

Collaboration Exercises: Demographics and Their Impact on Perceived Learning and Utility

Dr Jarle Løwe SØRENSEN^{a,1}, Prof Dr Eric CARLSTRÖM^{a,b} and
Dr Leif Inge MAGNUSSEN^a

^a*Crisis Management and Emergency Preparedness, USN School of Business,
University of South-Eastern Norway, Vestfold, Norway*

^b*Institute of Health and Care Sciences, Sahlgrenska Academy,
University of Gothenburg, Sweden*

Abstract. This paper examines a crisis collaboration exercise and tests whether there is a relationship between participants' past exercise and professional experiences and their perceived levels of collaboration, learning, and utility (CLU). The study reports on data collected from emergency personnel belonging to a Norwegian maritime agency responsible for maritime safety services. Survey data was collected in conjunction with a 2017 maritime oil-spill collaboration exercise in the southern parts of Norway. The personnel held operative positions during the exercise. Forty-two respondents constituted the final data set. Findings indicated that collaboration exercises have an effect, as the participants experienced moderate levels of CLU during the exercise. However, past exercise and professional experience constituted jointly little of the variance in learning ($r^2 = 0.19$) and utility ($r^2 = 0.02$). The results indicated a possible decoupling between exercise behaviour and behaviour in real crisis work, showing a possible dominance of single-loop learning, and a missing constructive alignment between planned learning activities and outcomes. To enhance perceived levels of learning and usefulness, this study recommends a stronger focus on initial simplicity, variation, constructive alignment, and the inclusion of collaboration elements in the design phases of exercises. Comparable research, preferably using the same design and instrument, is recommended.

Keywords. Collaboration, learning, usefulness, exercises, demographics

1. Introduction

There exists an assumption that collaboration exercises contribute to the development and strengthening of team-integration and response efficiency [1–3]. However, the general problem is that studies on the effect of collaboration exercises have shown that the exercises tend to produce results with limited perceived learning and usefulness [4–10]. Sources are conflicting, but possible cited reasons include lacking focus on variation [11], lacking focus on collaboration learning [5], a predominance of drills [6] and too much emphasis on multifaceted scenario script development [7]. Not being able to experience increased perceived learning and utility as a result of collaboration exercises may lead the participants to decouple [12] between the theoretical ideal and behaviour in real

¹ Corresponding Author: Jarle Løwe Sørensen, ^a USN School of Business, University of South-Eastern Norway, Vestfold, Norway. E-mail: Jarle.Sorensen@usn.no.

crisis, which again may make it difficult for crisis managers to handle crisis consequences [13], impose order [14], and ensure an effective and flexible response effort [15]. This paper reports on a crisis collaboration exercise and tests the hypothesis whether there is a relationship between the participant's past exercise and professional experiences and their perceived levels of collaboration, learning, and utility (CLU).

2. Background

In this study, collaboration is defined as a horizontal process in which stakeholders without a desire for personal gain, engage in partnerships to resolve a joint problem [16]. Collaboration thinking, which became a popular business working methodology in the late 1980s [17], is today also considered a success criterion in crisis management as the benefits of working together is assumed higher than the costs [18]. Collaboration in crisis may take different forms and be viewed from various perspectives, examples being vertical, horizontal, formal and informal [4]. Collaboration does not just occur by having multiple public and NGO stakeholders showing up at the same accident scene. It must be learned and developed.

