Adv in Health Sci Educ
DOI 10.1007/s10459-012-9402-z

COMMENTARY

CanMEDS and other "competency and outcome-based approaches" in medical education: clarifying the ongoing ambiguity

Florence Parent · Jean Jouquan · Jean-Marie De Ketele

Received: 15 May 2012 / Accepted: 3 September 2012
© Springer Science+Business Media B.V. 2012

We read with much interest the papers and comments recently published in the journal (Whitehead et al. 2011a, b; Malone and Supri 2012; Sherbino et al. 2011), which brought an insightful contribution to the wide debate on pedagogical initiatives pertaining to the concept of competency in medical education. In his editorial comment, Norman (2011) highlights the necessity for questioning the relevance and the limits of the competency-based approach. This is particularly imperative for professional frameworks whose inherent nature suggests that they be implemented and standardized at a national level, as it is the case with the ACGME framework in the United States, the "The Scottish Doctor" and the "Tomorrow's Doctor" in the United Kingdom and, in particular, the CanMEDS framework in Canada. The latter in particular has a major influence in several countries and is a topic that has been addressed in several published papers.

The competency-based approach is generally well understood and accepted as a newly emerging conceptual framework amongst professionals and researchers involved in medical education. We reckon it can offer a very important opportunity to improve health

This comment refers to the article available at doi:10.1007/s10459-011-9277-4.

F. Parent
Centres de recherche «Approches sociales de la santé» et «Politiques et systèmes de santé, Santé internationale» École de Santé Publique, Université Libre de Bruxelles, Brussels, Belgium

J. Jouquan
Equipe d'accueil EA 4686 «Ethique, professionnalisme et santé», Faculté de médecine et des sciences de la santé, Université de Brest, Université Européenne de Bretagne et Centre hospitalier régional et universitaire de Brest, Brest, France

J. Jouquan (✉)
Département de médecine interne et pneumologie, Centre hospitalier régional et universitaire, Boulevard Tanguy Prigent, 29609 Brest Cedex, France
e-mail: jean.jouquan@chu-brest.fr

J.-M. De Ketele
Université catholique de Louvain, Brussels, Belgium

J.-M. De Ketele
Chaire UNESCO en sciences de l'éducation, Université Cheikh Anta Diop de Dakar, Dakar, Senegal

Published online: 19 September 2012

professions education as it promotes professional expertise that is better adapted to social and societal realities (Parent et al. 2011).

On the one hand, we think that the very wide dissemination of this approach, in several states and different continents, applied to different health professions, gives an original scientific opportunity to identify underlying processes of curricular developments as well as to document their effects through comparative analysis. On the other hand we also agree with authors like Albanese et al. (2010) or Reeves et al. (2009), who think that accurate conditions, which need to be set within a critical appraisal, must absolutely be fulfilled so as to ensure that the potential of a competency based framework is met (Jouquan 2007).

It seems to us that these papers give rise to conceptual confusions rather than clarifications with regards to the competency-based framework. We consider important: (1) that the concept of competency be clearly defined and that it be differentiated from both the concept of role and that of performance; (2) that the concept of a competency framework be clearly defined and that it be dissociated from both the concept of roles framework and that of taxonomy.

Clarifying the concept of competency and distinguishing it from both the concepts of role and performance

The concept of competency is far from being clearly understood and it refers to rather different representations, not only regarding its definition, but even more so with respect to the pedagogical strategies suggested when competencies are clearly put forward as the outcomes of a program. Amongst numerous available definitions, we agree with the one proposed by Tardif (2006), which is often used within the French-speaking health science education community. He states that competency is "a complex acting-knowledge relying on the mobilisation and the efficacious combination of a variety of internal and external resources, inside a cluster of situations". We don't intend on giving a comparative synthesis of the different available definitions, as developed in a recent review (Fernandez et al. 2012), from which an original definition could be formulated. There is no need to open a formal debate on the differences in the meaning of these definitions, but we strongly suggest that each author, when using the competency concept in their work, attempt to clearly define it and its epistemological and methodological basis.

