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ABSTRACT

The Florida Teletraining Project (FTP) was funded by the Department of Defense to test the feasibility of using a video teletraining network (VTT) (two-way audio/two-way compressed video) to present military instruction to reservists in Florida. The program was to be conducted by two-year community colleges in collaboration with armed forces schools, in part to test the capability of the community colleges to provide VTT instruction to reservists. Specific project objectives were to: (1) ascertain the merit of using telecommunications training provided by non- military sources for training military personnel; (2) quantify the value of the instruction received; and (3) guide future government and Department of Defense decisions related to distance learning. This paper provides an overview of general course design considerations, issues in reconfiguring courses for the new format, and the evaluation process. Results showed that the technology was reliable (albeit costly), that the community college setting or infrastructure could handle program needs, and that all students passed the stated learning objective under VTT. A discussion of lessons learned includes lessons relevant to military instruction along with lessons important for planning any VTT project. The costs of VTT programs, typically higher than for other modes of training, depend on a number of factors including the technology used, extensiveness of the course design and/or reconfiguration effort, the number of support personnel required, the length of the training program, and amount of staff training required. The benefits that may accrue from quality distance education programs include improved instruction, broader access to training, delivering instruction in a variety of settings, and less travel by course participants. Just like good classroom instruction, good distance education programs are highly dependent on good planning (instructional systems design), good instruction (presentation), and good organization and management. Two tables are included: Pretest and Posttest Performance Data, and Selected Student Ratings of Instructional Methods, Interactivity, and Course Characteristics. (Contains 25 references.) (SWC)

Title:

Lessons Learned from the Florida Teletraining Project

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Introduction

Communication technologies now exist to present live interactive instruction in real time via distance learning. Video Teletraining (VTT), also known as interactive television, is an application of distance education presented by a two-way audio and two-way video system. The major advantage of VTT is that it offers *live* instruction. While other technologies may be both viable and cost effective, the option of live instruction available through VTT may outweigh other distance learning strategies. Using a myriad of media--print, audio, video, computers, supplemental technologies (e.g., the telephone and facsimile machine), and off-line equipment (e.g., videotape players)--provides instructors and students with a means for communicating and learning that may be almost as good as being there.

The Florida Teletraining Project (FTP) was funded by the Department of Defense to test the feasibility of using a video teletraining network (VTT) (two-way audio/two way compressed video) to present military instruction to reservists in Florida. This program was to be conducted by two-year community colleges in collaboration with armed forces schools, in part to test the capability of the community colleges to provide VTT instruction to reservists.

Objectives

The FTP was directed to identify, collect, and evaluate telecommunications and pilot project test data. The specific project objectives were to:

ascertain the merit of using telecommunications training provided by non-military sources (i.e., community colleges) for training military personnel

quantify the value of the instruction received

guide future government and DoD decisions related to distance learning.

Twenty-one evaluation objectives were identified for the project ir the following categories: technology, instruction, community colleges, and cost. Data related to each of the objectives was collected from: (a) students, (b) course developers who were also the VTT instructors, (c) all remote site personnel including Instructional Coordinators (ICs), Points of Contact (POCs), and technicians, (d) administrative project staff at the origination site, (e) technical and production teams, and (f) military personnel including subject matter experts (SMEs), on-camera military instructors, and military remote site personnel.

These evaluation objectives focused on the:

technology selected for the project (e.g., ascertaining its reliability, the target community's acceptance of it, and how appropriate it was for providing the training)

instruction (e.g., determining whether or not the students met the learning objectives, and the effectiveness of the instructional strategies)

community college (e.g., roles and responsibilities as providers of military instruction)

costs (e.g., developing a cost model, determining the cost of course design and implementation, estimating the cost of an operational system, and comparing the cost of a telecommunications approach to the cost of selected conventional training options).

Video Teletraining in the Military

Dwindling resources and the size and importance of the reserve component are two of the main reasons the U.S. military has become interested in distance education. Specifically, reservist must be trained to the same standard as the active forces but they cannot be trained on a daily basis. This need for increased training has prompted the military services, industry, and academia to conduct research on the feasibility of training in a distance mode. While the research

is in its infancy and many of the studies have limitations, researchers have drawn two primary conclusions: (a) students typically do as well on learning outcomes using distance education methods as they do when taught by conventional methods, and (b) student satisfaction using distance education is equal to or higher than classroom instruction (DeLoughry, 1988; Fahl, 1983; Grimes, Neilsen, & Niss, 1988; Keene & Cary, 1990; Kruh, 1983; Partin & Atkins, 1984).

