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Essential task identification for military occupations using the TRIAGE Technique

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Abstract

Health and fitness research in the Canadian Forces (CF) often requires the opinions of subject matter experts. The process of integrating diverging views in order to obtain a group consensus can pose a challenge to researchers. The Technique for Research of Information by Animation of a Group of Experts (TRIAGE) is a method of data collection based on the attainment of group consensus¹. The TRIAGE technique has been employed by this research group in various qualitative reviews as a group consultation technique involving military personnel. This methodology has allowed for an efficient and economical review of extensive volumes of material without requiring complex and lengthy data analyses. The successful application of TRIAGE in research requiring consensus by groups of military personnel, as well as the versatility of this technique in health and fitness research in the CF is discussed.

Introduction

Research in the areas of health, fitness and occupational requirements in the Canadian Forces (CF) often requires the researcher to draw on the experience and opinions of Subject Matter Experts (SMEs). The

Human Performance Research & Development (HP R&D) cell, within the Directorate of Fitness, has relied on expert opinion throughout various stages of several recent initiatives in the areas of physical and occupational fitness standards. In order to draw on the expert advice of SMEs in a thorough and efficient manner, HP R&D sought out a scientific methodology that would satisfy the following requirements; a) the research method employed must be based on the achievement of group consensus to ensure validity and legal defensibility of the end product b) input from SMEs must be gathered in such a manner that complex and lengthy analyses following data collection would not be required, c) the resources required to effectively apply the methodology must be consistent with available personnel and financial resources, and d) the technique can be consistently applied in several diverse projects conducted by our research group. The purpose of this paper is to discuss one such technique which has been adapted from the literature in order to satisfy the requirements of attaining expert consensus in the context of personnel research.

Various group consultation techniques are available that aim to solicit the opinions and experiences from SMEs within a group environment. Of these, the Delphi technique, the Nominal Group Technique, and the traditional focus group may be the most well-known. While these methods offer individual strengths and are effective in other contexts, each fail to accommodate all of the specific criteria listed above. The Technique for Research of Information by Animation of a Group of Experts (TRIAGE)² is a methodology that is gaining recognition in various domains, including health program evaluation and in the development of measurement instruments. TRIAGE is a method of data collection based on the attainment of group consensus, which seeks to enable group decision-making in an organized and efficient manner. This method was first employed by our research group in the early phases Project FORCE (Fitness for Operational Requirements of CF Employment); the initiative which developed a new baseline physical fitness standard for all CF personnel. TRIAGE was used to identify essential tasks which

all CF personnel can be called to perform, regardless of occupation, rank or environment³. Currently, the technique is a valuable component of the research methodology applied in the Occupational Fitness Standards (OFS) Project⁴. This initiative examines all trades in the CF with the objective of identifying lists of essential occupational tasks along with corresponding task demands, for use primarily by medical officers in assessing job suitability. OFS is currently conducting individualized TRIAGE groups for each of the approximately 100 CF occupations.

The Classic TRIAGE Process

The TRIAGE technique is a structured, inductive form of data collection that is comprised of three formal and distinct steps⁵. The first step, *Preparation*, involves the articulation of the research question of interest and the recruitment of appropriate SMEs for the particular topic. Included in this stage is the compilation and distribution of all relevant materials for preliminary review by the SMEs. The second step, *Individual Production*, begins once the participants have received the above-mentioned documents. Each SME is asked to provide responses, or *indicators*, to the research question and to return their contribution to the evaluator or research team. The compilation of information received from the SMEs represents the construction of the *dynamic memory* which is used in a later step. In the third and final phase, *Interaction Production*, participants are brought together with the research team. At this stage, through facilitated discussion and group decision-making, the SMEs are required to reach consensus on each piece of material within the *dynamic memory*. The researcher assumes the role of group facilitator and leads the discussion according to a structured process until consensus is reached on each *indicator* or item of interest.