For our part, we attribute both the socioconstructivist paradigm and the situated cognition theory as being the most productive epistemological orientations when addressing the concept of competencies in training (Driver 1995; Brown et al. 1989; Jonnaert et al. 2004). Such a conceptual framework introduces consequent implications. For one it highlights the necessity to make it clear, for pedagogical reasons, the fact that the concept of competency includes both an analytical—decontextualised—dimension and a situated—contextualised—dimension. When it comes to learning assessment in a curriculum elaborated on a competency-based approach, one will have to break away from the docimological perspective and focus rather on approaches like authentic assessment (Wiggins 1998). It is therefore possible to pose alternative arguments to Lurie (2012), who questions the feasibility of evaluating the competencies with measurable quantitative indicators. Actually, in contrast to the behaviourist perspective and in agreement with the perspective of the cognitive sciences, we move away from merely psychometric requirements and consider other criteria, such as those used in qualitative research (Lincoln and Guba 1985; Van der Vleuten et al. 1991a, b; De Ketele and Gerard 2005).

Competency is a cognitive construct assessing potential to perform efficiently in a given situation. However, it must be clearly distinguished from the notion of professional role, which is broadly defined as a person's expected behaviour with respect to his function as a health care provider. With reference to the latter, CanMEDS's framework is most confusing in that its definition of competencies is unclear when it stresses that "to be useful, [competencies] were organized thematically around "meta-competencies" or physician roles for CanMEDS". In failing to discriminate role from competency, this introduces a certain level of ambiguity which is further illustrated when some commentators bring into play "roles-competencies" (Des Marchais 2006). However, unless one wishes to delve a behaviourist and narrow understanding of the competency notion, it must be kept in mind that indicators which allow one to infer competencies from a learning assessment process are not the same as those used to assess the quality by which a "role" is practiced.

The concept of competency must also be distinguished from the concept of performance, which in turn is itself linked to task and activity notions. Pedagogically speaking, performance constitutes one or several real tasks, accomplished for the duration of a role, it is practiced and used for assessment purposes, to collect indicators for enabling gathering of inferences on the reality and availability of the competencies. From a behaviourist point of view, performance, as a directly and measurably observable product, would be considered as the only form of reliable data. On the contrary, in a constructivist approach, it is admitted that one has to use information related to both the product and the process by which it is generated. Some performances in conformity with expected results might indeed result from processes using inadequate strategies or misconceptions. Clinical reasoning is a particularly good example of this since numerous uncertainties still remain on the relation between, on the one hand, mobilised competencies (i.e., the knowledge and the cognitive processes), and, on the other hand, the quality of the diagnostic performance (Norman 2005). This further elucidates the importance of distinguishing competency from performance.

Clarifying the concept of competency framework and distinguishing it from both the concepts of roles framework and taxonomy

In line with the earlier discussion, it is important to understand what is at stake in the process leading to competency framework. Going back to the CanMEDS project, it claims to be essentially a competency framework (Frank 2005), whereas Norman (2011) considers it as a taxonomy of outcomes, Whitehead et al. (2011a) either sometimes, in agreement with us, consider it as a professional role framework, or as a competency framework elsewhere and at times even as a competency taxonomy. In fact, the main document in the CanMEDS project is itself also ambiguous as it proposes, but only as part of an appendix, an educational taxonomy of competency levels. We think that such ambiguity can only perpetuate semantic confusion and we openly appeal for a terminological and conceptual clarification.

Stricto sensu and historically, "a taxonomy in education is a methodical and hierarchical classification of learning phenomena" (Legendre 2005). This definition suggests a categorization of learning processes that takes into account a "horizontal" dimension according to different fields or scopes, as well as a "vertical" dimension according to hierarchical levels or degrees.

