the XO time by distributing the rework to the staff during the group session.

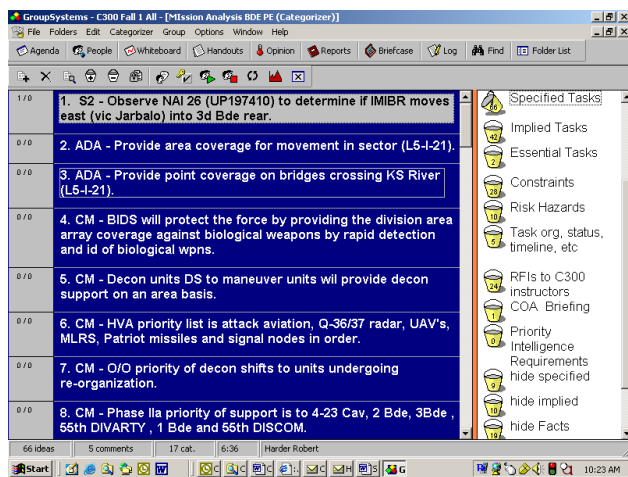


Figure 5 - Analysis of Specified Tasks

3.3. Briefing to Commander (Coded C in Table 1)

After the analysis was completed and other preparations made, the briefing was presented to the Commander using the buckets and lists. Maps on the walls were used to illustrate unit positions. Any clarifications were made by the staff while the commander was viewing the screen.

3.4. Commander’s guidance (Code D in Table 1)

After the briefing, the commander provided further guidance to the staff. In most cases, the commander simply reviewed his entries in the Preliminary bucket (Figure 4). At this point, the Mission Analysis stage was complete. Since the instructor had requested the GSS be used only for Mission Analysis, this concluded the use of the GSS. A report was created of the Mission Analysis activity and hardcopies made. The GSS system was available later for reference purposes, but no further inputs were made.

3.5. Class One - Urban Terrain Mission Analysis

The mission analysis for the urban terrain exercise was similar and accomplished in less than a couple of hours. This was a smaller exercise and took place at the end of the course. In each of these exercises, different individuals played different roles. Commanders were always changed. The mission analysis is shown in Figure 6. Although the basic mission analysis structure was furnished, the students were able to customize the environment to suit their needs. Originally, a line in the Commander’s area held the Commander’s Critical Information Requirements (CCIRs) (See Line 9 in Figure 6). However, during execution, the actual CCIRs were placed in a bucket shown in the lower left of Figure 6. The positive aspect of this was that the students started customizing the GSS for their own uses. The negative aspect was that these changes made it unclear where information resided.

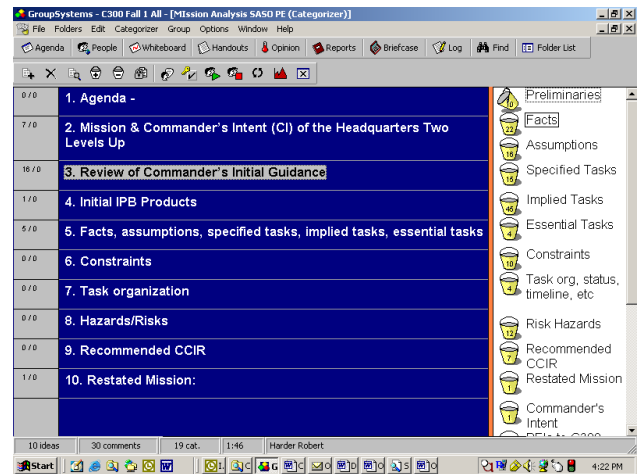


Figure 6 – Urban Terrain Mission Analysis

Figure 6 indicates there are 16 comments under Commander’s Initial Guidance. Some of those comments are shown in Figure 7.

3.6. Class Two – Brigade Mission Analysis

Due to circumstances of the schedule, Class Two was under a very strict time constraint. Instead of the full day allocated for mission analysis, this class had less than a half-day. Therefore, after mission receipt, the new XO immediately requested that each staff person provide no more than three entries in each bucket (Figure 8). The students also created headers for the staff groups for easy reading. Thus, although the “Specified Tasks” bucket indicates 45 tasks, in reality, there were only 29. Class One had about 75 tasks in the same bucket. The XO requested that all input be accomplished in 45 minutes. That produced a little over 100 items compared to about 230 for the first group. Class Two completed the entire

process in about 2 hours, using about 30 minutes for reviewing the material and over 30 minutes for the commander's briefing.

