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REVIEW ARTICLE

Competence and competency in higher education, simple terms yet with complex meanings: Theoretical and practical issues for university teachers and assessors implementing Competency-Based Education (CBE)

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ABSTRACT

Background/purpose – British, European and American universities are increasingly adopting competency-based learning, yet, there are different and conflicting definitions of competence, competency, and competency-based learning. Consequently, multiple interpretations and understandings are held by educators in respect of what these terms mean, when applied to their own teaching and assessment practices. Therefore, unless informed and considered discussion has taken place amongst staff about their individual understandings and interpretations, any development of new, competency-based assessment processes and procedures, is necessarily problematic. The main purpose of the paper is to stimulate reflection and discussion, so that teaching staff can arrive at a common understanding and interpretation of what competency-based education is, so that they may develop appropriate, authentic and equitable assessment processes.

Materials/methods – The methodology used was a systematic review of literature on competence, competency-based learning and the assessment of competency-based learning.

Conclusion – This paper provides an overview of the main issues and tensions involved in clearly defining competency within higher education programmes and assessing competence, along with two clear recommendations for practice. The recommendations have significance for all higher education teaching staff involved in programmes of competency-based learning.

Keywords – Higher education, competency, competence, competencies, assessment, competency-based learning.

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1. INTRODUCTION

This research project set out to investigate the nature of competency and competency-based learning in higher education and the key issues associated with it, particularly in respect of assessment. The main theoretical finding is that competency is a multi-faceted "essentially contested concept[s]" (Gallie, 1956, p. 169). The main practical findings for educators are: (i) that to implement competency-based learning in accordance with the theoretical literature, students need to be provided with very flexible assessment submission deadlines, and (ii) where the assessment of competence contributes to a student's qualification, in order to avoid confusion and provide a common understanding within teaching and assessment teams, it is essential for educators to very carefully consider how they interpret competence, and what they understand by the term 'mastery' of a competency.

Although debates around competence are now more than 30 years old it is timely to re-visit these, as universities would seem to have a current "fascination" with competency-based education (Lurie & Garrett, 2017, p. 1). There are numerous reasons for competency-based education, (hereinafter CBE), becoming increasingly popular in higher education. Book (2014, pp. 2-3), for example, suggests that CBE is

> Increasingly being embraced as a panacea for multiple pressing issues in higher education…often seen as having the potential to address accessibility, affordability, transparency, and improved learning outcomes, all relevant to graduate(s) employability.

Set against the contemporary background of a highly competitive, globalized economy, graduate employers and professional organizations have increasingly called for higher education institutions to ensure their graduates possess relevant competencies and skills (Sistermans, 2020). Whilst university subjects allied to Medicine have successfully used CBE and learning for many years (Cate et al., 2010, Weinburger et al., 2010) more widespread use of CBE and the assessment of competence is still in its relative infancy compared to assessment based on non-competence-based pre-specified learning outcomes. In response to the demands for competent, skilled and 'job ready' graduates a growing number of universities are introducing CBE (Nodine, 2016, Sistermans 2020), often accompanied by greater use of online learning (Burnette, 2016). Yet there are multiple different understandings and interpretations of the terms 'competent', 'competency' and associated 'competencies' (Halász, & Michel, 2011, Rasmussen et al., 2017). This paper explores some of the perspectives in the literature on competence and competency and the implications for assessment practices, so that educators may then critically reflect on their interpretation and develop a more informed and nuanced understanding. Through doing so, they will be better able to make their own distinctions and decisions about how they may be defined and assessed in the curricula they are responsible for, therefore ensuring the practicable development of equitable and authentic assessment processes in new programmes of CBE.