Applications to Personnel Research

The TRIAGE technique has been adapted by HP R&D in order to meet the unique demands of various initiatives and to achieve an end product requested by the client, the CF. In the first of three phases of Project FORCE⁶, TRIAGE was applied in its more traditional form with SMEs contributing information developed from their own opinions and experience and presented in their own wording. Conversely, the process applied in OFS begins with large volumes of information (integrated job descriptions containing as many as 2000 tasks) which is distilled down to more manageable, concise lists of relevant data through evaluation of the information by SMEs throughout multiple stages of TRIAGE. With either approach, the process begins with assembly of relevant materials by the research team, followed by evaluation and contribution by participants individually, and ending with interactive group consultation. An example of the complete refinement of information through the TRIAGE stages for the Air Weapons Systems Technician (AWS TECH) occupation is shown in Figure 1.

Figure 1: Phases of TRIAGE applied in the OFS Project for the AWS TECH occupation.

Phase 1: Preparation

In this phase, CF members are selected on the basis of being recognized for their ability to provide expertise in the subject area of interest and for their potential to make a strong and valuable contribution on the specific material being evaluated. In selecting SMEs, HP R&D seeks to include participants with a moderate range in rank, years of service, degree of training and/or practical experience in the area of interest. Achieving this range in experience and training aims to ensure that a broad scope of detail on the criterion of interest is captured. For instance, in examination of such things as essential task lists and occupational demands, the higher ranking SMEs provide expertise in the trends and activities relevant to the trade over past years or decades, while lower ranking SMEs offer insight into current occupational demands and training activities. It is essential that all participants have the necessary experience and knowledge in the area to qualify as being individuals with expertise, therefore a specified range of ranking is typically requested during the selection of participants. An example of the range in rank and years of service for the Maritime Surface and Subsurface Officer (MARS OFF) occupation is depicted in Table 1.

Table 1: SME Profiles for MARS OFF occupation

Preparation of documents for distribution to the SMEs also occurs in this initial stage. In the OFS Project, these documents included an overview of OFS, a legal definition of “essential” as it pertains to

occupational tasks, and instructions on how to indicate their responses and return their contribution to the research team.

Phase 2: Individual Production

In this second phase, the prepared documents are distributed to the SMEs for preliminary review and analysis. To date, in HP R&D initiatives employing this technique, participants have been asked to either, a) develop *indicators* or statements reflecting the requested criteria based on their individual experience⁷ or b) to review a list of items, identifying from this list the information which they view as being most relevant to the research question⁸. Any information produced or selected by SMEs is returned to the research team, which is then organized for use in the ensuing stage. Importantly, the information received from the participants is not analyzed or modified by the research team in any way at this stage.

Phase 3: Interactive Production

In this final phase, the group of experts is invited to attend a one-day TRIAGE session. While the SMEs typically vary in rank level and years of service, introduction of all participants seeks not to highlight the rank or accomplishments of participants, but to establish a casual, informal, and welcoming environment for all members present. The SMEs are briefed on the objectives, procedures and end-use of the project, as well as on the expectation of participant involvement throughout the session. Several important definitions are provided to participants to ensure an equivalent comprehension of key terms. In order to facilitate systematic and efficient progression through the information, it is recommended that a visual aid be used⁹. Traditionally, this visual supplement has existed in the form of physical material, such as flip charts, which are positioned on a wall or other area, onto which information is directed from one category to another as it is discussed. The members of HP R&D felt that this supplement could be enhanced to enable easier management by the facilitator as well as to allow more efficient progression

from one item of material to the next. As such, a visual tool was designed that was specific to the nature and requirements of HP R&D projects and which was simple for the facilitator to incorporate. This advanced visual aid presently exists in the form of interactive platform developed on the Microsoft ACCESS® platform (Microsoft Corporation, Redmond, WA), and is considered by HP R&D to be a significant improvement upon the previous method. This new tool allows one to insert extensive quantities of information, such as detailed occupational task lists, into the interactive platform prior to commencement of the TRIAGE session. Further, one can easily direct information from one category to another as decisions are made on that item. Importantly, as the new visual aid is operated by computer platform with no use of physical materials, the potential for the facilitator and/or the SMEs to become distracted by the aid itself is minimized.