The U.S. Army Training and Doctrine Command (TRADOC)(1987; 1990; 1991) supports the use of VTT and maintains that it is both an effective and cost efficient method for presenting instruction to RC forces. The Naval Air Warfare Center, Training Systems Division (NAWCTSD) has also conducted a series of studies that addressed different aspects of VTT. They too have concluded that VTT was a viable alternative for providing high quality and cost effective instruction to distance learners.

The need to find cost effective and efficient learning strategies has led to conclusions about what technologies are viable and effective, what courses should be selected for distance education, and what variables are key when designing distance learning courses. The NAWCTSD developed a course selection model for Navy VTT. The major recommendations from this study were: (a) select courses that have a high potential for savings, e.g., courses with high throughput and short duration, (b) select courses that have an appropriate mix of lecture and laboratory, (c) do not select courses that are equipment intensive, and (d) do not select courses that require substantial curriculum modification.

Course Design Considerations

Studies conducted by the Army and the Navy have concluded that distance education courses typically require more extensive planning than platform instruction. Haarland and Newby (1984) state that the increases in student performance and satisfaction may be due to improved course design and teaching performance rather than as a function of a specific technology. TRADOC endorses the SAT model for the design of courses and states that effective course delivery must take into account proper management of the design, resourcing, development, production, distribution, and evaluation of VTT programs.

At the core of interactive television is the concept of interactivity (Moore, 1989; Ritchie & Newby, 1989; Stoffel, 1987). Interactive television is defined by the fact that good instruction, whether it is presented in a classroom or at a distance, stresses interaction among the participants in the teaching-learning process.

In addition to interactivity, the following course design features are also necessary for successful VTT (Bailey, et al., 1989; Cyrs and Smith, 1990; Defense Language Institute, 1992; McDonald, et al., 1990; Martin, 1993; Ostendorf, 1991; Sheppard, et al., 1990):

group dynamics should be addressed

student involvement activities need to be carefully structured

lecture segments should not exceed 20 minutes

visual aids must be adapted for television viewing

careful planning is required to handle student questions and discussions

instructors must involve and motivate learners

an interactive study guide (ISG) must be provided

Because military projects are often large, management issues when using VTT are of utmost importance. Maloy and Perry (1991) addressed the policy and management issues of a large Navy project. They found that a large teletraining project required a team approach. Some of the key team members were an educational specialist (e.g., an instructional designer or evaluation expert), an engineer, a budget analyst, an audio-visual specialist, a security specialist,

a researcher/analyst, a resource sponsor specialist (to provide support at the highest level), and representatives from civilian personnel, fleets,-training command, and reserves.

In summary, effective teletraining courses are similar to other effective distance education programs. The following are key recommendations for successful VTT courses:

Select courses that are cognitive rather than psychomotor and that have high demand.

Course design and development is a critical component of a successful VTT course. Typically VTT courses require more detailed pre-planning than traditional courses. Time and resources must be allocated to the pre-planning stages.

Courses must be designed to facilitate interaction, to provide feedback, to be motivating, and to humanize the instruction. Course developers must be knowledgeable in the principles of learning and instruction.

Instructional personnel are one of the most important aspects of a VTT course. They may require considerable training and practice to be effective.

It takes a team of people to design and deliver good VTT instruction. This team must be organized and the roles and responsibilities of all personnel must be delineated.

Equipment failures occur. Contingency plans must be prepared. These plans may require the expenditure of additional time and resources.

In large scale projects, all the various management and organization functions need to be coordinated. Someone who is knowledgeable in all aspects of VTT needs to maintain a big picture perspective.

Overview of the Florida Teletraining Project

Five courses were reconfigured for delivery on the U.S. Army Teletraining Network, TNET. Three U.S. Army Reserve Component Configured Courseware (RC^3) Military Occupational Specialty (MOS) courses and two Navy special topics courses were conducted. The MOS courses were delivered once each to Army National Guard and Army Reserve soldiers who were seeking to be reclassified in these MOSs:

Army: Unit Administrative Specialist (71L, level 10--entry level) This 73-hour course was presented in a two week block. The 71L10 soldier is responsible for routine office administration and works at various organizational levels throughout the Army. Twenty-six hours of on-site typing instruction were provided.