A goal of learning is to acquire new learning [19]. Thus, it is relevant when it comes to reviewing and coordinating new situations [5]. Collaboration learning during exercises roots back to Argyris' [20] theory on organizational learning, Argyris and Schöns' [21] theory on single-loop and double-loop learning, Klabbers' [22] learning model, and Stein [23] theories on institutional first- and second order learning. Berlin & Carlström [5] argued that from a crisis management perspective first-order learning during collaboration exercises is when the participants gained new knowledge but compared to second-order learning, are not able to transfer that knowledge to real-life scenarios. Rather than increasing the utility value of the exercise to real-life situations, the participants end up displaying a weak practice impact, resulting in decoupled [12] behaviour between exercise conduct and performance in actual crisis work. For learning to have utility value, it must not only focus on the concept of gaining new knowledge, but it must also focus on development [24]. For collaboration exercises to fulfil its purpose, it must contribute to perceived usefulness, which here is defined as is a cross-sector capacity improvement [18]. Recent studies have highlighted that collaboration exercises in its current form leads to limited perceived levels of learning and utility [4–9], and that the levels of learning and usefulness decreased rapidly after only attending a few exercises [10]. Sinclair et al. [25] found that stakeholders tended to prefer staying within their sector-specific group both during planning and response phases. Cited reasons included that each organization studied had unique training and evaluation programs and lacked knowledge on how to effectively perform and assess exercises. Such behaviour, from an exercise learning perspective, does to encourage collaboration development and utility as it may lead to a focus on professional drilling and sector-specific isolation [26], rather than an evolution of cross-sector organizational and cultural knowledge, testing of new and alternative working methodologies, and joint problem solving [18].

A prerequisite for good exercise learning and utility is that the scenario is rooted in authentic so that the participants get a so close to reality as possible experience [27,26]. Sommer and Njå [19] did, however, discover that planning for learning was found a challenge for organizers and planers, as they tended to set too high and comprehensive requirements for exercise achievement. Findings indicated, compared to popular believes that more complexity equalled more effect, that most actual forms of learning appeared

when focusing on smaller, single elements. Learning through experience is found to enable deep learning [28]. While the professional theory of a subject can be learned in a class or from a book, it cannot truly convey the practical approach gained through experience [29]. Collaboration exercises should, therefore, be considered tools for developing individual and organizational skills rather than permanent solutions [11]. An exercise should build on and be a supplement to already existing knowledge and stepwise progress from simple to advanced [30,26]. To be most effective, exercises therefore need to focus more on flexibility and testing of alternative strategies. To adapt optimally to their surroundings, participants must see the value in collaboration and be willing to engage in prestige-less horizontal processes which focus on problem solving rather than self-reinforcing behaviour [14] and compressive bureaucratic, slow-going processes [31].

3. Methods

This quantitative non-experimental study applied an electronic survey-based approach for measuring the participant's perceived levels of collaboration (C), learning (L) and utility (U). A quantitative approach was chosen over other methodologies as it was deemed most suitable for extracting data from larger population groups, as well as enable variable testing through statistical procedures and methods [32]. The applied instrument was the Collaboration, Learning and Utility (CLU)-Scale which is a validated instrument for measuring collaboration exercise participant's perceived levels of these three factors [5]. Additionally, the survey included demographical questions related to the participant's gender, age, number of years of professional experience and number of previous collaboration exercises before this one. Norwegian Centre for Research Data (NSD) approved the study (ref. 44815). NSD is the data protection entity research in all the universities, university colleges, and hospitals and research institutes in Norway. All phases of the study were carried out following NSD ethical standards. Permission was sought from the sampled organization, and all the participants received information about the project in advance. The inquiry emphasized volunteerism. The sample population was emergency personnel belonging to a Norwegian maritime agency responsible for maritime safety services. Survey data was collected in conjunction with a 2017 maritime oil-spill collaboration exercise in the southern part of Norway. The personnel held operative positions during the exercise. Email invitations to participate in the study were distributed by the organization management. The email contained a hyperlink to the electronic survey, designed using Questback software. To ensure privacy, the Questback "hide identity" option was selected, which according to the Questback [33] Security Statement states that participants' e-mail addresses, IP addresses, and browsers type are not identified. A total of 45 out of 103 invitees responded positively to participation. The response rate was 44%. Upon completion of data collection, the data was electronically exported from Questback to the Statistical Packages for the Social Sciences (SPSS) software, version 24.0.

Out of the 45 respondents, three were identified as outliers following an examination of boxplots in SPSS and removed from the dataset. Forty-two responses constituted the dataset used for further analysis. Despite two reminders following the original invitation, the response rate was low (44% initial response rate; 40.8% rate following removal of outliers). This should be considered a limitation. Low survey response rates have constituted a growing trend in Norway. According to the Research Council of Norway [34] the average response rate has declined by over 40% over the last 40 years.

