

The 21st Century, the Competency Era and Competency Theory

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Abstract

This paper argues that while the 20th century witnessed the closing of the Contents Era, which placed more emphasis on the contents of the courses, the 21st century started during the early decades of the Competency Era in progressive education where the emphasis was stretched to include all the constituents of competence and not merely the contents. This paper further argues that, in the Competency Era, new theories, such as Competency Theory, are required to provide the theoretical understanding for such a shift in emphasis.

In this context, the Competency Theory that is comprised of two stages was proposed in December 2005 at the 13th Annual International Conference in Post Compulsory Education in Australia. The paper, by revisiting the Competency Theory, explores its application to VET in the 21st century.

Introduction

The global move to Competency Based Training has introduced a number of new concepts and chief among these concepts is the concept of competence (Mansfield 2004). The concept has created confusions and a host of conceptual misunderstandings at global (Van Loo J and Semeijn J., 2001a) (Mansfield B., 2004), national (Mitchell J. Chappell C. Bateman A. and Roy S., 2005b), (Smith E. & Keating J., 2003), (Schofield K.& McDonald R., 2004), (Azemikhah, 2005a), and State (Robinson C. AND Misko J., 2003, p 51) levels.

As result of global move to competencies, two major projects, the DeSeCo (Rychen D. S., 2002) and Tuning projects (González & Wagenaar, 2003), have been undertaken in Europe. Both of these projects, and in particular, the Tuning Project, aim to reform higher education in Europe and subsequently around the globe (González & Wagenaar, 2003). In other words, higher education is going through a vigorous global reform. The 'Tuning Project' in Europe, that has been carried out since 2001 by 100 universities and coordinated by the University of Deusto (Spain) and the University of Groningen (The Netherlands) and supported by the European Commission, focuses on educational structures and contents studies of Higher Education (Gonzalez and Wagenaar 2003). The impact and consequences of these reforms on the higher education globally lead to tuning of curricula in terms of structures, programs and, in particular, actual teaching of competencies (*Gonzalez and Wagenaar 2003, p22*).

The Tuning Project emphasises that not only academic and professional profiles required by the society are important in this process, but also equally important is "*the expression of the level of education to be achieved in terms of competencies and learning outcomes*" (*Gonzalez and Wagenaar 2003, p22*).

While the DeSeCo project emphasizes the significance of general competencies at the global level, the Tuning Project addresses both discipline-specific and generic knowledge competencies. Both projects involve competencies and Competency Based Training that have created misunderstandings and confusions of various kinds around the world.

For example confusions about competency and competency based training has been identified by some research works to be either conceptual (Rychen D. S., 2002) (Reeff, 2003) , pedagogical (Schofield K.& McDonald R., 2004), (Chappell, 2003a) or methodological /theoretical (Hinzen

H., 2001) (Vieyra-King M. and Caiteaux K., 1996). Some international authors around the world have gone further and argue that the very term 'competent' creates confusion (*Mansfield B., 2004, p 303*)

In Australia, as a result of the misunderstandings in the implementation of the Competency Based Training Packages, the National Government commissioned a major research project from 2002 to 2004 titled, "High Level Review of the Training Packages" (Schofield K.& McDonald R., 2004).

The High Level Review of Training Packages, (HLR), was commissioned by Australian National Training Authority (ANTA) to be completed in three Phases, during 2003 and 2004. The nature and the focus of the three Phases of the review had been different. While the focus of Phase 1 was on broad areas of changes impacting on education and VET (Schofield K.& McDonald R., 2003), which would significantly affect us as we move into the future, Phase 2 of the Review (Schofield K.& McDonald R., 2003b) has identified a number of issues raised by the stakeholders. Phase 3 proposed the required actions (Schofield K.& McDonald R., 2004) to be taken by the VET community in the future. For better understanding, these three phases may be illustrated as the analogy of rays, lens and the panorama. In other words, as the rays of changes, reflecting through the lens of issues, produce the image of six areas of action on the panorama screen of the 21st century.

The High Level Review reports documented a number of confusions and misunderstandings to be mostly of pedagogical nature (Azemikhah, 2005a; Schofield K.& McDonald R., 2004) in the implementation of the Competency Based Training Packages. At the completion of the HLR the complexities in the implementation and the delivery of the training Packages as a result of these misunderstandings and confusions were left to future research (Schofield K.& McDonald R., 2004) (Azemikhah, 2005a).