Another difference was the technique of the commander. Class One's commander provided much information in the system for the brigade exercise and gave his intent in just a few minutes. The commander in Class Two provided his guidance verbally and took over 30 minutes to read his notes to the class. This is in contrast to Figure 7 where the commander used the electronic system to provide his guidance.

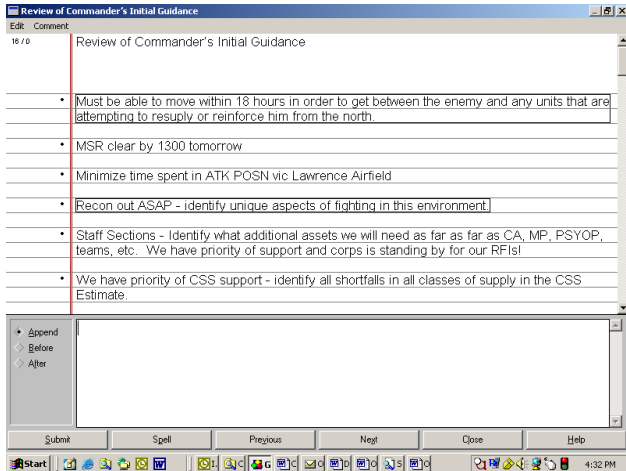


Figure 7 - Class One - Commander's Intent

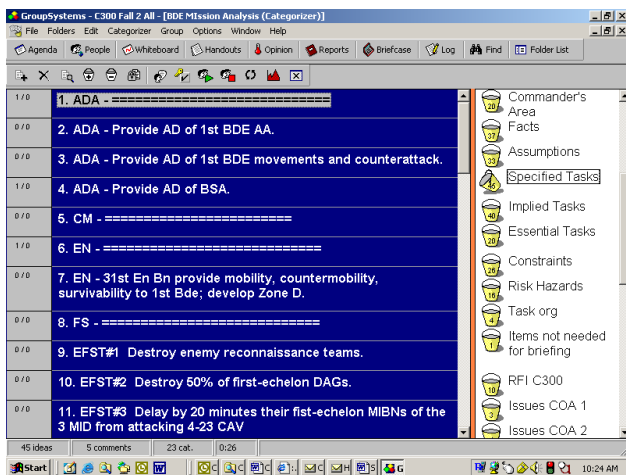


Figure 8 – Class two – Mission Analysis

3.7. Class Two – Another difference

An experienced electronic facilitator uses a GSS in many ways for group interactions and parallel processing. During the process of orchestrating the group through the review of the mission analysis buckets, all the XO's were functioning as electronic facilitators. Although none were trained, all were able to use the system to brief. Most of

the individuals were learning to perform the duties of an XO during Mission Analysis, so were focused on the analysis – not how to use the GSS. There was one exception. It was observed that one individual used the system as well as an experienced facilitator. As items came up, he immediately assigned individuals to fix, combine, or rework the material and then came back to it later in the process. Afterwards, he was interviewed to determine if he had had previous GSS experience, was very proficient with automation, or had used a Smartboard before. He had none of these skills. What he did have was two years experience in performing mission analysis in a previous job. He stated that as he learned the capabilities of the system he immediately could see the value of doing things differently. He stated that a similar effort with his previous staff would have taken days instead of hours.

3.8. Class Two – Another use of GSS

As originally agreed with the instructor, the students would only use the GSS for Mission Analysis, course evaluations, and surveys. As stated earlier, both classes were also using this special room to work with another project at BCBL-L. The project was the use of a desktop simulation for rehearsing the brigade plan before going to the formal simulation exercise. This desktop simulation rehearsal allowed the students to play the operation they had designed before the "real thing." The brigade staff was in one room and the battalions were in other rooms using the simulation consoles. The battalions fed status reports to the Brigade headquarters over radios. The headquarters did not have automated maps.

Unbeknownst to the researchers and totally on their own, Class Two designed a GSS activity to support their command and control. Individuals in the brigade staff were assigned a battalion and given a radio to that Battalion. They also sat in front of a GSS console and typed their radio spot reports into the system. This information was displayed in two buckets – one for friendly spot reports and one for enemy spot reports. The XO orchestrated the information and decided what the commander and his mapping crew needed to see. As these reports were presented to the commander, the XO archived them by dragging the spot report to a header. This removed them from the main board, but they were still available for reference. This is shown in Figure 9. The students felt this worked so well, they requested an entire GSS system at their formal simulation exercise.