In the context of university education there has been a long-standing debate around the belief that one of the defining characteristics of higher education is that it aims to enable learners to go 'beyond competence', because this distinguishes higher education from training. As far back as 1996 Jarvis (1996, p. 42), suggested that a "crude division between education and training" existed, with education occupying the moral high ground and training the lower. In the UK this moral high ground still exists in contemporary academia,

albeit to a lesser extent, as some academics identify competency-based assessment with pre-university level vocational learning and training. As Strivens et al., (2014, p. 5), from a pan-European perspective note:

> In some sources, competency is used in such a way as to be synonymous with skill. This usage implies an organized, repeatable action but critics have pointed out that this way of using the term can imply little cognitive content. There has been resistance because of this to using the term 'competency'…in higher education and higher levels of professional learning.

Despite this, in response to the demands of employers and the global graduate employment market, CBE has, firmly established itself, with many UK, European and American universities, increasingly introducing competency-based programmes and competency-based models of teaching and assessment across a wide range of disciplines (Rasmussen et al., 2017, Sorensen Irvine, & Kevan, 2017). Yet, whilst higher education institutions seek to implement CBE more widely, individual staff within them may not be fully cognizant of the requirements of CBE, nor indeed what competency involves, or specifically involves within their discipline. As Wagenaar (2014, p. 294) argues, "Day to day practice shows that many academics (still) have difficulties in distinguishing the concepts of competenc(i)es".

2. LITERATURE REVIEW

2.1. Defining competency and the implications for assessment

In everyday use, the terms competence and competency are generally understood as having the same meaning, with competence being an alternate noun form of the verb competent. The terms may be used interchangeably and are concerned with performance in accordance with certain specified standards (Khan and Ramachandran, 2012). Competence will usually refer to a *general* ability to do something (such as, 'to ride a motorbike'), whilst competency will refer to the ability to do a *specific* thing (such as, 'to ride a motorbike at an average speed of over 120mph around the Isle of Man TT circuit'). Competency particularly refers to a person's performance and/or their production of a product/artefact as evidence of that performance. Yet, competence and competency are concepts with many varied, sometimes convoluted, interpretations and explanations that typically vary due to the perspective from which they were developed, such as, for example, teacher Education, Human Resource Development, vocational training, and other discipline-specific origins. As Halász and Michel (2011, p. 291) suggest:

> There is some vagueness in the terminology used in different contexts and by various stakeholders: notions such as competence, competency, skill, ability, know-how, capacity, capability and aptitude are used or associated with different meanings according to the context and are sometimes considered as more or less equivalent. Moreover, in many countries, it is difficult to make a clear distinction between skills and competences or competencies.

Strivens et al., (2014) writing for the European Union E-portfolio competency recognition and accreditation framework argue that competency refers both to functional performance and (over time) expert application. Competency is not just a student's

demonstration of knowledge and understanding of a subject; it requires a clear demonstration of the application of that knowledge and understanding. Competency is not passive knowledge. To demonstrate it there must be an output - a product, or a performance; it is not sufficient for a learner to demonstrate factual knowledge alone. This is an important factor that needs to be considered in the design of assessment processes and procedures, so, for example, a traditional essay or written examination could not be used to demonstrate competence as there would be no actual demonstration of application. In the same way that understanding how to ride a motorcycle and being able to explain this to someone is not the same as being a competent motorbike rider, an essay explaining the understanding of theory and the application of that theory, is not the same as actually demonstrating the use of that theory in a real-world situation.

Khan and Ramachandran, (2012, p. 922), recommend that, "the term competency should strictly be used for the skill itself while competence is the ability to perform that skill and the attribute of the performer". As such, a competence may be seen to be much broader than a skill (Rychen, and Tiana, 2004). In simple terms, competence focuses on the 'what' and competency focuses on the 'how'. In other words, competency represents the integration of knowledge, skills, values and attitudes that allow a person to be competent in a specific situation or task. Competency being the *ability* to perform a task or tasks, and competence being the *actual performance* (Chapman 1999, Manley and Garbett 2000, McConnell 2001). This 'what' and 'how' distinction between competence and competency serves as a very useful and simple way of distinguishing the two for assessment purposes. It can be applied within a disciplinary context and is one that educators can use easily to separate them when designing new processes and procedures of assessment. For any assessment, what is assessed is the student's competence – a learner's demonstration of their competency; their competency *per se,* is not assessed.