In June 2004, the Australian Minister and State and Territory ministers for Vocational Education considered the Review findings and agreed to six major areas of action to address these complexities (Gawler, 2004; Schofield K.& McDonald R., 2004b). (Azemikhah, 2005a, p 3) identified four types of confusions and misunderstandings in the above reports (HLR reports, Phases 1-3) that have caused the complexities.

On 28 June 2005, the discussion paper, "Complexities and Opportunities" was released in Australia to deal with these complexities. The discussion paper was developed by the four researchers ((Mitchell J. Chappell C. Bateman A. and Roy S., 2005a) as part of Consortium Research Program: 'Supporting vocational education and training providers in building capabilities for the future'. The Australian, State, and Territory Governments through the Department of Education, Science, and Training (DEST) fund this research program. The National Centre manages it for Vocational Education Research (NCVER).

These complexities have created dissonance in delivery methods between universities and TAFE. For example in Queensland the complexities arising from these confusions have created "*a dissonance between the training based on industry competency standards used by TAFE and the discipline and content-based methods used in the university sector*" (Robinson C. AND Misko J., 2003, 18). In addition some "*differences also exist in the criterion-referenced assessment practices generally used in TAFE and the normative or graded processes generally used in the university or school sector. These differences also*

have created difficulties for the application of credit transfer and articulation pathways.”(Robinson C. AND Misko J., 2003, p 18)

The Analysis

At the global front, the Tuning project concerns the tuning of curricula in terms of structures, programs and, in particular, actual teaching of competencies (*Gonzalez and Wagenaar 2003, p22*). The concerns expressed in the Tuning project in relation to actual teaching of competencies suggest the end of the contents era where only the contents were the dominating factor in a teacher-centred environment.

At the national level Smith & Keating (2003, p 134) argue that’ *“the training Packages certainly brought back to teachers the feelings of insecurity attached to early days of CBT”*. While a number of researchers (for example Mitchell J. Chappell C. Bateman A. and Roy S., 2005b) have identified that VET teachers and trainers schooled in the teacher dominant paradigm (Contents Paradigm) require new skills to implement competency based training packages.

It can be argued that for teachers to acquire and develop skills, a good knowledge as well as a good understanding of the Training Packages is vital. A number of researchers, (for example Perkins and Unger, 1999) assert that acquisition of knowledge does not bring understanding along like the caboose of a train. This suggests that the mere knowledge of Training Packages by VET teachers does not bring along the understanding of its pedagogical complexities. And *“it is clear that knowledge in itself does not guarantee understanding”*(Perkins and Unger, 1999, p 96). The above references suggest that while understanding is the prerequisite for successful implementation, the knowledge of the Training Packages, per se, does not bring along its understanding.

In the context of understanding and implementation of the Competency Based Training Packages, two questions remain to be answered:

- Firstly, the question of what causes confusions in this context or where the confusions are coming from?
- Secondly, if the knowledge of the Training Packages in itself does not bring along its understanding and the understanding of its pedagogical complexities then what does bring along this understanding?

Contemporary research in cognitive science suggests that understanding is to have a clear mental model or schemata of some kind (Perkins and Unger, 1999) . While other research works (Perkins and Unger, 1999; Perkins D. & Blythe T., 1994) emphasize the importance of mental models or schemata for any kind of understanding, they also support that conceptual models such as diagrammatic presentations enhance understanding.

More recent literature (for example TAYLOR N. & Coll R., 2002) asserts how confusion arises where mental models are absent or not clearly formed. According to constructivist epistemology, knowledge is a human construction that takes place in two mental phases.

Firstly human beings construct mental models of their environment and, secondly, new experience is interpreted and understood in relation to existing mental model (TAYLOR N. & Coll R., 2002,p 295). Further, these research findings have established that when two like-minded experts with clear mental models communicate, no confusion arises. However, when the modeller attempts to communicate with the modelled, who do not have a clear mental model, confusion may arise(TAYLOR N. & Coll R., 2002, p 293). Again, (Mitchell J. Chappell C. Bateman A. and Roy S., 2005b) assertions further confirm this view by stating that VET teachers and trainers who were schooled in the teacher dominant paradigm (Contents Paradigm) require new skills to implement competency based training packages.