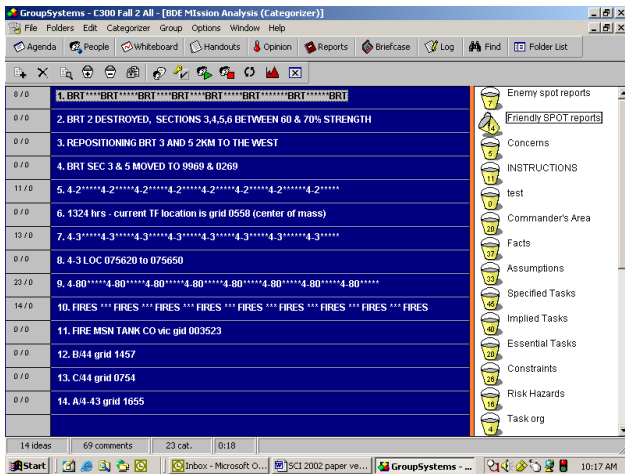


Figure 9 – Use of GSS for command and control

4. Analysis and future considerations

Although this study was disrupted by the 911 tragedy, instructor comments, researcher observations, and student feedback were obtained. The following paragraphs summarize those thoughts. The italicized statements represent direct student quotes and the bullets provide thoughts for future work.

4.1. Benefit of GSS for Mission Analysis

Many students felt the GSS greatly reduced the time required to complete the Mission Analysis, improved staff coordination, and resulted in a better product. One person stated that the system gave a better vision of the bigger picture by representing all battlefield areas and allowing a complete staff overview.

For mission analysis, GSS was an excellent way to capture information as it was extracted from higher level guidance and intent. It takes less time and puts the collaborative work in a medium that is readily editable and usable.

Group Systems works well in a time constrained environment. For example, it cuts to the chase on the 17 steps of mission analysis (MA) process. We conducted MA and put together an MA brief in one afternoon. It's a great tool for staff proponent and BOSS element collaboration, integration, and synchronization. It creates a synergistic effect where thoughts and ideas of others breed additional thoughts and ideas. The system can also be edited by select individuals during the refinement process while the rest of the group moves forward. The folders and buckets can also be manipulated to structure a brief with the existing data/input without the use of AMS Word or Power point. A great, great tool for staff and planners.

- Student usage of a GSS in a classroom situation showed that the Mission Analysis portion of the MDMP can be greatly enhanced by a GSS and can result in a better product. Future research is needed to validate and quantify these results.

4.2. Staff coordination - Pro

Synergism among individuals is a fundamental effect of using a GSS and was reflected in many comments. One student stated that he profited from ideas and input from others and these helped him complete his tasks as a staff proponent. Others felt that much duplication of effort was reduced as the staff could see all the inputs at the same time. Many stated this eliminated the “double tapping” situation. This situation arises when staff elements address the same problem independently and simultaneously. The students felt the GSS system facilitated staff cross-talk and interaction. It also allowed real time editing of work while in progress and established a visible common reference point. It gave individuals a sense that they were directly contributing to the whole group's objective.

Staff coordination was at its best. With the ability to electronically see each staff members thoughts and ideas and ask questions when needed made things extremely simple. Not having to write and rewrite a product due to lack of coordination takes a burden off of your staff.

- The Mission Analysis portion of the MDMP may result in better group cohesion.

4.3. Staff coordination – Con

Several comments expressed concern that the GSS inhibited interaction or could inhibit interaction in staff groups. Several felt dialogue and face-to-face discussions resulted in better comprehension of issues than electronic exchange. One felt the GSS made it difficult to argue points or communicate opinions while another expressed that individuals were “less likely to engage in cross-talk in the electronic environment versus face to face.” Another felt this automated “method reduced the need for a proactive interface between staff sections and therefore may be providing a false sense of collaboration.” One expressed that “verbal discussions might not occur on situations where thought was needed rather than input.” Another said, “There was so much information and not enough time to review and compare.” All of these comments expressed a similar concern that the GSS environment may result in some unintended consequences. Exactly what those consequences are is unclear. One of the best quotes expressing this was:

I still feel it's important to maintain verbal communication and not completely rely on electronics

to share information, and more importantly verify intent.

- Future GSS research in the military will need to determine and verify unintended consequences of lack of face-to-face interactions.

4.4. Electronic collaboration

Related to the concerns in the above paragraph is the concept of “electronic collaboration.” Through electronic collaboration one individual builds upon or corrects another’s ideas. Figure 10 shows a snapshot of the activity in the After Action Report (AAR) conducted at the end of the class. Line 8 was on the use of the GSS and some of the comments are shown in Figure 10 on the right side. These comments are an example of this “electronic collaboration” behavior where individuals agree, disagree, or modify thoughts of others. For example, 4 individuals agreed with comment #114. However, the last comment in the window (#197) not only agreed, but also added a recommendation.

