A framework to support the development of simulation exercises for resilient response

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To succeed, complex socio-technical systems operating in mission-critical work domains need to adapt to their environments, and for this, elements of theirs need to adapt to their environments, of which the most important components are usually other organizational elements. One of the approaches they employ to acquire the necessary ability to adapt is the use of scenario-based training and observation. In a bid to improve training outcomes, this work builds on and extends Dowell's and Voshell's 'Narratran' and 'Learning Lab' proposals [1] using insights from field observations of emergency response simulation exercises [2] and contributions from domain experts and other sources. The development of a framework to streamline and support continuous improvement of emergency response organizations' generation and realization of different types of simulation exercises and discussion-based training, from the identification of their training needs, through exercise conception, authoring, staging (execution), to discussion and analysis of events, perceptions, and other points, allowing them to reflect on their practices to realign Work-As-Imagined (WAI) and Work-As-Done (WAD) [2], accelerate their learning, and enhance resilience. The research method entails a number of activities, comprising field studies [2] and bibliographical survey to characterize problem scope and the solution paths. The proposed solution consists in a three-tiered system implementing nested, cross-connected, PDCA type cycles, enabled by advances in technology and developments in the complex socio-technical systems, emergency response, and training domains. The three proposed tiers, shown in Figure 1, are: plan/write (authoring functionality); run (where simulations are executed by participating practitioners-in-

training); and learn (where researchers observe, abstract, and codify phenomena from authors' and participants' performances in the simulations, facilitated by recording mechanisms in the simulation execution level). It is expected that the connections across levels and the enhanced observation opportunities will accelerate the development of more effective exercise designs, improve learning yield, and develop a deeper understanding of cognition at work.
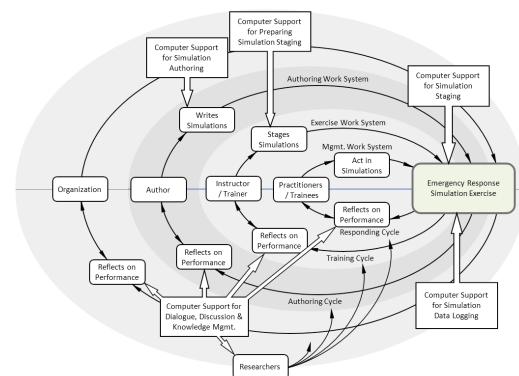

Figure 1. Actors, activities, and support functions of artifacts in the proposed framework to improve the use of simulation exercises

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