The above assertions suggest that the confusions in the VET community have arisen as a result of the shift from traditional paradigm (Contents Paradigm which was dominant in VET prior to 1987), and still is, where *“the curriculum documents were often focused on areas of ‘content’”*(Smith E. & Keating J., 2003, p 120) to the new ‘Competency Paradigm’. (Gonzalez and Wagner 2003, p64) argue that the shift in emphasis from input to output also needs to be reflected, *“in the evaluation of student performance, moving from knowledge as the dominant, (even the single) reference. And that to (include) assessment centered on competences, capacities and processes closely related to work and activities as related to student development and in relation to academic and professional profiles already defined”* (Gonzalez and Wagner 2003, P 64) .

This shift in focus, that has been further emphasized by the advent of Training Packages, involves two distinct paradigms that need to be understood by two distinctive mental models, i., e., ‘Contents based mental model’, and, the ‘competency based mental model’. While in the contents paradigm mental model, the focus is on Contents, subjects and it is contents based, in the competency paradigm, the focus is on ‘Competencies, Unit of competency and it is competency based (Schofield K.& McDonald R., 2004b)

The above assertions clearly indicate that the contents-based mental model (of the Contents paradigm) is not suitable for the understanding of how to work with the units of competency (of the competency paradigm); hence, a new mental model is required. *In other words, the above references suggest that the confusion in VET for the implementation of the Training Packages is the consequence of the lack of a clear mental model on competence and the pedagogy of competence.* Thus, without forming a new mental model in this context, VET teachers and educators are going around in their daily work trying to apply a Mental Model that was dominant in the ‘Contents Era’, in order to facilitate (teach) the units of competency.

The arguments and assertions about the importance of a clear mental model for teaching of Competencies suggest that the new requirements can not be framed with the old mental model, the consequence of which is confusion. The finding of pedagogical confusions is not new and was the subject of previous research works (for example Schofield K.& McDonald R., 2004). Some researchers (such as Govin & Alvarez, 2005) argue that as knowledge is not absolute, its understanding depends upon theories and concepts and methodologies by which we view the world. While other researchers (for

example Vieyra-King M. and Caiteaux K., 1996) argue that the lack of a clear mental model is the result of the neglect of the concept of competence as well as inadequate theorisation in this area. For example, prior to 2005 there were no theorisation in the complex interrelationships of the components, elements and constituents of competence. Ashworth and Saxton (1990) cited in Vieyra-king and Caiteaux (1996, p33) also highlight that the complex activities made of elements of competence is unspecified. In this context, Azemikhah (2005b) proposed three diagrammatical presentations(models) with theorisation in three parts, the Relational Model of pedagogy for Training Packages (RMP), Competency Theory (CT) and Double Heuristic Method that will be discussed next.

The Response

It has been argued that in a learner-centered perspective the learner occupies a number of positions throughout the learning process (Boud D., 2005). Boud (2005) further argues that, *"a learner centered perspective now perhaps involves recognizing this multi-positioned view of the learner and needs to develop models and discourses that respond to it"* (Boud D., 2005, p 100) As a response to above needs, the Relational Model of Pedagogy for Training Packages (RMPTP), was proposed to illustrate and theorize the multi-positioned view of the learner (Azemikhah, 2005b). Azemikhah (2005b) emphasizes that the Relational Model of Pedagogy for the Training Packages (RMPTP) was proposed for both understanding and implementing Training Packages (Azemikhah, 2005). The relational Model of pedagogy (Figure 1) is based on a learner-centred pedagogy where the learners are involved in active construction of meaning and the learners assume the position of either a worker-learner or a simu-learner in the model while maintaining their central position of control.

DHM

DHM has been proposed as a response to global (Mansfield B., 2004; Van Loo J and Semeijn J., 2001a) and national calls (Schofield K.& McDonald R., 2004) for the pedagogical complexities of competencies. One of the goals of the Tuning project is the tuning of actual teaching of competencies (González & Wagenaar, 2003) that in addition to contents includes other constituents of competence such as skills and the processes.