In order to address each item of material sequentially, various sections are presented on the visual display to organize the progression through material and to categorize each item into one of five outcomes. The layout of these various sections for the Infantry occupation (INF) is shown in Figure 2. All tasks begin in the *dynamic memory* or unprocessed category and are sequentially moved into the *grouping* or *combination separation* box. Here, the SMEs are guided using a series of questions pertaining to the nature and meaning of the item, the relation of that item to others on the list, and whether the item meets the relevant criteria being evaluated. In this stage for Project FORCE, the facilitator encouraged discussion amongst the SMEs by asking questions such as the following; “*Does this task meet the definition of essential?*”, and “*Do other tasks on the list represent the same construct?*”. SMEs have the option of selecting one item that best represents several original points, and to retain that which offers the most accurate or reflective wording to encompass all ideas. SMEs are also provided the option of creating a new statement that better encompasses a combination of similar items. Additionally, if an item contains more than one general idea, participants may elect to divide the statement into several statements that reflect only one concept each. Once a group consensus and decision is achieved on the

relevance of each point, that particular item is directed to the *selection*, *garbage bin*, *refrigerator* or *veto* locations. If the SMEs believe an item to be irrelevant or unnecessary, it is immediately moved to the *garbage*, and will no longer be discussed or revisited. Should the group feel unable to reach consensus on a topic during initial discussion and would prefer to return to that particular idea at a later time, that item is directed to the box labelled *refrigerator*, where it is stored for further evaluation. The *veto* box is used in the event that, following further discussion, the group remains unable to reach consensus and prefers to direct that item to an outside group or individual who will make a final judgement. In the case of Project FORCE, items were placed in this box when it was known that planned but unconfirmed changes in future operations would lead to differences in how tasks were performed. In general the inclusion of this option ensures that the SMEs will never feel forced to make an uninformed decision, should the group feel they lack the necessary expertise on a particular topic. The most critical box, labelled *selection* will contain those items that are determined by group consensus to meet the criteria of interest and that best represent a statement or collection of statements. SMEs are permitted and encouraged to return to the *selection* box at any time to review and revise items held in that category. Once all points have been discussed through this process, the final output, as determined by group consensus, are listed in the *selection* box, and constitute the end product of the TRIAGE session. This list forms the basis for further detailed content validation in following stages of HP R&D projects.

Figure 2: Interactive visual aid developed for application of TRIAGE by HP R&D

Discussion

Applied in several aspects of personnel research, the TRIAGE technique has consistently yielded concise data sets, such as short lists of common physically demanding tasks or essential occupation-specific tasks.

Though the results of this technique do not necessarily lend themselves to traditional validation studies, efforts have been made to assess the representativeness of the task lists generated. Firstly, in the case of Project FORCE, where this technique was used to identify an essential task list for all CF personnel, this list was deemed representative by all levels of the chain of command up to and including the Chief of the Defence Staff and all Level 1 branch Commanders at Armed Forces Council. In addition, since two distinct TRIAGE groups were conducted in this project, one involving experts in planning domestic missions and the other with experts in foreign missions, one can glean indicators of concurrent validity. Though the two task lists did contain significant differences - with the foreign missions focusing more on combat-related tasks and the domestic ones involving more support to other government organisations - they also contained expected similarities. Both yielded very similar tasks in the areas of casualty evacuations, protection of high-value assets and general military duties, as these tasks are performed similarly both domestically and in an expeditionary scenario. In the case of the occupation-specific task lists generated in the context of the OFS project, they have been accepted and approved by occupational authorities at the upper echelon of the CF chain of command as well. Furthermore, in terms of discriminant validity, the lists generated for each occupation are indeed unique.

The TRIAGE process has been employed by HP R&D since 2010 in the OFS Project, as well as in early stages of development of several other research initiatives requiring group consensus by SMEs, such as Project FORCE and in establishing essential, common tasks for Close Protection Operators. In the scope of these projects, this technique appears to be a highly effective group consultation technique in research requiring consensus by groups comprised of military personnel.