It is quite clear that the classification—or categorisation—proposed in the CanMEDS framework approaches only the horizontal dimension, and as already mentioned, the seven

identified categories primarily address professional roles, even if they are called "meta-competencies". The latter comprise the key-competencies as well as the enabling competencies. In fact, these "metacompetencies" are comprised of professional tasks and activities that are more or less contextually described. It is only in the appendix that the vertical dimension becomes evident as an educational taxonomy of competency levels. Firstly, this taxonomy is presented in three levels, referring to (a) a "construct of all of the roles used in practice" (level 1), (b) the "the seven CanMEDS Roles" (level 2), and (c) to the key competencies which shape each of the roles (level 3). Secondly, it is presented in eight levels: the first four of which include the three just mentioned, to which is added the additional level of enabling competencies (level 4). The remaining four levels refer respectively to "Specialty-specific objectives of training" which describe "the abilities that a physician must have to be a competent specialist in a given area of medicine" (level 5), "Program-level objectives" […] describing "the educational goals of a program, such as those used for a residency" (level 6), "Rotation objectives" […] which break down program-level objectives to make them manageable for use for each educational event (level 7), and finally "Instructional-event-specific objectives" which describe "brief educational activities, such as a seminar or rounds" (level 8).

We concede therefore that the CanMEDS framework is indeed a typology because it proposes one, and even several, categorizations, but we believe it is not a taxonomy. Indeed, when we consider the horizontal dimension of the categorization (fields or scopes), it appears to confound roles and competencies. Similarly, the vertical dimension (levels or degrees) fails to make the distinction between professional roles, which are defined as a quantitative hierarchy of mastership at a definite time during training, from those referring to teaching activities, which are characterized according to their levels of organization. Moreover, learning phenomena are never included directly in the proposed categorization nor are the links between professional roles, competencies and performances ever explicitly articulated. We think that when delineating the CanMEDS framework as a genuine taxonomy linked to the competency—based approach without pointing out its epistemiological and methodological weakness, Norman's editorial (2011) as well as other published comments (Whitehead et al. 2011a, b) are not devoid of confusion despite providing valuable critical analysis. Moreover, further details given by Sherbino et al. (2011) see insufficient, as they only succeed in renaming the non-medical expert roles to intrinsic ones. For the same reasons, the critical analysis of the competency-based approach developed by Malone and Supri (2012) remained globally descriptive, giving few operational directions.

From both a European and from a French-speaking 'engineering' point of view, we suggest that three distinct frameworks be considered when developing and implementing a competency-based approach. We do, however, deem it is essential to clearly dissociate them so as to better be able to adapt them to a taxonomy of learning phenomena relating to the competencies to be built.

The first framework should be professional, one that categorizes professional activities and functions. CanMEDS, as a roles framework, could, to some extent, exemplify this.

The second framework, gathered from the previous, should be a genuine competency framework. In line with our previous discussion, we believe that such a framework should propose on the one hand, categories (abilities and macro-abilities) derived from an analytical competency approach and on the other hand, categories (clusters of situations) derived from a situated competency approach. Elaboration of such a competency framework from a professional framework is increasingly being referred to as so-called competency engineering. It is a didactical translation process (Parent et al. 2011) that is,

epistemiologically and methodologically, inspired by professional didactics, work sciences, psychology and the sociology of organizations.

The third framework, again stemming from the previous one, should be a training and assessment framework, that is, a pedagogical framework. The elaboration of such a framework from the competency framework enters in what is progressively being referred to as curricular engineering. It is a pedagogical transposition process that is, epistemiologically and methodologically, inspired by the learning sciences, psychology and the sociology of education.

That being said, we believe that the structuring component, which would allow the articulation of the three frameworks in a coherent and integrative way, ought to be a taxonomy of learning phenomena related to competencies building. Such a taxonomy, of which Bloom's taxonomy and Miller's pyramid are two, the latter dedicated specifically to medical education, must surely be decontextualised. This must be done despite the need to use it contextually, that is, by applying all of its categories to specific contexts. This taxonomy should take into account fields or dimensions (horizontal component of the taxonomy), that describe categories of activities linked to specific knowledge and must be developed in a professional situation (for instance: cognitive, reflexive, metacognitive, operative, psycho-affective, social). It should also describe levels of differentiated and specific mastership (for instance: remembering, applying, constructing, mobilizing, transferring). It refers to levels (or degrees) of increased integration of knowledge built in each field (or scope) following a competency-oriented learning approach (vertical component of the taxonomy).

We strongly believe that a competency-based curriculum approach that would try, methodologically and systematically, to explain, to distinguish and to articulate its different frameworks and its different components, would more satisfactorily address a number of concerns.