While the fundamental assumption is that knowledge is not absolute, rather it is dependent upon the concepts, theories and methodologies by which we view the world (Govin & Alvarez, 2005). Perkins and Unger (1999) support the fact that we require conceptual models that simplify and facilitate the understanding of knowledge. This understanding based on conceptual mental models is crucial for the teaching of competencies. On this basis, DHM was proposed as the required mental model to facilitate the understanding the integration of the constituents of competence with performance criteria for the actual teaching of competencies. DHM defines the interrelationships of the constituents of competence in a Problem Based Learning (PBL) context to performance. Milne & Mc Connell (2001) emphasize the importance of PBL in accounting education. (Boud D., 2005) further confirms this view and argues that the starting point of learning is a problem or case that the learners wish to solve.

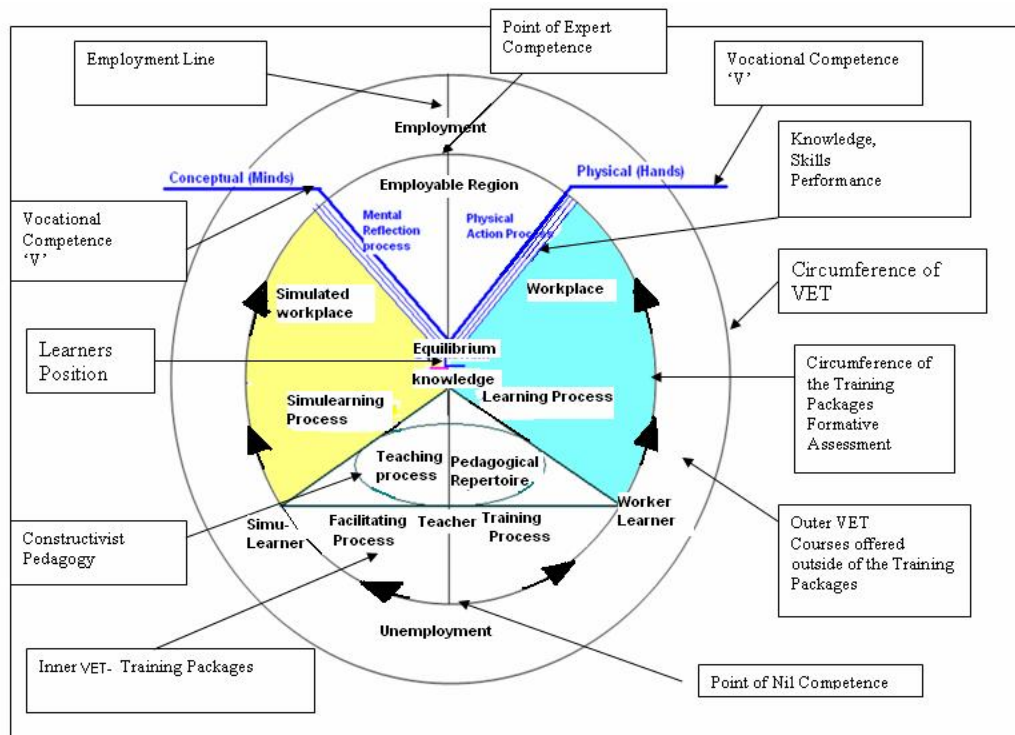


Figure 1 – RMPTP incorporating Vocational Competence

In this context by incorporating PBL, DHM is turned into a powerful new pedagogical strategy (device) that is practical for both teaching and learning. Using this pedagogical strategy, DHM in conjunction with PBL, turns into a mental simulation for teaching and learning that is runnable by both teachers and learners. In such a context, DHM is used as a pedagogical device that is controlled and run by the learner where problem drives learning (Jonassen, 1999), in which the learners, in their search for a solution attain the relevant domain knowledge (Jonassen, 1999) in “*active construction of meaning*” for themselves (Chappell, 2003a,p.3).

DHM approach as a pedagogical device is in line with González & Wagenaar (2003, p 63) view that competencies guide the selection of (knowledge) concepts, appropriate to particular ends, as a demand driven approach. The demand driven view of learning is later confirmed by (Mitchell J. Chappell C. Bateman A. and Roy S., 2005b) who see it as being appropriate in terms of customization of learning to learners’ needs based on principles of consumerism.

DHM starts from a case or problem (Boud D., 2005) where the learners identify and select the required concepts, from the relevant domain knowledge, which is facilitated by the teacher. The learners are then guided to identify and draw the relationship of the concepts from the problem to required knowledge, from the required knowledge to performance criteria using skills as the interplay elements or links, and, finally, from performance criteria to the problem. In the final stage, this process produces a customized competency map (CCM) that will be the basis for the teaching and learning

of competencies constructed on the basis of the demand-driven principles (Mitchell J. Chappell C. Bateman A. and Roy S., 2005b).