Although often used synonymously with 'skill', competence also refers to a person's ability to use and apply knowledge and skills in an independent and self-directed way (European Commission, 2016). Here, it is the individual's ability to be competent, without being told where and when to be by another person. In the European Qualifications Framework (EQF), competence is largely described in terms of individual responsibility and autonomy. Emphasis is placed on the importance of self-directed and independent learning. Competency is therefore seen by some educators as inherent to student independence and the development of autonomy in learning and lifelong-learning. Although the assessment of learner autonomy is not without its own difficulties (Holmes, 2018), the development of independent and self-directed learning has an extensive literature base that can be called upon by educators when developing new programmes of CBE (see, for example: Knowles, 1975, Mezirow, 1985, Merriam & Caffarella, 1999, Caffarella, 2000, Hiemstra, 2000).

2.2. Generic and specific competences

Competences may be generic or subject/discipline-specific (Eraut, 1994), with generic ones being valid across different contexts and specific ones those linked to particular areas of practice. The European Key Competence Framework and the European Qualifications Framework (EQF) act as a bridge between national qualification systems and have been mandatory for all new qualifications in Europe since 2012. Its eight levels distinguish between knowledge, skills and competence in the following way. Knowledge refers to theoretical or factual information and the outcome of the assimilation of information through learning. Skills (cognitive or practical) refer to the ability to apply knowledge and use

know-how to complete tasks and solve problems. Competence here means the 'proven ability' (European Commission, 2015) to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. Unfortunately, the term 'proven' may be interpreted differently by educators and assessors as either meaning a one-off demonstration, or as a longer-term track record of having demonstrated something repeatedly on a number of occasions and in a range of different contexts. For assessment purposes, it is necessary for educators to consider how they interpret the term 'proven', as this has implications both for the number and type of assessments used and student assessment submission points within a programme of study. Typically, for assessment purposes, proven should refer to more than a single one-off demonstration.

In their conceptual study of competences and competencies, commissioned by the Education Council of the Netherlands, Merriënboer et al., (2002) suggest that both terms have considerable elasticity and are, in practice, difficult to distinguish from others such as key qualifications and concepts such as 'expertise'. They emphasize that competencies should *always* be related to a particular specified domain or profession and are a combination of three elements: (1) complex cognitive skills, (2) interpersonal skills, and (3) attitudes that allow someone to demonstrate competent behaviour in a particular domain or profession. Importantly, they identify that the ratio between these three elements per competency can vary. This relation between knowledge, attitude and skills and the context of a task is important, and for assessment purposes, should be allowed for, at degree programme and module level, when implementing CBE.

2.3. Distinguishing different types of competency

Redding (2016, p. 6) defines a competency as a "defined cluster of related capabilities (skills and knowledge) with methods and criteria to determine the degree to which a person demonstrates mastery in them". He provides a useful categorization of educational competencies into three types: personal, academic, and career/occupational. In respect of personal competencies, Redding (2014) suggests that these are constantly evolving and accumulating related capabilities that help facilitate future learning. In respect of personal learning (personalized learning competencies and personalised learning) his work identifies four different categories of personal competency. (1) Cognitive competency - what we know. Prior knowledge which facilitates new learning; broad knowledge acquired in any context, accessible in memory to facilitate new learning, with a sufficient depth of understanding to expedite acquisition of new learning. (2) Metacognitive competency - how we learn. Self-regulation of learning and use of learning strategies. (3) Motivational competency - why we learn. Engagement and persistence in pursuit of learning goals. (4) Social/Emotional competency - who we are. Sense of self-worth, regard for others, emotional understanding and management, including the ability to set positive [learning] goals and make responsible decisions. Unfortunately, it is the case that, for assessment purposes, whilst cognitive competency is (relatively) easy to assesses, the other three are complex and do not readily lend themselves to being assessed easily. How, for example, may we authentically assess a learner's sense of self-worth? As such, the framework, although useful in providing context for personalised learning and competency, may not, without detailed re-interpretation and disciplinary contextualisation, be of immediate practicable use when developing new assessment processes and procedures. Yet in some respects, the more that competency is

broken down into detailed constituent elements, then the more problematic its assessment becomes.

