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Beyond the Medical Model: Thinking Differently about Medical Education and Medical Education Research

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ABSTRACT

Issue: In medical education, teaching is currently viewed as an intervention that causes learning. The task of medical education research is seen as establishing which educational interventions produce the desired learning outcomes. This 'medical model' of education does not do justice to the dynamics of education as an open, semiotic, recursive system rather than a closed, causal system. *Evidence:* Empirical 'evidence' of 'what works' – that is, what is supposed to affect 'learning' – has become the norm for medical educational improvements, where generalized summary outcomes of research are often presented as must-follow guidelines for myriad future educational situations. Such investigations of educational processes tend to lack an explicit engagement with the purposes of medical education, which we suggest to understand in terms of qualification (the acquisition of knowledge, skills, and understanding), socialization (becoming a member of the professional group) and subjectification (becoming a thoughtful, independent, responsible professional). In addition, investigations of educational processes tend to rely on causal assumptions that are inadequate for capturing the dynamics of educational communication and interaction. Although we see an increasing acknowledgement of the context-dependency of teaching practices toward educational aims, the currently prevailing view in medical education and educational research limits understanding of what is actually going on when educators teach and students participate in medical education – a situation which seriously hinders advancements in the field. *Implications:* In this paper, we hope to inform discussion about the practice of medical education by proposing to view medical education in terms of three domains of purpose (professional qualification, professional socialization, and professional subjectification) and with full acknowledgement of the dynamics of educational interaction and communication. Such a view implies that curriculum design, pedagogy, assessment, and evaluation should be reoriented to include and integrate all three purposes in educational practice. It also means that medical education research findings cannot be applied in just any teaching context without carefully considering the value of the suggested courses of actions toward the particular educational aims and teaching setting. In addition, medical educational research would need to investigate all three purposes and recognize the openness, semiotic nature, and recursivity of education in offering implications for teaching practice.

KEYWORDS

Medical education; medical education research; medical model; language of learning; education as open system

Introduction: medical education and the medical model of practice and research

In the wider field of educational research and practice it has become quite common to refer to a particular understanding of the dynamics of education as the 'medical model.'[1–5] This phrase is used to refer to the idea that teaching is an intervention to bring about learning in students. Some formulations even speak about teaching as the cause of such learning and see education as nothing but the production of measurable 'learning outcomes.'

This view of education, which actually relies on a rather simplistic understanding of the complexities of medical practice itself,[6] has generated a prominent line of educational research. In this research, the focus lies on finding the most effective ways in which

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teaching can bring about intended learning outcomes. The idea here is that research should find out 'what works' and that teachers should base their classroom practice on such evidence, either by simply following what the evidence tells them to do or by making sure that their actions are informed by the latest research evidence. Within the field of education there are ongoing discussions about the possibility and desirability of such an approach.[4–8] Policy makers nonetheless often seem quite keen to steer educational research and educational practice in the direction of such a medical model.

Medical education and its related research field have, over the past two decades, also adopted the medical model.[1,2,7,9] Medical educational *practice* relies heavily on the idea that teaching in some way causes learning. In this view, teaching is understood as an intervention that produces learning outcomes (see for example the definition of teaching as "the design and implementation of activities to promote learning" in Fincher and Work,[10(p293)] based on Smith[11]). The customary rationale here is that better teaching causes better learning, which provides for better patient care, which in turn improves patient outcomes (see for example, Chen, Lui, and Martinelli;[12] Harden et al.[9]).

In keeping with notions of teaching as an intervention and learning as the effect of that intervention medical educational *research*, following the logic of the medical model, looks for correlations between interventions and outcomes.[13] Current medical education research is predominantly designed to provide proof that particular teaching practices 'work'. It aims for "generalisable simplicity" to foster application in a wide range of contexts.[13(p31)] Despite being contested for their limited significance in educational contexts,[4–6,8,13,14] randomized controlled trials are still held in high regard in medical education research.[3,15] Building on analyses of teaching effects on learning, meta-analyses, and systematic reviews are frequently presented as guidelines for future educational situations[16,17] – see, for example, the field's renowned AMEE guides.

At one level the medical model of education looks quite plausible. After all, teachers do intervene with their teaching and they do so for good reasons as they want their students to learn. Moreover, if teachers can enhance the effectiveness of what they do, students definitely are to benefit. While at a superficial level this may make sense, a closer inspection begins to reveal several problems. In this paper we aim to identify two main problems of the medical model. The first has to do with the rather bland reference to 'learning' as what education is supposed to bring about. The second concerns the rather simplistic assumption that there is some kind of causal connection between teaching and learning and that the main task of research is to make this connection more secure and more effective.