Such a competency-based curriculum approach would thus allow one to confront the kind of criticism by Malone and Supri (2012). One such criticism is that competency-based approaches "are not suitable for highly skilled professions" or that they "limit the content of the curriculum". These criticisms are valid for some very narrow approaches to competency that reduce it to mere skills and capacities applied to the behavioural objectives strategy of some forty years ago, but since that time competency has been more broadly defined.

Such a competency-based curriculum approach would also allow one to go beyond the limits imposed by a limiting conception of Bloom's taxonomy, often instrumentalised from a purely behaviourist perspective, even though it essentially makes reference to cognitive activities. It would also allow one to go beyond the limits of the so-called Miller's taxonomy pyramid (Miller 1990), which remains very grounded in a behaviourist perspective and which divides learning phenomena into only two levels—knowing and doing. Thus, as Lurie (2012) has done, it assimilates outcomes solely with performance rather than with competencies.

In this context, we believe that a combining and integrating logic, one which adapts learning phenomena, and one that is divided in fields and levels, with both an analytical,—decontextualised—dimension, and a situated—contextualized—competency approach, together with placing the competency framework at the close interface between roles framework and pedagogical framework, would avoid the potential pitfalls that Norman (2006) describes. These include, on the one hand, a very descriptive and thorough approach of the different components and applications of the competencies, which CanMEDS does

not avoid, and on the other hand, includes competencies being described in such wide and generic terms that they are not quite useful for teachers and students. It would then be useless to take a posteriori semantic precautions, those that entail renaming non-medical competencies to intrinsic competencies in order to simply avoid talking about "general" or even "transversal" competencies, while the problem is the transfer of learning. That being said, one must keep in mind the idea that "transferable" competencies cannot be elaborated out of any context and specific contents.

Learning related to new or emerging competency fields could therefore be clarified as a result of original research becoming available. Some examples of emerging or new competencies are emotional intelligence, which was the topic of a paper in the same issue of the journal (Weng et al. 2011), or resilience, as recently discussed by Howe et al. (2012). Such competencies go well beyond low-level, specific objective tasks as recommended by Malone and Supri (2012), while they suggest that the competency-based approaches would not make it possible.

Finally, such an approach would make it possible to propose curricula adapted to the expected degree of standardization. We are aware that in the North-American context, an important standardization of outcomes is recommended and is considered as a preliminary condition to the quality of programs (Albanese et al. 2010). We also agree with the idea that it is important to find solutions "to both challenge and streamline processes that essentially bring about the same core skills in many different professions" (Reeves et al. 2009). We believe, however, that any competency-based approach should make it possible to promote competency frameworks respectful of intercultural diversities and curricular frameworks taking into account institutional specificities, while fulfilling the expected strictness of the professional roles with quality criteria (Parent et al. 2004). This seems consistent with the principles raised by the Global consensus for social accountability of medical schools (2010), in particular in order to guarantee the rights of the most vulnerable populations, in a social and societal vision of health.

In conclusion, we attribute more importance to disputing choices that have already been made and to diversities of frameworks that have been elaborated. This validates the construction of categories, fields and domains, rather than standardized curricular products (Jouquan 2009). Finally, we propose an integrating global conceptual framework, with several possible methodological and epistemiological references in a competency-based approach (Fig. 1).

The clarifications that we recommend integrate the principles of sharing project engineering linked to social engineering (bottom up rather than top–down), ones that are able to guide strict but flexible competencies and curricular engineering, while simultaneously taking into account the combination of analytical and situated components of competencies. They contribute to bring relevance and coherence into the three frameworks, which are, respectively, roles framework, competency framework and pedagogical framework, around a taxonomy of competency-oriented learning.

Finally, it makes it possible to redefine the conditions for the elaboration of a competency-based approach with epistemiological and methodological arguments. We reckon that these arguments are usually absent, but that they should be articulated to enable commentary and development of a comparative analysis of the different frameworks produced around the world. This would in turn facilitate achieving explicit and relevant outcomes in health professionals education.