However, Redding's work also suggests (2016, p. 6) that

> A competency is identified and its boundaries defined by specifying the specific skills and knowledge contained within it…the competency would be further defined by itemizing the measurable or observable skills and knowledge that constitute it. Finally, the competency's definition would include criteria and methods for determining mastery of the competency's constituent skills and knowledge, and the assessment would include demonstration or application.

Here, a competency is seen as a cluster of related capabilities (skills and knowledge), that encompasses the methods and criteria to determine the extent to which a person demonstrates mastery of them. This does provide a fairly comprehensive working description of what a specific competency should comprise. Educators can take this forward within their own fields and the programmes for which they are responsible when developing authentic assessment processes.

2.4. Competency as 'mastery'

Within the discourse on competency, the term 'mastery' is frequently found (Nodine 2016, Redding 2016, Curry & Docherty, 2017, Levine & Patrick, 2019). Yet, unfortunately, the term 'mastery', as with 'proven', is open to interpretation. And there is a long-standing debate as to whether or not competence and mastery are actually the same (see Guskey and Anderman, 2013). Some may interpret mastery as involving and requiring a repeated [very] high level of proficiency as demonstrated by an expert in their field, whilst others may identify it as equating to successfully completing a task once, at a threshold performance level. In respect of the latter position, for assessment purposes, there is a general agreement within the literature than more than one demonstration of mastery is required. Redding (2016, p. 8), for example, clearly argues that a single successful demonstration of attainment of a competency is insufficient.

> True mastery in a competency must be determined by examining the student's facility with an array of skills, understanding of overarching concepts, and ability to perform over time rather than to achieve a peak performance on a single test.

The practical implication here is that the assessment of competence requires multiple assessment points over a period of time during the academic year. A single end-of-semester exam, essay, or other form of assessment, as currently practiced throughout much UK and European higher education, would simply not be adequate to assess a student's competence.

Much of the literature on CBE (see, for example, Nodine, 2016, Curry & Docherty, 2017, Levine & Patrick, 2019) identifies that mastery in a defined competency is demonstrated according to pre-set criteria "without regard to time, place or pace of learning" (Redding, 2016, p. 8). Three important points should be noted here. Firstly, there is a requirement for pre-determined/specified criteria which a learner needs to demonstrate in order to achieve mastery. Secondly, that individual student learning that has taken place outside of the university environment should be allowed for. Thirdly, that it is in broad alignment with

Bloom's (1981) concept of 'mastery learning', in which students are allowed as much time as they need to learn something in order to master it. The issue of time is not a simple one. Within the majority of UK and European higher education programmes assessment points are usually fixed in advance and universities have clearly defined academic years with start and completion points. Students do not have an unlimited amount of time to demonstrate their mastery of any competency. They have very little, if any, flexibility or choice in deciding when to submit their assessed work (Holmes, 2019a), therefore, unless this is considered in the design of a programme of study and the associated assessment procedures, it may not be possible to take account of this fundamental underpinning requirement of CBE. The clear implication is that teaching and assessment teams implementing CBE therefore need to examine student assessment submission points both within the academic year and across academic years carefully and re-structure them to allow for much greater flexibility than currently, typically exists. To implement such flexible systems will necessarily involve a considerable overhaul of existing departmental and institutional procedures and associated time and costs involved in doing so.

2.5. Challenges of Competency-Based Education

One of the further challenges of assessment within CBE is that there is, unfortunately, no commonly accepted definition of precisely what CBE is (Book, 2014, Le, Wolfe, & Steinberg, 2014). Gervais (2016, p. 98) recently suggested that there was "no standard definition of competency-based education and agreement on the criteria that encompass this model". Yet, despite this, several organizations and researchers have identified its essential characteristics. Surr and Redding (2017), suggest that the most essential features of CBE are that (1) students advance on the basis of mastery, (2) competencies include explicit, measurable, transferable learning objectives, (3) assessment should be a meaningful and a positive learning experience for learners, (4) students should receive timely, differentiated support according to their individual needs and (5) learning outcomes should emphasize competencies that include the application and creation of knowledge, along with the development of relevant skills and dispositions.

