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Abstract

This paper presents the preliminary findings and research plan for a simulation project that considers skills and knowledge for human resource development (HRD) practice in a factory context. Situated in the North West of England, the case provides a rich research context for considering the way in which the development of a simulation model for HRD is influenced by the organizational context and culture. The results presented here have been drawn from a rich set of qualitative data that will be used to drive the elicitation of user requirements for the simulation model. The paper concludes with a set of challenges for future research that spans multiple disciplines.

Research Context

Against the backdrop of the growth in knowledge management systems and human resource information systems this research addresses the thorny problem of simulating the organization's skills and knowledge base to aid organizational effectiveness, to support decision-making and to promote a systematic approach to human resource development. The project, driven by the initiative of our participant organization's human resources department, involves a multi-method analysis of the organization's context, which informs the design and building of a simulation of that context. The work acknowledges four major challenges (presented at the end of the paper), which are currently faced by human resource development practitioners, which, to some extent can be mediated by sophisticated HR based decision support tools. The organization (referred to as 'Candy' in this paper) is a Danish confectionery producer, which has recently acquired two factories in the North West of England (factory A and factory B).

The research investigates how the use of computer simulation will assist the organizational actors in improving their human resources practices (in terms of streamlining processes as well as enabling organizational learning). As part of our research we will develop and test a factory simulation, which explicitly factors in the skill and knowledge levels of production teams. Furthermore, the research will study how this simulation will be used to serve the interests of different stakeholders. In particular, we expect the human resource management team to use the simulation to provide evidence to the parent company of the importance and effectiveness of their investment in training. Thus, our research project aims to investigate how a simulation-based information system affects and is affected by the organizational context of a human resources department.

Theoretical Foundations

This research is based on the premise that an effective HR strategy will impact upon organization effectiveness, including measurable performance outcomes, at a number of levels. Evidence for this proposition is mixed. Early models of HRM, such

as those of Beer et al. (1984) and Guest (1987), show that external integration and fit have been constructed as a desirable objective for the competent HR department and the business enterprise which sees people as 'the key to success'.

Since then, research has attempted to explicitly articulate the nature of this link (e.g., Schuler and Jackson, 1994). Some writers claim that HR practices make a positive contribution to organizational performance (Boxall 1996), but in order to sustain a competitive advantage, they would have to be somehow idiosyncratic to the organization. Others argue that coherent HR practices only emerge when the organization is performing successfully (Paauwe and Richardson 1997), whilst, in the context of human resource information systems, Broderick and Boudreau (1992) draw upon Schuler and Jackson's model of strategic fit to postulate the types of HR system which will emerge in different strategic environments. Others, such as Ferratt and Vlahos (1998), have used a task-technology fit model to understand how computer-based information systems can support managerial decision-making.

Mueller (1996) claims that the organization's social fabric, or 'social architecture' is responsible for codified, yet disparate, HR practices throughout the organization. These evolve alongside strategic policy, and relate to it in a recursive way. Similarly, Legge (1995) and Grant (1999) would argue that any such integrative articulation of the relation between HR policy and strategy is embedded within management rhetoric and has a political economy. Guest and Hoque (1984) conclude that any level of fit is the exception rather than the norm. Difficulty and ambiguity in this area is surmised by Ogbonna and Whipp (1999, p.76).

Research Objectives

The aim of this research is to build and evaluate a model that simulates the knowledge and skill acquisition process in the organization, and its effects on other key organizational variables such as quality, throughput, absenteeism, and accident rates. The objectives of the model are to feature: a visual representation of current skill levels; manipulation of skill variables; simulation of the organizational appraisal system; simulation of a factory in action focusing on the varying effects of changing skill and knowledge levels; and a business game feature, with trainees taking resource investment decisions based on the tenets of effective investment in HRD to ensure optimum skill and knowledge levels.