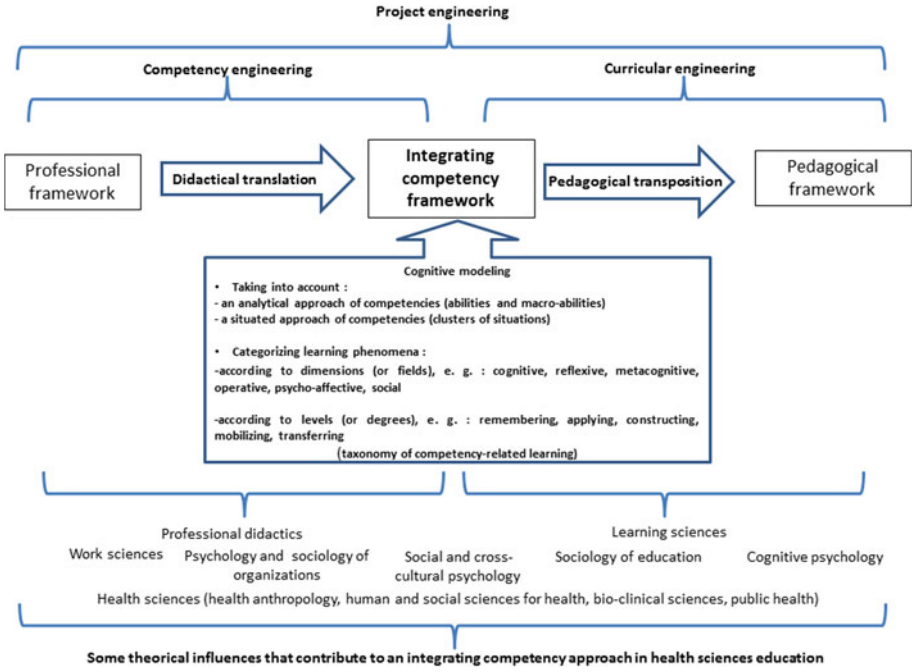

Fig. 1 Integrating conceptual framework for curricular planning of health sciences professional development

References

Albanese, M. A., Mejicano, G., Anderson, W. M., & Gruppen, L. (2010). Building a competency-based curriculum: The agony and the ectasy. *Advances in Health Sciences Education, 15*, 439–454.

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*, 32–42. doi:10.3102/0013189X018001032.

De Ketele, J.-M., & Gerard, F.-M. (2005). La validation des épreuves d'évaluation selon l'approche par les compétences. *Mesure et évaluation en éducation, 28*, 1–26.

Des Marchais, J. (2006) Les rôles-compétences CanMEDS. *Bulletin de l'Association des médecins de langue française du Canada, 29*, 8–10. Retrieved May 15, 2012, from http://www.amlfc.com/.

Driver, R. (1995). Constructivist approaches to science teaching. In L. Steffe & J. Gale (Eds.), *Constructivism in education* (pp. 385–400). Hillsdale, NJ: Lawrence Erlbaum.

Fernandez, N., Dory, V., Ste-Marie, L.-G., Chaput, M., Charlin, B., & Boucher, A. (2012). Varying conceptions of competence: An analysis of how health sciences educators define competence. *Medical Education, 46*, 357–365.

Frank, J. R. (Ed.). (2005). *The CanMEDS 2005 physician competency framework. Better standards. Better physicians. Better care.* Ottawa: The Royal College of Physicians and Surgeons of Canada. Retrieved August 14, 2012, from http://www.royalcollege.ca/portal/page/portal/rc/common/documents/canmeds/resources/publications/framework_full_e.pdf.

Global Consensus for Social Accountability of Medical Schools. (2010). Retrieved May 15, 2012, from http://healthsocialaccountability.sites.olt.ubc.ca/files/2011/06/11-06-07-GCSA-English-pdf-style.pdf.

Howe, A., Smajdor, A., & Stöckl, A. (2012). Towards an undertstanding of resilience and its relevance to medical training. *Medical Education, 46*, 349–356.

Jonnaert, P., Barrette, J., Boufrahi, S., & Masciotra, D. (2004). Contribution critique au développement des programmes d'études : compétences, constructivisme et interdisciplinarité. *Revue des sciences de l'éducation, 30*(3), 667–696. Retrieved August 14, 2012, from http://id.erudit.org/iderudit/012087ar.