At its heart, CBE encompasses a personalized approach to education that awards academic credit on the basis of a student's demonstrated mastery of competencies, irrespective of how long that learning takes (Surr & Rasmussen, 2015). Yet, as previously discussed, in the majority of contemporary higher education programmes students cannot take as long as they like to demonstrate their mastery. There are fixed assessment points (Holmes, 2019a), fixed examination boards, and fixed graduation points. University curricula may well be designed and organised in a way that competencies are integrated, yet if students are assessed in accordance with pre-set time scales and deadlines this will negate the personalized approach that is fundamental to CBE.

In 2016 Gervais (p. 98) suggested that, because much greater emphasis was increasingly being placed on outcome-based education in universities, the creation of a universal definition of CBE was "imperative". Based on an extensive review of the literature and interviews, he developed the following operational definition:

> An outcomes-based approach to education that incorporates modes of instructional delivery and assessment efforts designed to evaluate mastery of learning by students through their demonstration of the

> knowledge, attitudes, values, skills and behaviours required for the degree sought.

This definition serves as a useful reference for the design and development of CBE programmes (assuming that educators have a common understanding and interpretation of the term 'mastery').

Within a CBE approach, students are not seen as passive consumers of knowledge, but co-producers of it. As such, it is usually regarded as being a co-constructivist model of learning. Hoskam (2006) suggests that CBE is firmly rooted in social constructivism - learning as an active, constructive, cumulative, goal-oriented, reflective and diagnostic, contextual, and social process. This suggests that assessment procedures need to be closely aligned with constructivist approaches to learning (Holmes, 2019b). In contrast to Hoskam (2006), Gervais (2016) argues that CBE is a more eclectic model based on multiple learning theories that include behaviourist, functionalist, and humanistic models of learning. He suggests it is a combination of liberal arts education and the professional education movement, with the professional education movement placing emphasis on practical preparation for a profession. Importantly, he supports the position that, in order to be able to apply theory to practice, students first have to learn the theoretical foundations of a discipline in order to be able to understand *how* to apply their learning to practice (Tyler, 1976, in Gervais, 2016). From this perspective, CBE may be seen to be *discipline-based*, with the existing disciplinary frameworks and contexts informing and shaping the more practically based application and subsequent assessment of student competence.

As an alternative to CBE, Le et al., (2016, p. 3) use the term 'competency education' and consider it to be:

> Synonymous with competency-based, mastery-based, and proficiency based education, referring to educational approaches that prioritize the mastery of learning objectives regardless of how long it takes.

Here again, we see the influence of Bloom's concept of mastery learning and the importance of allowing individual students as long as they may need in order to demonstrate their competence. Yet, from a practical perspective we may also anticipate the difficulties that arise with higher education's existing assessment systems of pre-determined fixed assessment points in the academic year that (i) do not allow students to take as long as they need to achieve a learning objective and (ii) do not allow for multiple repeated opportunities to demonstrate their mastery.

Le et al., (2016) explain that, despite there being differences between the various models of CBE, certain pedagogical characteristics are essential. They identify three specific features they consider to be fundamental to any competency-based model. (1) Mastery; students advance to the next level, course, or grade based on demonstration of skills and content knowledge that is outlined in clear, measurable pre-specified learning objectives that hold all students to the same academic standard. (2) Pacing; students progress at different rates in different areas, rather than determined by a teacher-driven, class-wide schedule. Students who do not demonstrate mastery of a competency on the first attempt continue learning and have multiple opportunities to try again. (3) Instruction; students receive customized support to match their individual learning needs in order to keep them learning increasingly challenging material in a developmentally appropriate and motivating manner and to ensure that those struggling in any area will be able to reach proficiency.