Army: Unit Supply Specialist (76Y, level 10). This 96-hour phase of the 76Y10 course was presented in a two-week block. The 76Y10 soldier performs unit and organizational supply tasks, including receipt, storage, issue and accountability of supplies and equipment.

Army: Basic Military Police (95B, level 10). This 66-hour phase of the 95B10 course was presented as a two-week block. The entry level MP performs the tasks of apprehension and search, patrol and traffic operations, investigations, physical security, and self-defense.

The two special topics courses addressed joint services needs and were made available to members of interested services and components:

Navy: Handling Hazardous Waste (HazWaste). This was offered three times as a one-day course. Course topics included a review of pertinent laws and regulations, a discussion of the physical and chemical

properties of hazardous materials, the correct techniques for delivery and transfer of materials to hazardous waste collection sites, and pollution and spill prevention.

Navy: Total Quality Leadership (TQL). This was offered two times as a one-day workshop. It was an introduction to the Navy's adaptation of W. Edwards Deming's approach to continuous quality improvement.

The courses were delivered to three Florida community college remote sites: St. Petersburg Junior College (SPJC), Valencia Community College (VCC) in Orlando, and at FCCJ. HazWaste and TQL were also offered at two out-of-state sites during the final administrations of these courses: Ft Taylor Hardin in Montgomery, Alabama and Camp Fogarty in East Greenwich, Rhode Island.

Course Reconfiguration

The five courses had to be converted from the standard mode of platform delivery to VTT delivery. The five-component Systems Approach to Training (SAT) model was adapted for use in reconfiguring the courseware. In the adapted model, the five functions of the SAT were included (i.e., Analysis, Design, Development, Implementation, and Evaluation). Due to the complexity of the reconfiguration effort, two functions were added (Revise Instruction and Management).

The five courses that were reconfigured in the FTP were assigned by the government. Therefore, the traditional tasks performed during the analysis phase of the SAT model were not conducted during this project. However, these courses were analyzed for their suitability for VTT according to the criteria provided by NAWCTSD.

During the design phase, the Programs of Instruction (POIs) and syllabi were analyzed to determine the adequacy of the course materials from an instructional design perspective. In the Development Phase, the instruction was developed and produced. All course materials were developed during this phase of reconfiguration. Preparation for, and the delivery of, instruction were the primary goals of the implementation phase of the reconfiguration process. The Revise Instruction Phase was added to the adapted model because several revision and validation cycles had to be performed during the reconfiguration process. The Management Phase was also added to the adapted SAT model because of the complexity of the project. Three primary groups of people had to coordinate multiple tasks for the success of the project: (a) the design, development, production, implementation, and evaluation teams, (b) the military organizations and groups involved in the project, and (c) the three community colleges.

A considerable amount of data was collected during delivery of the courses (Evaluation Phase). One of the roles of project personnel was to collect data from students, and data were collected from all project personnel.

Course Delivery

Instruction was presented *live* over TNET (Compression Laboratories' Rembrandt II 06™; compression rate 256Kbps). At the origination site, the primary person responsible for content presentation was the VTT Instructor. The content of the courses, however, required that a military instructor/SME, the Military Instructional Assistant (MIA), deliver some of the content. During delivery, up to three people were needed to implement the instruction.

At each remote site, a community college site coordinator, known as the Instructional Coordinator (IC), was needed as the instructor of record for each course. The IC also performed some of the off-line instructional roles. For the MOS courses, a Military Site Coordinator (MSC) was also required. The IC and MSC were the VTT Instructors' representatives at the remote sites. It was their responsibility to manage the instructional activities at each remote site.

Evaluation Methodology

Students

Students were selected by their respective military commands for participation in this project. A total of 275 students were trained during the project. All four services (including the reserve components of the Army and the Air

Force), and the U.S. Coast Guard were involved: Florida Army National Guard, Florida Air National Guard, U.S. Army Reserve, U.S. Navy (military and civilian personnel), U.S. Marine Corps, U.S. Coast Guard, Rhode Island Air National Guard, and Alabama Army National Guard.