In the Mission Analysis work, virtually none of these types of comments appeared. This could be attributed to the fact the students were collocated. However, many of their comments indicated they “thought” they were interacting electronically. Further, there were few interaction comments within A311 and those efforts were conducted in a distributed manner [4]. There are many arguments as to why this “electronic collaboration” did not occur, but the facts so far are that it did not occur – yet the same individuals will “electronically collaborate” within an AAR context.

- A more specialized study with rigorous controls may be needed to investigate “electronic collaboration” behavior for the Objective Force.

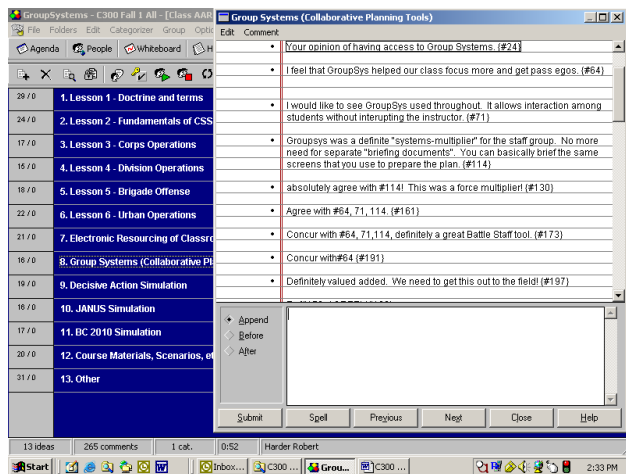


Figure 10 – After action review for Class One

4.5. Future students are more amenable to GSS

During the courses, the authors had several interactions with the instructor. An interview was held with him on April 26, 2002, to summarize his observations. The instructor pointed out that the 17 steps of the mission analysis can almost be done in any order, although they are depicted in sequential order in Table 1. The tool allowed those steps to be done concurrently by numerous individuals. As stated earlier, the Class One was allowed about 6 hours to do the Mission Analysis. Class Two was allowed about 2 hours. The instructor said that the same compression phenomena would have occurred without the technology but “clearly, without the technology, you would not have accomplished the same amount of work in less time.” This begs the question: “Which class did the better job?” In the instructor’s opinion, the resulting products were about the same. However, in the past year, screens of the efforts of Class One and Class Two have been show to many military officers. Two were previous CGSOC instructors and felt that Class Two did the better job.

- More research is needed to determine what exactly is the effect of a GSS used for mission analysis.

4.6. Group leader requirements

Although most of the students the system using did not have problems, several voiced concerns in how a GSS would affect a commander. The students said that the leader would have to be trained on how to keep the process going to avoid delays during the execution of the MDMP. Some thought it might dilute the role of the XO or commander and leave them at the whim of the person in charge of the software. Others were more optimistic, saying the GSS did make the XO’s job easier

- The next design for Mission Analysis will need to consider the role of the leader of the group differently from the role of the staff elements.

4.7. Student innovation

The instructor also felt the students of Class Two were never at a loss for innovative approaches with technology. “You don’t have to tell them how to use it.” The instructor felt this notion was the heart of the difference of the two groups – the computer comfort level of the students. Each succeeding group of students has been more comfortable with automation than its predecessors , and therefore more innovative with computers. Many students felt the whole concept of collaborative planning was very powerful. For several students this was a good first look at the potential of a collaborative planning tool. Several students said the GSS helped the class focus more and get past egos, thereby expediting work. The GSS also

“allowed interaction among students without interrupting the instructor.” The students felt the use of the tool would improve with practice especially for sharing and developing information. Many students wanted to see the tool used throughout the course. One caveat was: “the staff needs to still be experienced as a group in order to get maximum benefit from a collaborative environment.”

- GSS tools should be made available for use for an entire class.

4.8. Customization of the environment.

One of the strengths of the GSS was its flexibility. Figure 4 is a good example of the customization of the tool for a specific commander. If the commander’s intent had been “hard coded” without the ability to add additional lines, then the tool would have been too confining for that particular commander. Another example of flexibility was the use of the GSS for command and control. Existing military systems provide command and control, so this is not a method suitable for a field unit. The usage by the students was very significant for other reasons. The students invented this method entirely on their own. They used it for three hours before the researcher was even aware of its usage. They designed the bucket structure, the heading structure, and the methodology of archiving information. This illustrates that given a flexible GSS, the military officers are able to adapt the system to suit situational needs. Therefore, it is suggested that GSS be introduced to the deployed Army. Unfortunately, deployed units do not have the internal budgets to support the costs of a sophisticated general purpose GSS.