As outlined previously, HP R&D required a scientific methodology that would achieve several specific requirements, all of which we believe to have been accommodated by a modified version of the TRIAGE technique. First, a qualitative technique that focused on the achievement of group consensus was

necessary to ensure validity and legal defensibility of the end product. TRIAGE, being an inherently consensus-based consultation technique, indeed operates on the basis of group decision-making as opposed to an aggregation of individual participant contributions. Secondly, a methodology that did not involve within it an inherently complex and time-consuming form of analysis was required, as projects such as OFS would comprise over 100 independent group consultations, each involving the evaluation of substantial quantities of information. TRIAGE has repeatedly allowed for the organization of extensive volumes of information into concise task lists during group consultations lasting only several hours, with the greatest volume of information assessed in one TRIAGE session presently exceeding 2000 unique items. At completion of the *Interactive Productive* phase, the end-product is achieved, with no further qualitative analyses being necessary. A third requirement was that the methodology would accommodate both the financial and personnel resources available to HP R&D. In line with this, some of the specific strengths of TRIAGE are that the technique is highly economical and can be applied using minimal material and personnel resources. Finally, a technique was sought that could be applied in multiple research initiatives. To date, TRIAGE has been employed by HP R&D in a variety of reviews with diverse groups of SMEs, each time yielding the intended outcome of a consensus-based and defensible end-product.

An additional function of TRIAGE observed in its application by HP R&D is a capacity to work well with small groups of participants. While it is suggested that the technique is appropriate for use with small or large groups ranging from five to over 40 participants¹⁰, our experience with the technique in the OFS Project lends further support for its utility with smaller working groups, provided that all aspects of the occupation are represented (ex. training, operations, different platforms where relevant). The design and development of a visual aid specific to the needs of HP R&D appeared to enhance the efficiency with which the group can progress through material. This may be related to the ease with which the evaluator

can direct various items around the visual board, or can quickly return to any previously selected or eliminated tasks. Certainly, our revised visual aid appeared to effectively capture and maintain the attention of all participants, allowing SMEs to remain engaged in the current discussion as reference to the item of interest was constantly available to them.

It has been the experience of HP R&D that the effectiveness of the process in facilitating group consensus and decision making may be influenced by several factors. Firstly, group interaction and active participation by group members is imperative. It is therefore vital that the facilitator ensure that all SMEs are contributing to the discussion and subsequent decision making. Secondly, as recommended¹¹, the TRIAGE group must be managed by a group facilitator who is competent in group dynamics and group management. Specifically, the facilitator must be able to remain flexible throughout the discussion, accommodating the needs of individuals and adapting his/her communication style in order to engage or manage varying types of personalities. He/she must ensure equal participation by all members of the group, minimizing the potential for any one group member to assume an assertive role and attempt to exert stronger influence than the others in the decision-making process. Further, the facilitator must be able to engage in conflict management and to stimulate discussion when involvement by the group is lacking. It is essential that the facilitator continuously ask relevant, guiding questions to facilitate group decision-making, while being cautious to ensure that any questions or instructions do not unduly influence the outcome of the decision making process. We have also observed the organization of information received from SMEs to be valuable in rendering the TRIAGE process more efficient. In the Individual Production Phase, the responses provided by SMEs are organized according to the frequency with which each item or idea was selected by the SMEs to be relevant to the research question. As a result, the most popular responses are then reviewed first in the ensuing *Interactive Production* phase. In

our experience, the organization of material in this manner appears to assist SMEs in understanding the process, while also increasing the speed of progression through the material.

As with any qualitative methodology, several limitations of the TRIAGE technique exist.

The quality of information obtained through this process will depend directly on the quality of the initial list of indicators, as well as on the competency and level of expertise of the participants. As such, care must be taken in the recruitment of SMEs of a particular topic. It is also recommended that a researcher be cautious of the breadth of themes covered within a single TRIAGE session¹², as efforts to cover too great a number of broad areas can jeopardize results and risk the SMEs becoming disengaged. Further, if a TRIAGE session continues for an extended period of time, participants may find the process tiring. As a result, their degree of interest in the session or level of concentration may waiver. It is therefore suggested that a single session last no longer than three hours¹³. Finally, in most cases the results obtained through this process are usable only within the context of that particular study. However, in projects undertaken by HP R&D, the resulting outputs from the TRIAGE process have provided a suitable basis from which to pursue further content validation by alternative methods.

