THE DEVELOPMENT OF A RISK BASED APPROACH TO ASSESS TEAM REFRESHER TRAINING REQUIREMENTS: METHODOLOGICAL CONSIDERATIONS

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Keywords: Teams, Skill-Fade, NEC, Information Exploitation, Shared Situation Awareness.

Abstract

Research on those factors influencing competence deterioration in safety critical roles has typically focussed on individual task competencies. Validated techniques, (i.e., rating scales and models) to inform an analysis of team and collective refresher training requirements have not been developed. This paper presents a brief consideration of the methodological issues which should be taken into account in the development of a risk based approach to the assessment of team refresher training requirements.

1 Introduction

The acquisition and retention of those competencies associated with effective team working and Shared Situation Awareness (SSA) is critical to achieving the aspirations of future military and business organisations operating within a Networked Enabled Information Environment.

'Networked Enabled Capability offers decisive advantage through the timely provision and exploitation of information and intelligence to enable effective decision-making and agile actions. NEC will be implemented through the coherent and progressive development of Defence equipment, software, processes, structures and individual and collective training, underpinned by the development of a secure, robust and extensive network of networks' [5]

Whilst tri-service guidance for the effective analysis of team and collective training requirements is emerging [7, 8], robust methods for determining individual, team and collective refresher training requirements have not yet been developed.

Refresher training represents a cost which should be taken into consideration during the Training Options Analysis (TOA) phase of a Training Needs Analysis (TNA). Furthermore, an appreciation of the different rates of deterioration within a set of competencies supports the prioritisation of refresher training requirements and targeted training. For example, team competencies in communication may deteriorate more rapidly than competencies in adaptability.

The objective of this extended abstract is to outline the key methodological issues which should be taken into consideration during the development of a risk-based approach to an assessment of team refresher training requirements.

2 Methodological considerations

2.1 Defining a relevant set of team competencies

Before skill fade can be considered a stable and relevant set of team competencies for analysis must be defined. Competencies are groups of behaviours that individuals, teams, multiple teams and organisations demonstrate when undertaking job-relevant tasks effectively within a given context. Behaviours are an expression of the knowledge skills and attitudes that would be observed when someone demonstrated competence [12].

Many individual and team competency frameworks and taxonomies have been developed [3, 6, 11, 4]. Examples of intra- and inter-team competency clusters are listed below [2]:

- **Interpersonal Relations** Uses interpersonal skills to optimise the quality of intra- and inter-team interactions (e.g., collective orientation, conflict resolution, mutual trust, shared vision).
- **Adaptability.** Collaboratively uses information gathered from the task environment to adapt team resources, processes, structures and norms to meet the requirements of the environment/task (e.g., task adaptation, team adaptation).
- **Performance Monitoring and Feedback.** Understanding of the roles and KSAs of collective unit's members is used to ensure that the performance of the collective unit/elements can be monitored and that the appropriate feedback is provided (e.g., evolving learning, mutual performance monitoring and feedback).
- **Coordination.** Organises collective unit's resources, activities and responses to ensure that tasks are integrated, synchronised and completed within temporal constraints (e.g., task organisation, timing and activity pacing).

- **Problem Solving.** Collective unit collaborates to ensure that information related to a problem, task or issue is gathered and analysed and ensures that an appropriate solution is selected and implemented (e.g., problem assessment, implementation).
- **Communication.** Uses the ability to express task information accurately and the appropriate communication channels, to ensure that pertinent and valid information is passed and understood by the correct collective unit members (e.g., passing information, receiving information).

The selection and development of competency statements and behavioural indicators which are critical to job success and/or the phenomena under investigation is fundamental. In addition, the presentation of competencies and behavioural indicators, using language that is understood by the training audience is essential. For example, in a recent study of Information Exploitation (IX)[1] team competencies, the content of a prototype competency framework was informed by a review of existing team competency taxonomies, a detailed content analysis of future military doctrine [10], consultation with the end-user communities and behavioural observation of a collective training exercise.

2.2 Validity of predominantly task-based studies

A review of the literature indicates that competence deterioration, or skill fade[2] is influenced by a range of factors associated with the characteristics of the individual (e.g., motivation), and the task (e.g., learning sub-category[3], criticality, number of procedural steps, built-in-logic, temporal demand and performance frequency); and the quality of the user-interface and job aids [1]. The latter list comprises the content of the Refresher Training Requirements Rating Form (RTRRF) [9]. The importance of skill acquisition and the affect of over learning on competence deterioration have also been investigated [1].

Studies of competence deterioration, however, typically involve an experimental analysis of task-based factors influencing competence deterioration during the conduct of procedural tasks. Moreover, there is a focus on individual task work competencies with limited or no consideration of factors influencing teamwork competencies (e.g., adaptability, coordination, cohesion, performance monitoring and feedback).

[1] Information Exploitation is the sharing and use of information to support situation awareness, planning, decision-making and the co-ordination of desired effects [1].
[2] The term skill fade refers to the shortfalls in performance due to the impaired recall of acquired knowledge and/or skills required to perform a task. There is a tendency for skill fade and competence deterioration to be used interchangeable.
[3] Learning sub-categories include, for example: attitude learning, detecting, decision-making, recalling procedures and voice communication.

The validity and utility of applying these refresher training analysis techniques and models to assess team refresher training requirements is therefore questionable.

3 Next steps

A large body of research exists which has documented the range of organisational, technological, environmental and individual factors influencing team effectiveness [2]. Key factors are listed below:

- **Organisational factors.** Organisational objectives, policy, processes, generic and specific practices, maturity, culture, resources and interfaces.
- **Team organisation.** Number of sub-teams, physical distribution, communication structure and interfaces.
- **Team characteristics.** Development history, size, type (i.e., ad hoc, specialist, functional), culture and trust.
- **Team work skills.** Leadership, co-ordination, communication, adaptability, collaborative working, performance monitoring and feedback.
- **Individual characteristics.** Situation awareness, prior experience, knowledge, skills, beliefs and attitudes and cognitive style.
- **Technology factors.** Technology type, functionality and usability.
- **Environmental factors.** Physical environment, operational tempo, complexity.

The development of hypotheses describing the relationship between the above factors and team competency deterioration is proposed, as an initial step. This process should include a description of the rationale or psychological processes underlying the hypothesised relationships.

For example, at the organisational level the team's ability to maintain acquired competencies in performance monitoring and feedback skills may be influenced by the extent that an organisation develops and maintains company processes which encourage the demonstration of this competency. The company may institutionalise these practices through appropriately designed competence management systems.

A further example at the individual level. Mutual trust within and between teams may be influenced by the development and retention of valid knowledge of the roles, responsibilities, strengths and weaknesses of other team mates and teams; prior experiences; communication modes and performance feedback.

Innovative experimental and social constructionist methods to gather evidence to test the hypothesised influences would then need to be developed. This is a significant challenge requiring the collection of longitudinal information by the end-user communities and the design and conduct of multivariate 'experiments' within a simulated operational context.

Acknowledgements

The work reported in this extended abstract was informed by studies sponsored by the UK MOD, DPA and the Rail Safety and Standards Board.

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