

Title:

Outcome-based education in undergraduate medical education

Authors: Anne Mette Morcke, Tim Dornan, Berit Eika

Institution: Aarhus University, Denmark, and Maastricht University, the Netherlands

Extended abstract

This extended abstract is a critical discussion of outcome- and competency-based education (OBE) based on a literature review exploring the historical origins, theoretical basis, and empirical evidence of OBE in undergraduate medical education (Morcke et al., 2013). At the ICED conference, we would, furthermore, enjoy discussing the extent to which our findings are relevant to other higher education settings. The terms outcome-based education and competency-based education describe educational models, which differ in detail, but share the assumption that education should be guided by predetermined outcomes. Since the introduction of OBE to undergraduate medical education 15 years ago, the approach has been adopted internationally. Not every author has been convinced, however, that OBE provides a comprehensive solution for the future of medical education. Malone and Supri (2012) wrote that experience suggests that the uncritical application of OBE to medical curricula may not achieve the intended aims. The editor of *Advances in Health Sciences Education* asked the research community: “How strong is the link between teaching, learning, and performance outcomes?” (Norman, 2006). We set out to contribute to Norman’s call and try to answer the question: How can predetermined learning outcomes influence undergraduate medical education?

This review has three parts: First, we traced the movement back, identifying why OBE was first recommended; second, we reviewed underlying conceptual frameworks and theories; and third, we examined the available empirical evidence base. In the first part of the review we traced why OBE was first recommended. This was based on a re-reading the classical educational literature, the literature specific to medical education which recommended OBE from the end of the twentieth century, and finally the very influential recent advocates. In the second part of the review we discussed underlying conceptual frameworks and the terminology in OBE. Finally, in the third part of the review we examined the available empirical evidence base by systematically searching research publications to answer the question: How do predetermined learning outcomes affect learning and teaching in undergraduate medical education?

First, when tracing the movement back, it became clear that OBE has been advocated for over 60 years. The theoretical orientation of early OBE was towards behaviourism and the basic idea of emphasizing educational objectives was formed by Tyler as early as 1949 (Tyler, 1949). Curriculum design should be determined by explicit objectives expressed in terms of the changes the learning was supposed to produce in the behaviour of students. Very early Bloom and colleagues classified the cognitive learning objectives into knowledge, skills,

and attitudes (Bloom 1956). This first wave of advocacy came to a head in the 1970's (Bloom 1968; Gagné & Briggs, 1974; Mager, 1962). By the mid-1970's, the tide was turning against OBE. Critics rejected that the only way to organise a curriculum was to pre-specify outcomes and pointed to the importance of the development of values, insight, and judgement (Stenhouse 1975). However, OBE was revived in the 1980s focusing on the same benefits as the first wave of advocacy: assessment and accountability (Spady, 1988). The revival was not based on any new theoretical insights and adhered to the behaviourist principles of the earlier competency movement.

At the turn of the millennium, OBE was vociferously advocated for medical education via influential American and Canadian organisations (Albanese et al., 2008; Neufeld et al., 1998). Inspired primarily by Spady, Harden and colleagues (1999) also advocated OBE in Europe. Curriculum, activities, assessments, and programme evaluation should follow logically from an unambiguous outcome specification: "OBE has two requirements. First that the learning outcomes are identified, made explicit and communicated to all concerned (...). Second, the educational outcomes should be the overriding issue in decisions about the curriculum." This advocacy was followed by global implementation of OBE in medical education. Publications showed it was possible to meet the first requirement of OBE, to define the learning outcomes of medical education across the world (Simpson et al., 2002; Frank & Danoff, 2007; Cumming and Ross, 2007). However, the widespread implementation of OBE re-aroused more or less the same critique, as was heard in the 70's (Hodges, 2010; Prideaux, 2004; Rees, 2004; Talbot, 2004) and the second requirement was much harder to meet. Whilst strongly endorsing OBE, the Flexner centenary report noted two important, unresolved issues (Cooke et al., 2010). The first was how to define and assess for example humanism, altruism, ambiguity, curiosity, commitment. The second issue was how to promote excellence when competencies are targeted at "good enough" performance.

It is striking how vigorous and alive the discussion of OBE remains more than 60 years after the invention, implementation, rejection, revival, advocacy and critique cycles began. Another striking feature of the discourse of OBE is that individual teachers and learners are more or less unrepresented in it, except as objects of regulation. The rationale for adopting OBE is almost entirely expressed in terms of assessment and accountability, with little direct link to teaching and learning.