- Develop a pilot study with a line unit to introduce GSS technology at no additional cost to the unit.

4.9. Future GSS for military repeatable processes

Most students liked the concept of mirroring the “text book” format of the MDMP. However, they also desired to view the various elements such as assumptions, tasks, and risks for a given functional area such as engineering or intelligence. They wanted to avoid redundant input and limit the amount of information entered as they saw there was a tendency to put in more data than normal. As Class Two showed, if the GSS tool is flexible and a need arises not currently met by existing automation support, the military will apply the tool in new ways not previously identified. For example, if the mission analysis process had been hard coded into a computer-guided process, the ability to customize the commander’s intent (Classes One and Two) may not have been available.

- Structured support tools can move a team through a polished, well understood process efficiently, but

warfighters may still need the flexibility of a generic GSS tool kit.

4.10. AARs and thinkLets

AARs are a constant in the military. Besides the MDMP, an AAR is probably the most used repeatable process. AARs of both classes obtained a number of comments and had intense electronic collaboration.

- Classroom AARs are a rich and prolific area to investigate military thinkLets and assist in developing measures of performance for those thinkLets.

4.11. GSS to reduce rework time

As stated earlier, one of the goals of the C-STO project was to reduce reentry of information. The most touted benefit by the students was the use of the system as a briefing product. It encouraged students to see the assumptions of other staff elements. It provided a standardized text format. It allowed for changes to the final briefing to be input on the fly instead of interrupting the flow of the brief. It allowed a better check and balance across the staff. For class purposes, the students had to transition some of the mission analysis material to word processing, and some felt this was still a problem.

Groupsys was a definite "systems-multiplier" for the staff group. No more need for separate "briefing documents".

You can basically brief the same screens that you use to prepare the plan.

Great tool for combining staff products. Beats semi-automatically merging into PowerPoint.

- A next generation GSS for Mission Analysis will need to be designed with a “presentation view” for selected information.

4.12. GSS as a wargaming tool

One student felt the GSS could be used as a wargaming tool. The wargaming portion of the MDMP consists of the staff slowly and painfully going through various steps of their plan using maps, synchronization matrices, and several other tools. It is a step by step analysis of what is happening at each time segment to each unit.

The XO/G3 [operations] could describe the key event or time to be discussed and then each participant could input their key activities, coordination required, or questions. This would dramatically reduce the time involved in the process, eliminate the need for a recorder, provide a complete record, and basically

give all the info for a sync matrix. In addition, as members complete their comments - they could be reviewing other areas that require coordination and provide input.

- The wargaming methodology should be studied as the next candidate for GSS application.

4.13. Uses of GSS for military operations

One specific question in the AAR asked the students how they thought a GSS could be used within operations. The following comments provide some insight.

Great process which needs to be integrated into BN /BDE headquarters to reduce meetings and increase time available to accomplish other tasks. This could easily replace the blanket e-mails you get telling you to respond NLT and allow the sender to collect and manage information for briefings with minimal effort

Definitely valued added. We need to get this out to the field!

Experiments should be conducted with operational units.

- The Army should sponsor a long-term pilot project to use GSS in a field environment.

5. Research Status

A major goal of the C-STO research project was to validate these results in an experiment at BCBL-L scheduled for January 2003. Unfortunately, the prototype MDMP to be used for that experiment does not include a strict analytical approach to mission analysis. Therefore, this GSS methodology will probably not be used. However, there has been interest in adapting this approach to a forthcoming mapping/planning system used in the Army, and ARL will continue this research.

6. Summary

This case study mapped the mission analysis portion of the MDMP to a GSS environment. It showed that military officers could work quickly and efficiently in a GSS and that they could replace some existing processes such as viewgraph briefings with a direct usage of the tool. It showed that officers could be quite innovative on their own with such an environment. Not surprisingly, this innovation seems to be more frequent with younger students. Further, the study serves as a good example of three very different organizations (ARL, BCBL-L, and CGSC) working together to provide a useful and productive training experience for the ultimate user – the soldier.

7. Acknowledgement

This effort with C300 and the previous effort with A311 would not have been accomplished without the aid of an outstanding officer – LTC Phil Visser. He took a great risk in allowing his classes to use software he had never experienced, but he had the foresight to see the potential.

8. References

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