Appendix A  Terms and Definitions

A.1 Terms and Definitions

accommodation: a modification of a conceptual structure in response to a perturbation which is necessary for cognitive development to occur.

assimilation: the integration of any sort of reality into a structure.

automatic skill: skill with understanding, characterized by adaptability and a well-connected schema.

collage: an artistic composition of materials and objects pasted over a surface, often with unifying lines and colour.

category: a specifically defined division in a system of classification.

catalyst: one that precipitates a process or event without being involved in or changed by the consequences.

cognitive collage: a metaphorical characterization of a conceptual framework of cognitive structures which includes complex networks of schemas, concept images, and cognitive units, flexibly linked together by highly individual paths, with varying hierarchical levels, degrees of compression, and flexibility.

cognitive unit: those bits and pieces of knowledge chunked together that can be held in the focus of attention (i.e., held in working memory), which act as the cues for retrieval and selection of the schema which determine subsequent actions or those facets of a concept image needed for the task at hand.

concept image: everything associated with the concept name, including mental images, properties, processes, contexts of applications.

concept maps: external visual re-presentations of a student’s internal conceptual structures at a given moment in time that is explanatory of the process of constructing new knowledge structures and reorganizing existing knowledge structures.

distributed intelligence: resources in the world are used, or come together in use, to shape and direct possible active emerging from desire.

epistemology: a theory of the nature, genesis, and warranting of subjective knowledge, including a theory of individual learning

external representation: of a concept map is an observable representation of the student’s internal cognitive collage at a given moment in time.

intelligence: the ability to learn in a particular way; a kind of learning that results in the ability to achieve goal states in a wide variety of conditions, and by a wide variety of plans.
intelligent technologies: those which undertake significant cognitive processing on behalf of the user and thus is a partner in distributed intelligence.

interiority of a concept: the richness of the various concepts in a network of cognitive structures and the complexity of appropriate linkages among them.

internal representation refers to possible mental configurations of individuals, such as learners.

methodology: a theory of which methods and techniques are appropriate and valid to use to generate and justify knowledge, given the epistemology.

mechanical skill: rote-learned habit with little or no adaptability and few linkages in the existing schema.

ontology: a theory of existence concerning the status of the world and what populates it.

pedagogy: a theory of teaching—the means to facilitate learning according to the epistemology

prior variables: attitudes, beliefs and competencies they bring to the current course.

procept: symbolism that inherently represents the amalgam of process/concept ambiguity.

proceptual divide: a bifurcation of strategy between flexible thinking and procedural thinking which distinguishes more successful students from those less successful—the divergence in performance that is a result of a failure to think proceptually.

procedure: a specific algorithm for carrying out a process.

process: the cognitive representation of a mathematical operation.

representation: a something that stands for something else, a kind of model of the thing represented.

schema: a very stable, refined cognitive collage. It can be a cognitive unit or a concept image which has been carefully shaped and refined with use into an effective tool for organizing and retrieving stored knowledge and can also be used to organize and assimilate new knowledge into an existing cognitive structure.

skill: the combination of having a plan, and being able to put it into action. Sources of the plans that form the basis of skills include schemas, genetically-programmed plans of actions and plans of action learned as habits. In the case of the latter two, plan and action are fused and contain a small cognitive element, with useful, effective skills in a particular situation or under certain conditions, but they are inflexible, lacking adaptability.

understanding: connected knowledge, i.e., a process by which one assimilates something into an appropriate schema.