We are raising these two points within the context of medical education, first and foremost in order to inform discussion about the practice of medical education. We are also concerned, however, that because much *medical* research focuses on questions about effectiveness, there may be a strong pull for medical *education research* to emulate such an approach where it concerns matters of education. Our paper is therefore also meant to open up a discussion about adequate forms of research for informing the practice of medical education *beyond* the medical model.

What is education? And what is it for?

To suggest that the medical model amounts to a too simplistic representation of the dynamics of education, raises the question of what these dynamics actually are and, before that, what education actually *is*. The now ubiquitous language of 'teaching and learning' – used so easily that it often feels as if 'teachingandlearning' has become one word – seems to be a concise and meaningful summary of what education is about. After all, education involves teachers and thus some form of teaching and it seems plausible to assume that the activities of teachers are intended to bring about learning in their students.

However, one key problem with the suggestion that teaching is there to bring about student learning is that the language of learning is not sufficiently precise. After all, students can learn many things when they are in educational settings, just as they can learn many things outside of those settings. The whole point of education, however, is not to ensure that students learn, but that they learn *something*, learn it *for a reason*, and learn it *from someone*. Education thus always raises questions about content, purpose, and relationships – the three 'elements' that in a sense constitute education. These questions are often absent when we just describe education in terms of 'teaching and learning', or when, in research, we seek to find out which factors impact on 'student learning'.

With regard to content, purpose, and relationships it can be argued that the question of purpose is actually the first question that needs to be addressed. If one is not able to articulate what particular

educational activities and arrangements are *for*, there is no way in which one can decide which content students should engage with and what kind of relationships will be most conducive for what one seeks to achieve. What makes education particularly interesting is that it is not oriented toward one purpose or domain of purpose, but that all education needs to engage with three 'domains of purpose'[1] (see, e.g., Biesta,[18] Bruner,[19] Egan,[20] and Lamm[21]). The first domain of purpose for education is that of *qualification*, which is about providing students with knowledge, skills, and understanding that will qualify them to do 'something.' This 'something' can be narrow, such as in the case of becoming qualified for a particular job or profession – which is, of course, key in the field of medical education – or it can be conceived more widely such as the role schools play in providing young people with the knowledge, skills, and understandings for living their life in complex modern societies.

The purpose of education is, however, not confined to qualification. Education also has an important role to play in the domain of *socialization*. Socialization is about providing students with an orientation in particular fields or domains including vocational and professional domains. It is about initiating students into the ways of being and doing, the norms and values of particular social, cultural, practical, or professional traditions. This is intended to give students a sense of direction in such traditions and practices and also contributes to developing a sense of identity by becoming part of particular traditions and practices. There are stronger forms of socialization where the ambition is to make sure that students follow the rules and regulations and adopt the particular norms and values of the practice or tradition. Here identities are prescriptive. Some medical specialist groups, for example, may be known for their specific ways of doing and being (e.g., Musselman, MacRae, Reznick, and Lingard[22] on surgical education). In those cases medical education plays a key role in students' becoming part of such ways of doing and being. There are, however, also more 'open' forms of socialization aimed at giving students a sense of direction, but giving them opportunities to find their own role and position within such traditions and practices. In addition to becoming competent – the acquisition of knowledge and skills – such opportunities create room for questions about professional identity: how one wishes and should understand oneself as a competent practitioner.

It could be argued that qualification and socialization are, to a large degree, done 'to' students. We teach students knowledge, skills, and understanding and check through assessment whether they have acquired this successfully. Similarly, we teach them the ways of doing and being of particular practices and assess whether they have adopted these successfully. This, however, is not all there is to education. We do not want our students to end up as objects with knowledge, skills, values, and norms. We always aim for them to end up as subjects in their own right; as individuals who can make up their own mind, draw their own conclusions, and take responsibility for their actions. This is captured in the domain of *subjectification* where we encourage and support our students to become subjects of their own action. Subjectification thus has to do with key educational ideas such as agency, autonomy, and responsibility.[2]

The suggestion that all education needs to work in relation to three domains of purpose is not only relevant for general education, but also helps to get more precision vis-à-vis the purposes of professional education including medical education. It thus provides a much more helpful and precise discourse than the reference to 'learning.' Rather than asking whether students are learning, we need to ask whether their education addresses all three domains of purpose. The simple but nonetheless helpful insight here is that the purpose of such education is not confined to the presentation and acquisition of knowledge, skills, and understanding. In addition to *professional qualification* (becoming a competent doctor), there is also a need for *professional socialization*: providing and achieving orientation in a professional field. Professional socialization in medicine has to do with achieving a professional identity as a medical professional (which actually has been described by some as the main purpose of medical education).[23–26] Also, medical professionals do not just need to be qualified and socialized; they also need to become a subject of their own actions. That is, they need to be able to judge which knowledge, skills, and understandings need to be utilized in which situation and also when they should stick to the rules and when to question the rules or bend or sometimes even ignore them if a particular situation calls for this. There is, therefore, also always

[1]In this regard education differs from many other practices which are often oriented to only one purpose or domain of purpose. Think, for example, of the orientation of medical practice on (the promotion of) health (acknowledging that what counts as health and how one promotes this are complex questions) or the orientation of the legal domain on justice.

