

**Towards a general framework for evaluating Intelligent Environments methodologies***Aditya Santokhee\*, Juan Carlos Augusto, Lindsey Brodie*

Engineering intelligent environments is a challenging endeavour due to the dynamic nature of the operational conditions in which these systems have to function [2]. According to recent studies, intelligent environments are being developed using different methodologies due to lack of any recognised standard one [3, 7, 13]. It is also reported that these methodologies are disconnected from each other and each one of them is focused on solving certain development issues [1]. It would therefore be useful to scrutinize and evaluate these methodologies to increase our understanding of their strengths, weaknesses and features especially as this has not been a focus within recent research. Although studies have investigated evaluation frameworks for related intelligent environment systems [4, 10, 11, 16], the focus has been mostly on evaluation of the systems rather than on methodologies used to develop them. In this study, we present an evaluation framework for qualitative evaluation of intelligent environment methodologies. It enumerates best practices and recommendations for engineering intelligent environments. The framework has been defined through studying, abstracting and unifying systems engineering lifecycle models [5, 6, 14, 15]. It is based on a generic life cycle model and is representative of the majority of systems that are developed including those containing significant software functionality at component level [8]. As an initial validation of the framework, we have evaluated the User Centred Intelligent Environment Development Process (UC-IEDP) [3]. We note that UC-IEDP in its current format has certain limitations. Its focus is more on the technical side and to a lesser extent on project management. It does not explicitly define project planning and control activities such as work breakdown structure, statement of work and risk management. On the other hand, the evaluation framework recommends focusing on both technical and project management aspects equally. Project planning would lead to better coordination of efforts, especially if the project is large, and identification of critical activities. Risk management is particularly important for intelligent environments as it would allow to mitigate potential risks with unproven technologies. Application of techniques such as modelling and simulations to analyse behavior of potential systems, especially during initial stages, is highly encouraged [9]. This is particularly important for intelligent environments whereby system developers can gain an understanding of how the systems will behave even before they exist. Additionally, the evaluation framework advises on defining metrics such as measures of effectiveness which leads to establishment of more meaningful and verifiable system requirements. It also helps to define better testing criteria for the system. However, UC-IEDP methodology does not particularly enforce such requirements and is not explicit on which quality attributes to measure and assess against once the system has been developed. Our current efforts are in defining a quality framework for intelligent environments.