The average age of all the students was 33.37 years. All of the students were high school graduates or the equivalent and 15% had a four-year college degree or more. A military grade of E5 was selected as an approximate estimate of the numbers of students who were managers versus those who were first line supervisors and enlisted personnel. Approximately 63 percent of the students were E5s or below. In addition, approximately 30 percent of the students had a military duty position related to the course in which they were enrolled and 4.9% had a civilian occupation related to the course content.

Students were asked how interested they were in the course content prior to taking the course. Approximately 73 percent rated themselves as very interested (5 on a 5-point scale). Approximately 19 percent reported that they had taken a course taught by television

Evaluation Instruments

There were 40 different data gathering instruments developed by FTP personnel in conjunction with Systems for Training and Applied Research, Inc., Lexington, Kentucky. These included achievement/proficiency test, student course perceptions, student ratings of course components, and interview forms. The achievement/proficiency tests were criterion based. Those for the MOS courses were Performance tests (PTs) developed by the military. Other performance tests were developed by project personnel. In addition, six standard Army forms were also used to collect test data.

Typical items from the instruments developed by the FTP include the following:

Dichotomous data, usually "yes/no" responses or "like/did not like," for example,

If you had the opportunity to take additional military teletraining instruction in the future, would you want to? _____*yes* _____*no*

Ratings on a 3- or 5-point Likert scale, where the highest number is always the most positive response, for example.

Please rate the aspects of this course on a scale from 1 to 5 or mark NA if the item is not applicable to this course:

5 = Excellent
4 = Very Good
3 = Good
2 = Below Average
1 = Poor
NA = Not Applicable

1.	*The VTT instructor's poise, personality and enthusiasm.*	*1*	*2*	*3*	*4*	*5*	*NA*
2.	*The VTT instructor's delivery of information over the network.*	*1*	*2*	*3*	*4*	*5*	*NA*

Ranking a series of responses (coded so the highest number was always the most positive), for example,

If you could pick from the following military training options in the future, which would you prefer as a method to receive training?

_____ *Traditional classroom instruction at a military school*
_____ *Video teletraining at a community college site*
_____ *Correspondence study*
_____ *Training provided locally by an assigned military instructor*
_____ *Video teletraining received at your armory/reserve center*

Open-ended questions, for example,

If you could have changed something in the course, what would it be?

Procedures

The five courses produced by the FTP were delivered between October, 1992 and February, 1993. Data were gathered from the course participants as well as from the staff responsible for facilitating the instruction.

All student and instructional personnel interviews were conducted by the project evaluators according to a predetermined schedule. Individual student interviews were conducted by the project evaluators immediately after the students completed the questionnaire(s).

The evaluation and cost data were coded as necessary and entered into a database. The Windows version of the Statistical Package for Social Sciences (SPSS for Windows 5.0) was used to analyze the evaluation data.

Results

The following list is a brief overview of the major findings related to the FTP. A more complete analysis of the data can be obtained in Bramble and Martin (1995), Martin and Bramble (in press); and Martin, B. L, et al. (1994):

Technology:

TNET was 99% reliable; students and instructional personnel rated the quality of the system high.

Students and ICs indicated that they preferred a VTT approach to traditional training at a military facility.

The courses selected for VTT presentation were generally suitable for the technology although some modifications were made (e.g., off-line activities) to accommodate the technology and the course content.

Even though training was provided, the instructional personnel felt that more training and practice was needed on TNET.

Instruction

The most important objective was the quality of instruction. All students passed the stated learning objectives, and over 90% of all students in the MOS courses passed the performance tests on the first attempt (See Table 1).

No comparisons could be made between the performance records of students in the VTT courses and those in other training options.

Students rated the learning methods and activities, including the interactivity provided in the VTT courses, to be effective (See Table 2). The opportunities for interaction were rated the highest, although interaction with students over the network was the most difficult interaction to achieve. Based on data collected during the interviews, students said these learning methods stimulated their interest and they were generally motivated by the VTT instruction.

No student demographic variables predicted success or lack of it for military students and hence one can expect that VTT is an acceptable approach for the general military population.

