

Phenotypes and Genotypes of Erroneous Actions

The study of human actions with unwanted consequences, usually referred to as human erroneous actions, generally suffers from inadequate operational taxonomies. The main reason for this is the lack of a clear distinction between manifestations and causes. The failure to make this distinction is due to the reliance on subjective evidence which unavoidably mix manifestations and causes. It therefore seems sensible to propose a clear distinction between the phenotypes (manifestations) and the genotypes (causes) of erroneous actions. A logical set of phenotypes is developed and compared with the established "human error" taxonomies as well as with the operational categories which have been developed in the field of human reliability analysis. The principles for applying the set of phenotypes as practical classification criteria are developed and described.

Further descriptions can be found here:

Hollnagel, E. (1991). The phenotype of erroneous actions: Implications for HCI design. In G. Weir & J. Alty (Eds.), *Human-computer Interaction and complex systems*. London: Academic Press.

Hollnagel, E. (1993). The phenotype of erroneous actions. *International Journal of Man-Machine Studies*, 39, 1-32.

Hollnagel, E. & Marsden, P. (1996). Further development of the phenotype-genotype classification scheme for the analysis of human erroneous actions. (EUR 16463 EN). CEC Joint Research Centre, Italy: Institute for Systems, Informatics and Safety.