COMPETENCY MATCHING BETWEEN VOCATIONAL EDUCATION AND THE WORKPLACE WITH THE HELP OF ONTOLOGIES

THE ONTOHR PROJECT

Background
• Broad educational qualifications are too crude for purposes of personnel selection
• Why does General Mental Ability (GMA) predict job performance so well? "The reason is that people who are more intelligent learn more job knowledge and learn it faster, the major determinant of performance is not GMA but job knowledge." (Schmidt and Hunter, 2004).

Purposes and expected outcomes
• To create a knowledge and mental ability-based qualification to job matching systems with the overriding purpose of lacking the conversion of vocational education qualifications into job-related competencies
• To assist candidates in identifying their knowledge deficiencies vis-à-vis a particular job role, and to offer remedial learning content to redress any such deficiencies
• To assist decision-makers in making content, construct, and criterion valid selection decisions using an ontology-based knowledge and mental ability test.
• Address the weaknesses of particular VET curricula, and thereby provide ad-hoc support

Methods
• Job selection: the role of Job Systems Analysis was selected as the required job knowledge and competencies are well documented. Furthermore, the selection was based on the fact that the competencies required for this job role were relatively invariant across the Italian and Dutch contexts in which this research is being conducted. This latter finding was the result of structured interviews that were carried out with Subject Matter Experts in both countries.
• Competency definition: A competency is a temporary, stable, narrowly defined, and trainable latent ability to obtain an organizationally valuable prospective job task successfully (cf. Teti et al., 2003). For the purposes of the current project we focus specifically on those competencies that are contingent upon an identifiable, specific, and distinct educational knowledge domain.
• Competency profiling: Inductive derivation, through desk research, of the universe of knowledge-based competencies required for the ICT systems analyst role across countries (Italy and the Netherlands) and organizations on the basis of:
  - Competency profiles developed by academics (e.g., O’Toole and WSIC databases)
  - Competency profiles in use (e.g., Express National ICT competency standards)
  - Competencies listed in job-vacancy announcements
• Linking Competencies, Job Knowledge, and Mental Ability: Based on a review of the personnel selection literature, it was established that both job knowledge and mental ability are among the strongest predictors of job performance, across jobs, organizations and countries. Using competencies as our operationalization of job performance, we therefore set out to populate the ontology-based selection system with the prerequisite knowledge and mental abilities for each of the competencies.

Results achieved so far
• Established an extensive network with relevant industry and educational stakeholders, both in the Netherlands and Italy
• Developed a valid competency profile for the role that adequately and accurately describes the demands of the job
• Developed the domain ontology model for both the education and job role ontologies
• Deployed both models for the job role in question

What remains to be done
• Piloting. At least two pilots are being set up to test the feasibility of the system. The pilots will be aimed at:
  - Cross-cultural experience: Variables to be assessed include: justice and fairness, perceptions, face validity, user friendliness, time needed to complete the assessment, etc.
  - Validity: Suggested selection criteria regarding particular applicants will be compared and contrasted with the outcomes generated by the selection system currently in use (e.g., structured interviews, general mental ability tests, personality tests, etc.).
• Self-ratings of applicants’ perceived demands abilities fit
• Subject Matter Expert judgments about the suitability of applicants for the job role in question
• Performance appraisals

Innovative aspects of the solution
Although a handful of ontology-based systems have been successfully implemented both within the fields of HRM and education, the readily apparent desirability of bridging the vocational education–workplace divide, by means of interconnected VET and domain ontologies as outlined in the current research to the best of our knowledge, is unique.

ValORIZATION AND FUTURE RESEARCH
• Expand the scope of the system to include various interrelated job roles in a particular industry, so that the system may be used for making both selection and placement decisions.
• Seek to employ artificial intelligence solutions to the work involved in populating and keeping up to date the knowledge and competency elements of the system.
• Seek to incorporate "soft" competencies, such as interpersonal skills, in addition to the "hard" competencies that are the focus of the current project.

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