Turning to the second part of the review, the underlying conceptual frameworks and the terminology in OBE, it became even clearer that also the theories underpinning OBE are tightly linked to assessment and regulation of proficiency. The terminology used in OBE is unfortunately not clear, but it can be reconciled (Fernandez et al., 2012; Shumway and Harden, 2003). Outcome-based and competency-based education share a main focus on the product, as opposed to the process of education. According to Albanese et al. (2008), the difference between outcomes and competencies is in the words "want" students to have and "need" students to have respectively. In the large Bologna Tuning Project the terms were used more or less interchangeably (Cumming and Ross, 2007). Having found no essential difference between outcome- and competency-based education in practice; we have aligned ourselves with Hodges (2010) in using the term OBE to refer to both.

Furthermore, it seemed there is a theory gap in OBE between defining outcomes and supporting the teaching and learning activities. Part of the gap could be filled by Biggs' & Tangs' (2007) constructive alignment curriculum framework emphasising outcomes, teaching-learning processes, and assessment. Constructive alignment calls for intended learning outcomes to be stated clearly and unambiguously. It puts a strong emphasis on assessment systems that call for learners to demonstrate proficiency in the intended learning outcomes. Teaching-learning activities should be planned in such a way as to increase the

likelihood of students being assessably proficient in the learning outcomes. The approach has been predicted to foster a deep approach to learning and broadens the theoretical foundation of OBE to include the learning process. It can be argued, however, that the alignment framework also narrows learning to observable behaviours and one could question if OBE has moved beyond its behaviourist origins. Having looked in vain for a contemporary learning theory, which could reconcile society's demand for doctors to show complex and affectively-laden personal and professional attributes with OBE, whose focus is on assessing demonstrable aspects of competence, it seemed logical to go back and scrutinise the basis on which OBE has been so strongly recommended. No new theory lay behind the second cycle of advocacy and OBE is no closer to providing a curriculum framework for the complex elements of professionalism than it was in the 1970s.

Therefore, in the third part of the review we examined the available empirical evidence base. A review by Carraccio and colleagues (2002) summarised the research published up to the millennium and concluded that evidence behind OBE in medical education was weak. We searched the relevant databases covering 1999 – 2010 for papers 1) concerning undergraduate medical education, students, or teachers, and 2) investigating learning outcomes, and 3) providing data from an experiment or observation, and 4) reporting the influence, effects, or impacts on teaching or learning. The search resulted in 2,168 hits, of which 8 papers could be included. One single qualitative study addressed how learning outcomes influenced medical teachers' teaching and found that school level learning outcomes influenced teachers' course planning while lesson level outcomes influenced their teaching (Bolander et al., 2006). On the negative side, the study indicated that teachers with a richer view of expertise, who encouraged learning by participation, might be limited by a focus on outcomes. The other seven included papers concerned students. One study showed that learning outcomes promoted active learning, although the number of participants was small and the result was not statistically significant (Gonzalez et al., 2004). Outcomes led students to be better prepared for teaching sessions (Waydhas et al. 2004) and resulted in higher scores (Kuo and Slavin, 1999). In three other studies, learning outcomes were part of complex curriculum interventions, which made it hard to determine their independent contribution. These studies showed increases in students' self-evaluated competence and confidence (Brody et al., 2004; Jacobs et al., 2005; Lai and Ramesh, 2006). Finally, there was one important, negative finding from a study, which asked students how they used course objectives, exam blueprints, and the content of teaching sessions for examination preparation (McLaughlin et al., 2005). Only 34% of students used the course objectives and they were significantly less likely to have above-average test scores.

In conclusion, OBE has its theoretical origins in the behaviourist psychology of Tyler and his successors. The last 60 years have seen two clear cycles of advocacy, then critique, of OBE. By the turn of the millennium, advocacy for OBE in medical education had moved from being supported by theoretical argument to appeals to common sense, backed up by authority pronouncements from regulatory bodies. The implementation of OBE in undergraduate medical education has not been followed by substantial research on the impact of learning outcomes on teaching and learning medicine. Thus, the empirical evidence behind the benefits of OBE in undergraduate medical education is still inconclusive. How can predetermined learning outcomes influence undergraduate medical education? We suggest that OBE lends itself to tidying up those parts of educational practice that can be tidied up, but its danger is that inappropriate application could devalue those parts that are inherently 'messy'. The single most pressing scholarly task identified by our review is to examine OBE from theoretical perspectives other than behaviourism: cognitive and social theory for

example. Studies concerning ‘how does OBE work, for whom, and in what circumstances?’ are sorely needed.

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