Using a demand driven pedagogical approach, DHM focuses on the output rather than input. In this context (Gonzalez and Wagner 2003, p64) argue that the shift in emphasis from input to output is important *“in the evaluation of student performance, moving from knowledge as the dominant, (even the single) reference. And that to (include) assessment centered on competences, capacities and processes closely related to work and activities as related to student development and in relation to academic and professional profiles already defined”* (Gonzalez and Wagner 2003, P 64) .

While DHM maintains the focus on outputs rather than inputs (Boud D., 2005), it is constructed on the basis of Boud (2005, p 2) suggestions of innovation in teaching at higher education. DHM is a self directed, negotiated pedagogical approach using problem-based learning (Milne & Mc Connell, 2001) (Boud D., 2005)

The pedagogical approach in DHM is also aligned with the consumerism view of learning suggested by (Mitchell J. Chappell C. Bateman A. and Roy S., 2005b). This view further confirms the move from “standardization” to “customization,” suggested by (Reigeluth, 1999). Both of these views support the learner-centred emphasis that has guided the design of DHM.

DHM method is a two-step (double heuristics) process, using ‘W’ diagram as an extension of ‘V’ diagram proposed by (Govin & Alvarez, 2005) . While Govin and Alvarez (2005) assert that, *“the V diagram is a heuristic that can be used to better analyse and understand the structure of knowledge of a given topic”*, ‘W’ diagram is used to analyse and understand the structure of competency that includes, inter alia, the understanding of knowledge. While *“V diagrams decipher the complexities of construction of knowledge and knowledge making”*(Govin & Alvarez, 2005), the “W” diagrams decipher complexities of competencies and competency development. Hence, DHM is a knowledge integration device. Its purpose is to construct knowledge in an integrated approach. The integration process involves all the constituents of competence (propositional knowledge and dispositions) and their relationship to performance (procedural knowledge). It is an integrated learning, using ‘W’ diagram as a heuristic device. In other words, DHM aims to integrate propositional, procedural knowledge as well as the dispositions. It is comprised of first and second heuristics that are explained next.

First Heuristic

The purpose of the first heuristic is to construct the competency diagram (Figure 1). A competency diagram has a ‘V’ shape comprised of three elements and two processes. It was constructed on the basis of the definition of competence proposed by (Azemikhah, 2005a, p 4). Azemikhah (Azemikhah, 2005a, p 4) has defined competence in line with the orientation taken by the High Level Review as *“a quality that needs to be developed by the learners both conceptually and physically.” It needs to be conceptually developed in*

the minds of the learner based on the constituents of competence (underpinnings and attributes), and physically developed and perfected by performance (based on performance criteria) resulting in a balanced hands-and-minds equilibrium (Azemikhah, 2005b, p 3) .”

The competency diagram (Figure 1) is comprised of three elements, the conceptual element (the minds), the physical element (the hands) and the balancing element (the equilibrium). The equilibrium is the balancing element in the competency diagram controlled by the learner and facilitated by the teacher using skills as the interplay element between the two processes. The competency development process in the model is comprised of the Mental Reflection process as well as the physical action process. These dual processes transform the learners by using skills as the interplay elements and this “*transformation relies on individual construction of meaning so that experience and knowledge are in equilibrium*”.(Stevenson, 2000)

The work in the first heuristic starts with a simple problem (Boud D., 2005; Milne & McConnell, 2001) . The learners identify the key concepts in the problem in the light of required knowledge and variables in the competency unit. These concepts are then listed at the foot of the competency diagram. Refer to Fig 2. The focus of the First Heuristic is to integrate the problem to the unit of competency. In other words, it is constructed by linking the key concepts embedded in, or implied from, the problem to the variables and performance criteria in the unit of competency.

The first Heuristic is completed by listing the key concepts of the problem at the foot of the competency diagram. The relevant variables from the Unit of Competency are identified and listed on the right side (Conceptual) of the diagram. The performance criteria are listed on the left (Physical) side. The relevant skills are listed at the centre of the ‘V’. The key concepts are then connected to variables; variables are connected to skills, skills to performance criteria, and performance criteria to the key concepts. Figure 2 illustrates the completed competency diagram of the first heuristic.