In SPSS the questions, which together measured the three dimensions of collaboration, learning, and utility, were indexed into the same three variables. Mean CLU values were calculated, and their causal effects were tested up against 1) previous exercises attended and 2) years of professional experience. The grouping of previous exercises attended was identical to the response options in Questback. They were 1 = 0–1, 2 = 2–4, 3 = 5–7, 4 = 8–10, and 5 = 11+. The groupings of professional experience were also like Questback and were 1 = 0–5, 2 = 6–10, 3 = 11–15, 4 = 16–20, and 5 = 21+. Statistical significance was established at $p < .05$. Standard deviations (SD) were calculated for description purposes. The data set was visually inspected for skewness and kurtosis, which suggested a normal distribution. For support, data was also tested in SPSS showing a joint negative skewness of .06, while the kurtosis produced a value of .18. All values were considered acceptable within the range of normal distribution [35].

3.1. Materials

The CLU-scale is made up of the following dimensions and items:

Table 1. CLU-scale.

C	The exercises were focused on collaboration
C	Sufficient forms of discussions were provided
C	There were opportunities to improvise
C	Personnel in need of exercise participated
C	Collaboration was initiated immediately
C	Clear instructions of collaboration were presented
C	My points of view were regarded
L	I learned new things during the exercise
L	I learned about others' organizational aspects
L	I learned about others' communication patterns
L	I learned about others' prioritizing of activities
L	I learned other's concepts and abbreviations
U	Based on what I learned, the exercises were useful to real-life activities during actual emergency work
U	Based on what I learned, the exercises were useful to command officers
U	Based on what I learned, the exercises were useful to ordinary operative staff
U	Based on what I learned, the experiences from the exercise were so useful that it will have impact on my daily work

Dimensions: C = Collaboration, L = Learning, U = Utility.

3.2. Limitations

Several limitations need to be addressed. First, this study was limited in scope, as data was gathered from only one exercise and a limited sample population. Second, other demographic variables such as age and gender were not taken into consideration. Third, no face-to-face interviews were performed; had this been possible, participants could have elaborated more about their role during the exercise, which could have resulted in a more accurate screening.

4. Results

The final data set comprised 42 respondents, of whom 25 were males and 17 females.

The total mean for the collaboration (C) dimension was 3.91 (SD = 0.57). Learning (L) had a total mean of 3.67 (SD = 1.00), and utility (U) had a mean of 3.40 (SD = 0.50). Number of years of professional experience ranged from the 0–5 group to the 11+ group. When it came to years of professional experience, all groups were represented, ranging from the 0–5 group to the 21+ group. The calculated beta values showed that past exercise experience had a small positive effect on perceived levels of collaboration ($B = 0.039$, $p = 0.828$) and that professional experience had a small negative effect ($B = -0.037$, $p = 0.838$). Summed, exercise and professional experience constituted only 5% ($R^2 = 0.055$) of the variance in collaboration. In learning, exercise experience, despite significant found results, had a negative effect ($B = -0.49$, $p = 0.003$), while professional experience had a positive effect ($B = 0.039$, $p = 0.796$). The total of exercise and professional experience constituted 19% ($R^2 = 0.19$) of the variance in learning. In utility, exercise experience indicated a modest negative effect ($B = -0.034$, $p = 0.841$), while professional experience indicated a stronger positive outcome ($B = 1.693$, $p = 0.09$). A weak correlation of 2% ($r^2 = 0.02$) was identified.

Table 2. Impact of exercise and professional experience's impact on CLU (Sign. = $p < 0.05$).

	Collaboration		Learning		Utility	
	Mult. Regr. Stand. Beta	Sign.	Mult. Regr. Stand. Beta	Sign.	Mult. Regr. Stand. Beta	Sign.
Exercise	0.039	0.828	-0.491	0.003	-0.034	0.841
Professional	-0.037	0.838	0.039	0.796	1.693	0.098

$N = 42$, Collaboration ($R^2 = 0.055$), Learning ($R^2 = 0.19$), Utility ($R^2 = 0.02$).