Building the simulation requires a number of prerequisite activities: (i) a deep understanding of the organizational context, including cultural and performance measurement issues; and (ii) an investigation of the use of simulation to facilitate the business game. The simulation of knowledge and skills will provide the evidence of the extent to which effective HRD improves organizational effectiveness: the potency of this tool is immense in terms of monitoring the effectiveness of the HR function, the development of staff, succession planning, and the quality of work life.

Methodology and Preliminary Findings

In accordance with our objectives we have adopted a three-phase methodology. The *first phase* considers the culture, knowledge and process mapping and thus relates to the prerequisite activities for building the simulation as discussed above. The objective of this stage is to understand how the new human resources practices come to life in the organization, how they are produced by information, and how they inform action. Data is being collected via interviews, qualitative instruments, documentary data, workplace observation and participant observation. This phase is currently in progress. Thus far, the research team have completed a participant observation of Candy's business game for introducing new HR practices. Data collected includes video recordings of two teams during the 'game', notes from factory visits and several team interviews. The data that has been collected reveals key contextual differences between the two factories.

Specifically, the findings reveal that the HR department intends to use an innovative approach to training that has been developed and used extensively in Factory A over the last year. This consists of a paper-based business game (that is referred to above). The game is a manual simulation of the effects of changing skill levels on organizational effectiveness. This is typically demonstrated through cost, quality and health and safety measures. The scenarios used in the game are derived from actual events from the organization's history. These are events that had had an impact in terms of cost, productivity, quality and overall effectiveness. The business game is designed to change production team leaders' perceptions in assessing staff's skill levels. The aim of the HR department in using the game is to prepare for the *devolution of the training budget to the factory team leaders*. These team leaders are the people responsible for organizing work on the shop floor.

New skill assessments are conducted biannually via a revamped appraisal system, and represented in physical form on a graphical matrix (The Training Web - TTW). The TTW, which is currently available on paper format, enables the HR department and the team leaders to visually assess skill levels and recruitment needs on the shop floor at any one time. This tool will be transferred directly to the simulation model. The HR department (the user) hopes that the visualization of skill levels should promote better

succession planning, flexibility in scenario planning, and enable the moderate forecasting of where problems are likely to occur. The current paper format of the TTW prevents its more exacting and flexible use.

Participant Observation Results

The results of our participant observation at the recent running of the business game with Factory B has led to a very rich set of qualitative data. This includes field notes of the participant researchers and twelve hours of video-data. A research database of qualitative data is currently being generated using the NUD-IST qualitative analysis software. The differences highlighted in the data will clearly influence the elicitation of user requirements for the simulation model.

Subsequent Research Phases

The *second phase* of the methodology involves performance measurement of team and organizational effectiveness. This part of the study aims to understand the effects that the TTW has on organizational effectiveness at the macro, team and individual level. The study will be split into two parts, and will collect and analyze Key Performance Indicators (KPIs) for each level: (a) macro level KPIs and (b) team and individual level KPIs. The *final phase* of the methodology is based on the development and evaluation of the computer simulation. Using performance information gathered in stage two, and the process information gathered in stage one, we will build a simulation model of the factory processes. The research plan for these phases is detailed in the next section.

Research Plan and Conclusion

We are currently implementing a schedule of structured interviews. These are being conducted with team members, leaders and management from both factories. The interviews are structured around the following areas: work roles and processes, the organizational context, individual work and training histories, as well as issues of responsibility, team leadership and membership, ownership of process, resourcing, pace and goal setting, orientation to others, socialization and orientation to the business.

The product of the research will be to address the following challenges through the development of a simulation that models skills, training and knowledge. **Challenge 1**: Linking HRD with user requirements for the simulation model; **Challenge 2**: Achieving an integrated model of HRD processes; **Challenge 3**: Using the simulation to facilitate organizational learning; **Challenge 4**: Gaining the support and commitment of key stakeholders.

The preliminary research that we have conducted at Candy and presented in this paper opens many avenues for research. We envisage that a significant contribution can be made in the areas of information systems and computer simulation as well as organizational studies and human resource management.

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