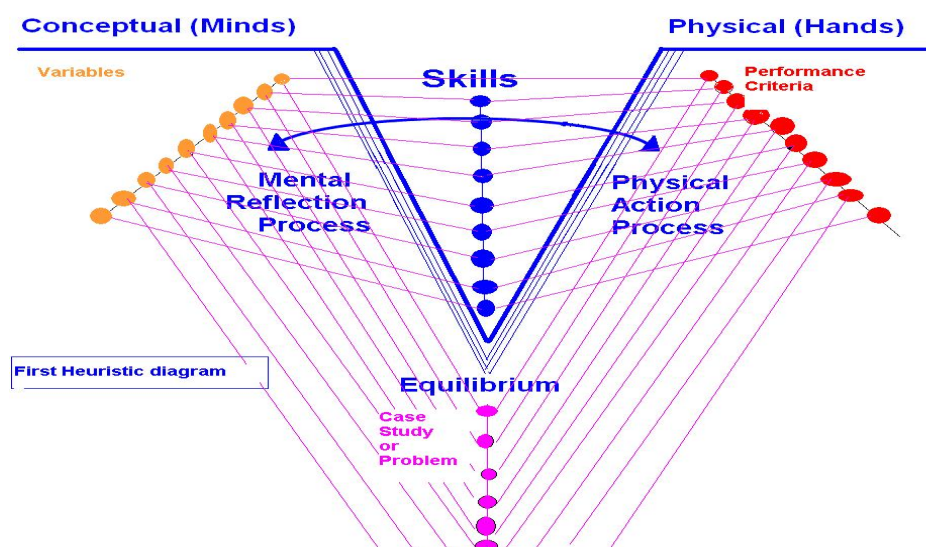


Figure 2 – First Heuristic of DHM

The second heuristic

The work on second heuristic commences by embedding the first heuristic at the foot of the 'W' diagram (Figure 3). The construction of knowledge is continued by selecting one of the methodologies prescribed by (Candy, 1991) such as Gowin 'V'. In this way, the second heuristic is used as a constructivist tool to extend the first heuristic further by linking it to the selected methodology. Then the Second heuristic extends in all the three dimensions of DHM. For example, it extends into conceptual side by identifying relevant theories and philosophies. It also extends into the physical side of the study by identifying and linking to the relevant elements of competency. Finally, the heuristic is connected to the methodological dimension by arrowing to the selected methodology Candy (1991). Unit's title, descriptor and purpose are listed in the big notch of the 'W', while the topic's focus question is entered in the small notch.

Methodology

Methodology is defined by Oxford Dictionary as *"the branch of knowledge that deals with method, and its application to particular field"* (The University of Oxford, 2002, p 1762), while method is defined as *"a mode of procedure"* (The University of Oxford, 2002, p 1805). These definitions suggest that methodology can take many modes such as the four strategies proposed Candy (1991) listed in Figure 3.