5. Discussion

The calculation of the participants' means CLU values displayed results like those in previous studies (Berlin & Carlström, 2009, 2015; Kristiansen et al., 2017; Magnussen et al., 2018; Sorensen, 2017; Sorensen et al., 2018a, 2018b). Overall, the participants experienced moderate levels of learning and usefulness. An important finding, however, was that while calculations showed that collaboration exercises have a positive effect on crisis work regarding the participants' perceived levels of CLU, past professional experience seems more to be of an influencing factor for learning and utility during the exercise than past exercise experience only. While the existing assumption is that collaboration exercises contribute to the development and strengthening of team integration and response efficiency in crisis work (Axelsson & Bihari Axelsson, 2006; Drucker, 2007; Ruddy & Ruddy, 2012), the results indicate that exercise experience alone has a significant adverse effect on the perceived level of learning.

On that note, exercise experience and professional experience should not be considered two separate entities, as none of the exercise participants had only one type of experience alone. The participants took part in the exercise based on their occupation as professional emergency workers. Of the participants, 88% stated that they had 5 or more years of professional experience, while 76% had participated in two or more previous exercises. Their mission, based on their professional role, was to contribute to the

achievement of exercise goals, which in this case was collaboration learning and development.

The moderately high CLU dimension scores, in combination with the findings that exercise and professional experience only constituted 19% ($R^2 = 0.19$) of the variance in learning and 2% ($R^2 = 0.002$) of the variance in perceived utility, suggests a decoupling (Meyer & Rowan, 1977) between exercise behaviour and behaviour in real crisis work. A possible decoupling may indicate that the exercise was dominated by single-loop learning [21], where the participants modified their actions and adapted their behaviour according to the exercise scenario and expected exercise outcomes, rather than focusing on practical learning and utility development related to actual crisis work (double-loop). Learning through experience is found to enable deep learning [28]. Therefore, exercise scenarios and outcomes should build on, and be a supplement to already existing knowledge, rather than be considered separate entities [30,26]. The results are supported by Rolfe, Saunders, and Powell [27] which stated that a prerequisite for good exercise learning and utility is that the scenario is rooted in authenticity. If the exercise scenario is designed in a way that participants consider it too unrealistic or too unlikely it will hurt perceived learning and utility [26,6].

Getting designers to develop realistic scenarios that ensures a constructive alignment [28] between planned learning activities and desired learning outcomes has proven difficult, as designers tend to set requirements for exercise achievement that are too high and comprehensive [19]. The dominance of complex scenario thinking has resulted in the result that cross-sector collaboration exercises tend to focus too much on fragmented sector specific drilling and individual task solving rather than coherent approaches [4,6,8]. Lacking focus on the inclusion of collaboration developing elements, together with exercises often being characterized by standardized drilling, may lead to exercise saturation among experienced participants, a decline in learning development, and a fastening in sequential and parallel working patterns [10].

6. Conclusion and Recommendation

This paper examined a crisis collaboration exercise and tested whether there was a relationship between the participants' past exercise and professional experience and their perceived levels of CLU following the exercise. First, mean CLU calculations indicated that the exercise contributed to perceived moderate levels of learning and utility, supporting findings from existing studies. Second, the results indicated that past exercise and professional experience contributed to little of the variance in learning ($r^2 = 0.19$) and utility ($r^2 = 0.02$). This study, therefore, argues that there is a decoupling between exercise behaviour and behaviour in real crisis work, indicating a dominance of single-loop learning, and a missing constructive alignment between planned learning activities and desired learning outcomes. This gap in behaviour reduces the perceived effects of exercises among the participants. Instead of viewing exercises as a tool for professional learning and utility development, exercise is rather viewed as a repetitive necessity to fulfil legal requirements and organizational expectations. The lack of perceived utility value over time results in a decline in learning development, and a fastening in sequential and parallel working patterns. Possible reasons may include the lack of a focus on the inclusion of collaboration elements built into the exercise, and the fact that exercise designs are characterized by standardization, which again leads to exercise saturation among experienced participants. To enhance perceived levels of exercise learning and

usefulness, this study recommends a stronger focus on simplicity, constructive alignment, and the inclusion of collaboration elements in the design phases and execution of exercises. Comparable research, preferably using the same design and instrument, in combination with face-to-face interviews, is recommended.

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