Jouquan, J. (2007). From objective-based to competency-based approach. Should we have to throw out the baby with the bathwater ? *Pédagogie Médicale, 8*(4), 197–198. doi: http://dx.doi.org/10.1051/pmed:2007021.

Jouquan, J. (2009). L'évaluation de la qualité des formations: Au-delà des chiffres. In D. Bédard & J.-P. Béchard (Eds.), *Innover dans l'enseignement supérieur* (pp. 199–212). Paris: PUF.

Legendre, R. (2005). *Dictionnaire actuel de l'Education*. Montréal: Guérin.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.

Lurie, S. L. (2012). History and practice of competency-based assessment. *Medical Education, 46*, 49–57.

Malone, K., & Supri, S. (2012). A critical time for medical education: The perils of competence-based reform of the curriculum. *Advances in Health Sciences Education, 17*, 241–246.

Miller, G. E. (1990). The assessment of clinical skills/competence/performance. *Academic Medicine, 65*(Suppl 9), S63–S67.

Norman, G. (2005). Research in clinical reasoning: Past history and current trends. *Medical Education, 39*, 418–427.

Norman, G. R. (2006). Outcomes, objectives and the seductive appeal of simple solutions. *Advances in Health Sciences Education, 11*, 217–220.

Norman, G. (2011). CanMEDS and other outcomes. *Advances in Health Sciences Education, 16*, 547–551.

Parent, F., Baulana, R., Kahombo, G., Coppieters, Y., Garant, M., & De Ketele, J. M. (2011). A comprehensive competence-based approach in curriculum development: Experiences from African and European contexts. *Health Education Journal, 70*(3), 301–317. doi:10.1177/0017896910376229.

Parent, F., Kahombo, G., Bapitani, J., Garant, M., Coppieters, Y., Leveque, A., et al. (2004). A model for analysis, systemic planning and strategic synthesis for health science teaching in the Democratic Republic of the Congo: A vision for action. *Human Resource for Health, 7*(2), 16. doi:10.1186/1478-4491-2-16.

Reeves, S., Fox, A., & Hodges, B. D. (2009). The competency movement in the health professions: Ensuring consistent standards or reproducing conventional domains of practice? *Advances in Health Sciences Education, 14*, 451–453.

Sherbino, J., Frank, J., Flynn, L., & Snell, L. (2011). ''Intrinsic Roles'' rather than ''armour'': Renaming the ''non-medical expert roles'' of the CanMEDS framework to match their intent. *Advances in Health Sciences Education, 16*, 695–697.

Tardif, J. (2006). *L'évaluation des compétences. Documenter le parcours de développement*. Montréal, QC: Chenelière Education.

Van der Vleuten, C. P. M., Norman, G. R., & De Graaff, E. (1991a). Pitfalls in the pursuit of objectivity: Issues of reliability. *Medical Education, 25*, 110–118.

Van der Vleuten, C. P. M., Norman, G. R., & De Graaff, E. (1991b). Pitfalls in the pursuit of objectivity: Issues of validity, efficiency and acceptability. *Medical Education, 25*, 119–126.

Weng, H.-C., Steed, J. F., Yu, S.-W., Liu, Y.-T., Hsu, C–. C., Yu, T.-J., et al. (2011). The effect of surgeon and emotional intelligence on patient satisfaction. *Advances in Health Sciences Education, 16*, 591–600.

Whitehead, C. R., Austin, Z., & Hodges, B. D. (2011a). Flower power: The armoured expert in the CanMEDS competency framework. *Advances in Health Sciences Education, 16*, 681–684.

Whitehead, C. R., Austin, Z., & Hodges, B. D. (2011b). Intentions vs. unintended discursive consequences: Reflections upon Sherbino et al'.s commentary on ''Flower Power''. *Advances in Health Sciences Education, 16*, 699–701.

Wiggins, G. (1998). *Educative assessment: Designing assessments to inform and improve student performance*. San Francisco: Jossey-Bass Publishers.