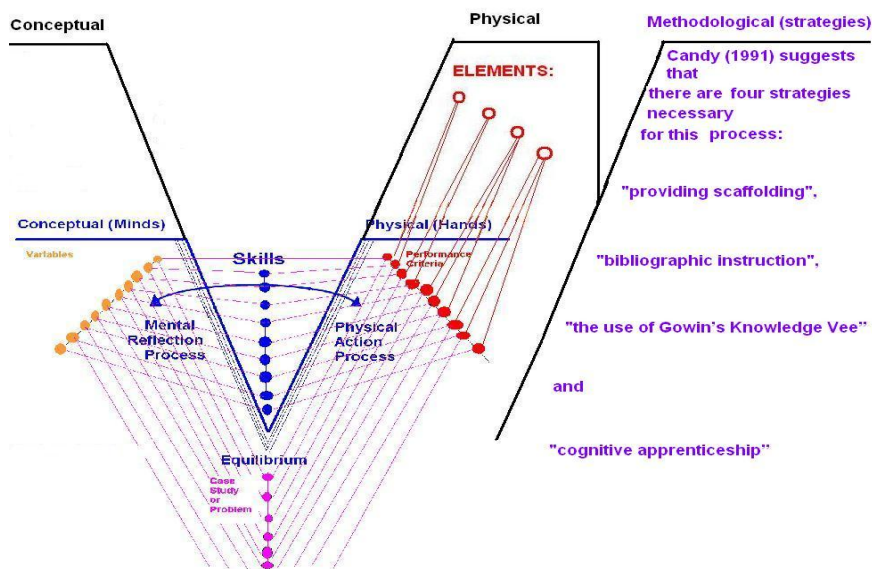
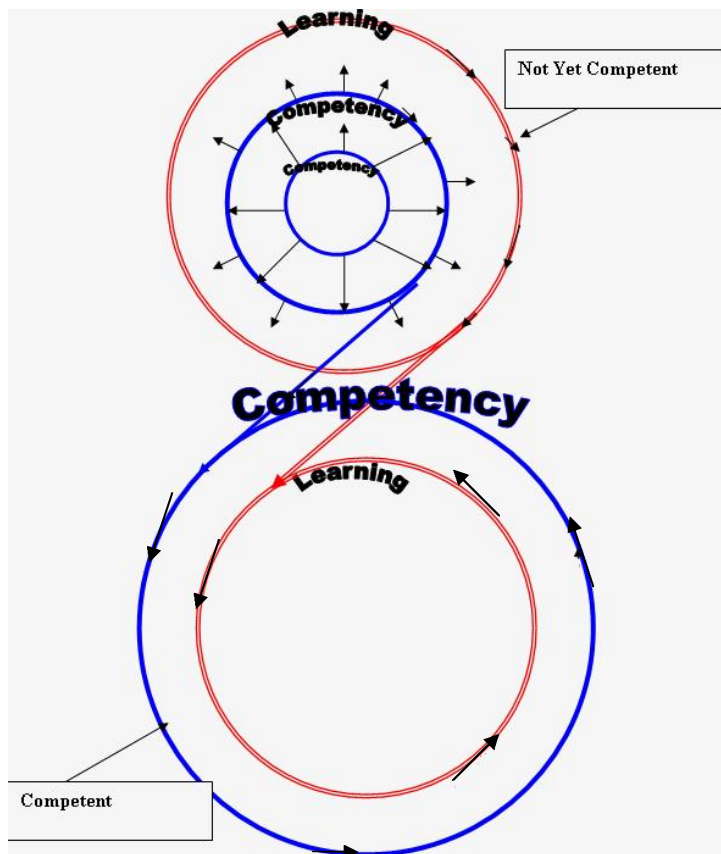


Figure 3 – Second Heuristic of DHM

The transposition of competency and learning (Competency theory)

The competency development process, comprised of the above heuristics, is repeated for quite a number of times, using simple to complex problems, until the learner has attained mastery in the unit of competency. At each iteration, represented by expanding circles in the competency theory, the learner's level of competency and professionalism elevates to a higher level. This process continues until the learner arrives at the point of transposition of competency and learning. *"At the point of transposition, the learner is able to apply*

performance criteria to new problems or cases independently. The learner is now able to examine new cases, identify, and study new concepts, if any, and using his/her acquired skills is able to perform in accordance with the requirements of the unit of competency independently. At that point, the learner is deemed competent and the relationship of 'learning to competency' is transposed into 'competency to learning'. When competency and learning are transposed, the learner moves from the 'Not Yet Competent' position to the 'Competent' position. The learner's level of competency and professionalism elevates to a point where it can take care of his/her learning. The following diagram illustrates this trans-positioning event."



"At the points of transposition of the competency and learning, the learner becomes self-sufficient to learn independently of the facilitator when confronted with new cases or concepts within the precincts or boundaries of the unit of competency. At the point of transposition, the learner enters into the new stage or cycle of learning where the learning depends entirely on the learner's competency and thus learning becomes the function of the competency itself."

Figure 4 – The transposition of competency and learning (Competency theory) ©

Conclusion

While the global move to competency and CBT has been supported by Tuning and DESECO projects in the first decade of the 21st century, we have witnessed that, in Australia, by the advent of Training Packages, the 20th century has stamped its seal of approval on this revolutionary move. The 21st century is going to witness its success and consolidation globally in the next stage of progressive education. It has been argued in this paper that the confusions or the over-reactions to this global move is the result of inadequate theorization. In response to these needs, three pieces of theorizations were proposed to pave the road to excellence in the delivery and implementation of the Training Packages.

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