The issue of different interpretations and associated difficulties associated with (1) 'mastery' has already been discussed, as have some issues associated with (2). Pacing, allowing students to progress at different rates, is extremely problematic in respect of the current way that pre-specified learning outcomes with fixed assessment points are used in UK and European universities (see Holmes, 2019a). If educators wish to introduce CBE programmes, then the use of the same fixed assessment point for all students studying a module will need to be removed and a much more flexible range of submission points introduced. In theory, individually negotiated assessment submission points may be needed for every single student and these may need to span different academic years. Similarly, if a student fails (i.e. does not demonstrate their competence of a specific competency), then multiple further opportunities for assessment submission need to be allowed. In the UK and much of Europe the majority of university programmes currently only allow students one single submission of an assessed piece of work, and other than in continuous-assessment approaches, this is typically at the end of a semester. Typically, only one re-submission, or re-take, of a failed module or assignment is usually allowed. Yet within a CBE programme more than one assessment submission point is not just something to be allowed, but is a necessary requirement and perhaps *unlimited* submissions need to be catered for, because each individual student will take a different amount of time to achieve 'mastery' of a specific competence. Effectively, what is required are individually negotiated and agreed assessment submission deadlines for every single student. To introduce such procedures would be a serious administrative challenge for many universities. Similarly, addressing point 3 (Instruction), introducing customized or personalized support to match individual student need would be prohibitively expensive and take up a not inconsiderable amount of academic staff time. It may be unmanageable in the contemporary marketized mass system of higher education. Yet CBE clearly requires this if it is to be incorporated into, or to replace, existing pedagogical approaches.

3. CONCLUSION AND SUGGESTION

Concluding remarks and implications for practice for university teachers and assessors implementing CBE

It is the authors' view that competence, competency and 'mastery', may well be "essentially contested concept[s]" (Gallie, 1956, p.169) i.e. things that may be *impossible* to conclusively define, but perfectly possible and rational for people to discuss and justify their holding of one interpretation rather than a competing one. Yet, despite this, where the assessment of competence contributes to a student's qualification, in order to avoid confusion and provide a common understanding within teaching and assessment teams, it is essential for educators to very carefully consider how they interpret competence, and what they understand by the term mastery of a competency, both individually, and collectively. There is a substantial body of literature on competence, competency and CBE in Nursing, subjects allied to Medicine and the discourse on vocational education and specific professions (see, for example, McGahie and Lipson, 1978, Merriënboer et al., 2002, Mulder, 2017, Rassmusen et al., 2017). There are many competency-based assessment frameworks and guidance available (see work by Bers, 2001, Cheng et al, 2005, Baartmen et al., 2006, Strivens et al., 2014, McClarty and Gaertner, 2015 and many of the Tuning Academy projects http://tuningacademy.org/). This body of work can be used to inform understanding in other disciplines and help educators develop disciplinary-specific competencies, so educators do

not need to 're-invent the wheel' when designing and implementing teaching and assessment procedures.

Educators do need to collectively understand *how* they interpret competence and competency, *what* it means to be competent in their discipline, what mastery of a specified disciplinary competency involves, the implications for the pedagogical approach they use, the assessment processes used and the assessment procedures they develop, along with scheduling and flexibility of assessment submission points throughout the academic year. Introducing any form of CBE into the curriculum is not simply a matter of re-writing and re-validating existing programmes of study. Teaching staff need to spend time collectively discussing how they will develop authentic assessment processes and procedures in order to be able to assess the competencies they deem to be essential and appropriate for the programmes of study they deliver and the different levels of study within each programme. It is therefore strongly recommended that, before implementing any competency-based curriculum, or any assessment involving a student's demonstration of competence, thorough discussion is conducted and a common understanding and definition of the terms agreed amongst all staff involved in teaching and assessment.

Serious consideration must be given to removing fixed deadline assessment points within the curriculum and introducing much more flexible assessment submission deadlines, that are negotiated and agreed with individual learners, and with the recognition that some students will need multiple repeated opportunities to demonstrate their mastery of a specific competence. The caveat being that, to do this would require major changes to the existing administrative and academic procedures within universities.

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