Students rated all the instructional personnel, VTT instructors, MIAs, ICs, and MSCs, as effective. A question was whether or not civilians can provide quality instruction to military students due to their lack of military training. Some students felt that a military instructor should have presented the instruction, however, all students passed the learning objectives for all five courses.

Community Colleges

FCCJ had the technical and instructional capabilities to implement VTT instruction. The technical staff, TV studio, and production facilities (one of the best among community colleges in Florida) were excellent.

Community college faculty are professional educators. While the faculty at FCCJ lacked instructional design and military training expertise, they were able to design and present high quality instruction given specific training.

Staff training was presented to all instructional and technical personnel. This training was judged to be of high quality by the staff and they indicated that it enabled them to perform their roles and responsibilities.

The course developers/VTT instructors had the most extensive training of all the instructional personnel. This included instruction in VTT presentation, instructional design, and military training.

The community colleges were able to grant academic and continuing education credit for all courses. Although not all students were interested in receiving credit, those that were, indicated that college credit was a definite advantage to receiving military training at a community college.

The three community colleges were organized to work together through subcontracts; this proved to be a very effective mechanism.

There was a complex web of community college, university, government, and military organizations that had to work together to implement this project. Formal contracts, MOUs, IPRs, and a number of informal agreements enabled the groups to work together effectively.

Costs:

With the exception of the HazWaste course, the VTT courses in the FTP were more expensive when compared to resident training. The HazWaste course was cost effective because there were a large number of students (N=116) in the course and because of travel and per diem savings.

The costs associated with providing college credit (in-state and out-of-state) and the lease of the four TNET systems greatly increased the costs of the VTT courses.

The VTT courses become more cost effective if: (a) the same course is presented more than once (because design and development costs are paid only once), and (b) different courses are presented in the same month, (because each course would be charged only for the days the course is implemented rather than paying the TNET costs for the entire month).

Lessons Learned

The pilot test and project provided several lessons about designing and implementing VTT instruction. While some lessons are more relevant to military instruction, others are important for planning any VTT project:

The choice of technologies, in this case TNET, influenced the design of instruction because of the video transmission rate. The FTP courses are not directly adaptable to other VTT systems. They would have to be modified to be used effectively. Adapting the courseware will typically be needed when changing delivery methodologies.

Origination and remote site technicians are invaluable resources. Origination site technicians should be knowledgeable in various communication technologies.

Adequate staff training is necessary for successful VTT instruction. Instructors and course developers need instruction in basic ISD, how to conduct instruction using the selected distance delivery system, and how to operate the equipment.

VTT must be considered in the context of other training options. Courses should be selected for VTT delivery that are short (one to two weeks in length), are primarily cognitive, and have high demand or throughput.

While the TNET equipment is not difficult to use, some personnel are intimidated by any new technology. Care must be taken to provide sufficient practice and technical support to such personnel when the technology is in use.

Military programs of instruction (POI) and syllabi can be successfully reconfigured for VTT instruction. The quality of the POIs and syllabi received from the military directly effects the time and the costs for reconfiguring military courses for VTT.

Careful attention must be paid to designing activities that allow students to interact with each other on the network.

It took longer to present RC^3 courses by VTT than to present platform instruction because of planned interaction and the administration of on-site PEs. Typically, the overall course length will increase when using VTT in order to present the same content.

Students who were more highly educated or held a higher military grade or rank were more critical than others of the interactive study guide (word picture concept) that was used in this project. Other ways of involving these students in the instructional process needs to be explored.

The different cultures of the military and the community college, in addition to the roles and responsibilities assigned to each group, require coordination by individuals who can link the two communities.

Course design, development, and delivery required a team approach because the community college faculty who taught the courses did not have sufficient military background.

The larger the population that can be served using VTT, the greater the cost savings. On-going VTT programs will be more cost effective than one-shot courses.

Conclusions

Video teletraining, like other forms of distance education, can be a viable option for increasing training and education possibilities for military reservists as well as for non-military populations. The costs of such programs depend on a number of factors including the technology used, how extensive the course design and/or reconfiguration effort is, the number of support personnel required, how long the training program is, and how much staff training is required. The benefits that may accrue from quality distance education programs include improved instruction, broader access to training, delivering instruction in a variety of settings, and less travel by course participants.