In addition to the abovementioned limitations, HP R&D has observed several caveats in the implementation of TRIAGE. Given the requirement that our enhanced visual aid be managed by an additional member of the research team, it is necessary that a minimum of two HP R&D personnel who are comfortable with the session content and are experienced in the process be present for each TRIAGE session. Also, at the *Individual Production* stage, we have typically received contributions from several but not all of the SMEs. As the order of information presented in the following stage is meant to reflect the information viewed as most relevant by all participants, not receiving input from several participants may delay the progression of the session while those participants who are less familiar with the material reach

an understanding of the nature and objective of the process. We have consistently observed that, following discussion of approximately 20 items, the SMEs will reach a point at which the process is well understood, discussion flows easily and participants engage in effective decision-making. However, the time required to reach this state will inevitably depend on the expertise of the SMEs, the degree of preparation by the SMEs, the level of engagement of participants during the TRIAGE session, and the capabilities of the facilitator.

Conclusion

TRIAGE is a group consultation process which provides readily usable data in a relatively short session. The applicability of this process not only to program evaluation but also to personnel research, particularly in the identification of essential tasks within occupations or across the CF, has been demonstrated.

Figure 5.1. Phases of TRIAGE applied in the OFS Project for the AWS TECH occupation

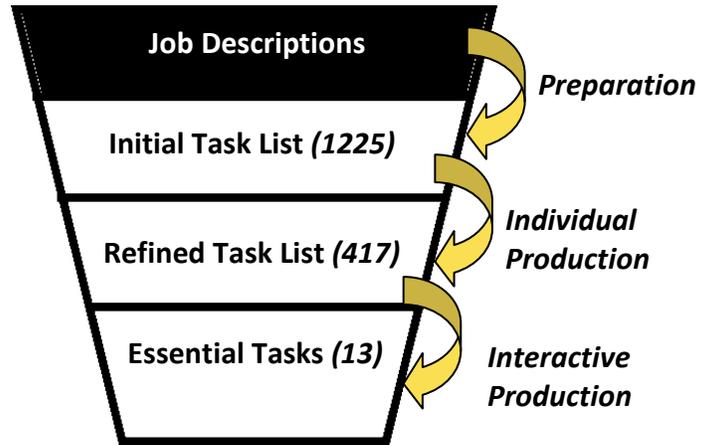


Table 5.1. SME profiles for MARS OFF occupation

Rank	Years in CF	Years in trade
Lieutenant (N)	37	2
Commander	37	37
Acting sub-lieutenant	4	1
Lieutenant (N)	12	12
Lieutenant-commander	25	25

100 90 80 70 60 50 40 30 20 10 0

Taskslist	Task	Action
2	Coordinate dismantled personnel movement	
3	Coordinate mechanized operations movement	
6	Employ dismantled hand signals	
7	Employ mechanized hand signals	
8	Employ night light signals	

Record: 1 of 1041 | No Filter | Search



Combination/
Separation

Taskslist	Task	Action
1	Adjust indirect fire	Combination/Separation
*(New)		

Refresh

Display Full tasks list

Edit / Print tasks

Same Action on Range of Tasks

Same Action on List of Tasks

Record: 1 of 1 | No Filter | Search



Selection

Taskslist	Task	Action
9	Fight at close quarters	Selection
25	Execute a fighting patrol	Selection
82	Conduct house/building clearance operations	Selection
*(New)		

Record: 1 of 3 | No Filter | Search



Garbage

Taskslist	Task
4	Cross artificial
5	Cross water ob

Record: 1 of 2 | No Filter | Search



Fridge

Taskslist	Task
*(New)	

Record: 1 of 1 | No Filter | Search



Veto

Taskslist	Task
*(New)	

Record: 1 of 1 | No Filter | Search

Record: 1 of 1 | No Filter | Search

Figure 5.2. Interactive visual aid developed for application of TRIAGE by HP & RD

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 6. Spivock, Reilly, Newton, Blacklock & Jaenen, *Project FORCE Phase 1 Report*, 30
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 8. Théoret, Driscoll, McRae, Niang, Karam, Spivock & Gagnon, *A Systematic Approach*
 9. Gervais & Pépin "TRIAGE: A new Group Technique", 47
 10. Ibid.,
 11. Ibid., 48
 12. Ibid., 48
 13. Ibid., 48