It is important, however, to keep in mind that good distance education programs are highly dependent on good planning (ISD), good instruction (presentation), and good organization and management (Cornell, 1995; Martin & Bramble, in press). Failure to attend to these important aspects of a distance program will likely result in poor instruction and learning just as platform instruction that is not well planned and well managed will also result in poor instruction and learning. That is, good instruction is good instruction regardless of whether it is presented in a classroom or at a distance.

Note: The Florida Teletraining Project was conducted under contract number N61339-85 from the Defense Training and Performance Data Center (TPDC) to the Institute for Simulation and training at the University of Central Florida. With the closing of TPDC in 1992, contract management was transferred to the Defense Institute for Training Resources Analysis (DOITRA). Dr. Steven Skiles and Mr. Bill West served as DoD Project Managers.

Table 1

Pretest and Posttest Performance Data

Course	Performance Test Measure	Pretest (SD) (N)	Posttest (SD) (N)	t-value (df)
ADMIN	Timed Typing	20.48(9.58) (33)	32.42(9.58) (33)	11.41* (32)
	Type a Memorandum (# errors)	7.42(4.81) (33)	1.85(1.54) (33)	6.97* (32)
SUPPL	50-item Achievement Test	59.95(16.63) (40)	76.00(11.25) (40)	8.57* (39)
MP	90-item PT[a]	71.81(10.22) (26)	92.58(10.22) (26)	13.56* (25)
HAZ	20-item PT	47.68(13.53) (111)	78.23(10.95) (111)	21.54* (110)
TQL	20-item PT	No pretest given	82.90(11.01) (48)[b]	NA

*p<.001, one-tailed.

[a]PT = Performance Test

[b]Note: There are 11 missing scores from the Rhode Island site.

Table 2
Selected Student Ratings of Instructional Methods, Interactivity, and Course Characteristics
(5 Point Scale, 5 = Highest)
(SD)
(N)

ITEM	ADMIN	SUPPLY	MP	HAZ	TQL
Word graphics	3.65 (1.14) (31)	3.82 (1.23) (38)	3.44 (1.04) (25)	4.33 (0.77) (110)	4.43 (0.65) (47)
Value of Practical exercises	4.18 (0.98) (33)	3.44 (1.19) (32)	4.04 (0.89) (25)	4.26 (0.82) (111)	4.15 (0.81) (47)
Instructional games	2.61 (1.45) (28)	3.44 (1.19) (32)	3.46 (1.25) (24)	NA	NA
Remediation helpful	4.13 (0.88) (31)	3.68 (1.02) (40)	4.05 (0.80) (21)	NA	NA
Opportunities to ask questions	4.09 (0.89) (32)	4.03 (1.19) (40)	4.31 (0.84) (26)	4.18 (0.89) (111)	4.21 (0.77) (48)
Interaction w/ students on-site	4.62 (0.61) (32)	4.47 (0.82) (40)	4.58 (0.50) (26)	4.33 (0.74) (111)	4.11 (0.76) (47)
Interaction w/st. on-network	3.38 (1.48) (32)	3.50 (1.41) (40)	3.08 (1.06) (26)	N/A	N/A
Interaction w/VTT instructor	4.23 (0.88) (31)	4.15 (1.08) (40)	3.60 (1.15) (25)	4.33 (0.74) (111)	4.23 (0.73) (47)
General course organization	3.00 (1.22) (32)	2.95 (1.18) (40)	3.38 (1.06) (26)	3.84 (0.93) (111)	4.06 (0.95) (48)
Quality of lesson presentations	3.44 (1.01) (32)	3.28 (1.13) (40)	3.19 (1.17) (26)	3.95 (0.85) (110)	4.00 (0.83) (48)

Table 2 (continued)

Time to cover topics	2.69 (1.12) (32)	3.68 (1.02) (40)	3.42 (1.33) (26)	3.24 (1.22) (111)	3.13 (1.21) (48)
Overall course quality	3.59 (0.98) (32)	3.55 (1.18) (40)	3.19 (1.10) (26)	4.04 (0.92) (111)	4.10 (0.81) (48)
Pacing of course (3=about right)	3.48 (1.34) (31)	2.68 (0.91) (34)	2.04 (1.06) (25)	2.94 (0.86) (110)	3.11 (0.87) (47)

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