[2]For a more detailed discussion about the idea of subjectification as a core educational ambition, see Biesta.[33,34]

the need for medical education to focus on *professional subjectification*.

Instead of the bland and to a degree even meaningless suggestion that the task of medical education is to make students learn, we can now say that medical education needs to aim for *professional qualification*, *professional socialization,* and *professional subjectification*. It also needs to make sure that these do not remain separate compartments but actually become integrated in the knowing, doing, and being of professionals. This then suggests a framework for the development of curricula – the content and experiences that students should encounter and work with during their education. This includes a range of experiences students should 'meet' – one can think, for example, of the importance of encountering the limits of medical treatment, a first unexpected patient death, the ambiguity or uncertainty of a high stakes treatment decision, a first euthanasia, resistance (from patients or other medical professionals) to one's medical decision, a first consultation carried out independently and satisfactorily, etc. In addition to a framework for curricula, the proposed view on education also suggests a framework for the development of pedagogy – the ways in which medical teachers engage with their students in order to promote professional qualification, socialization, and subjectification.

How does education work? And how can we make it work?

To see that the point of medical education is not to make students 'learn' but to contribute to their professional qualification, socialization, and subjectification is helpful in overcoming the limitations of the language of learning but does not yet resolve the question of *teaching*. One could, after all, still argue that once we have a more refined understanding of what it is that we seek to achieve, we should focus our research efforts on finding out which teaching interventions work for each of the three domains. This conclusion is helpful to the extent that it shows that asking the general 'what works?'-question is actually not very meaningful. Rather, we need to begin by asking *for which particular purpose or domain of purpose* a particular teaching strategy may work.

With regard to this it is important to acknowledge that the three domains of purpose do not exist separately but are always all three at play in the concrete practice of education. Teaching a particular skill, for example, motivational interviewing in General Practice consultations, is not just about acquiring that skill (qualification). It also communicates something about the importance of the skill in the profession (socialization) and simultaneously has an impact on the agency of the student: by mastering a skill one is able to act differently, which raises the question when it is appropriate to utilize this skill and when not (subjectification).

Whereas there can be synergy between the three domains, there can also be tensions and even conflicts. Think for example how 'teaching to the test' does very little in supporting students becoming responsible practitioners (subjectification) and also sends out the message that what really matters is passing the test (socialization). So the question which of our teaching strategies or wider educational arrangements 'work' is actually much more complicated than that – not just because the question of 'working' is a threefold question, but also because what may work in relation to one domain of purpose may actually work differently, or may not work at all in another domain of purpose.

Much educational research that seeks to generate evidence about 'what works' couches its ambitions in terms of factors that impact on students. It is here that reference is often made to the medical model on the assumption that teaching is an intervention that produces particular effects. The important question for education, including medical education, is whether this understanding is adequate for capturing the dynamics of education. Can it be assumed that under ideal circumstances teaching is a cause and learning – or with the language we prefer: students' professional *formation*[27] – is the effect? And is the fact that we have *not yet* established certain and secure connections between educational 'input' (teaching) and educational 'outcome' (learning; formation), just a matter of time and money? That is, would investment in more research eventually lead us to the evidence that will tell us once and for all which interventions will produce which effects?

This, we think, is unlikely. The reason for that lies in the fact that the strong causality that is assumed in this way of thinking actually only occurs in very specific situations: in closed, deterministic systems that operate in unidirectional ways. The paradigm case for this is the clockwork where each cogwheel puts the next cogwheel into motion so that, if we know the initial situation of the clockwork and have perfect knowledge of all connections between the cogwheels, we can predict with one hundred percent certainty how the machine will operate, and will continue to operate until eternity. This, however, is not the reality

of education.[28] So the first question to ask is what kind of system education actually is in order, then, to say something about how a system such as education works and can be made to work.[29]

The first thing to bear in mind here is that education is a relatively *open system*. What happens 'inside' education is significantly influenced by what happens 'outside' of it. Students have lives and experience outside of the classroom and are therefore influenced by much more than just the teaching they receive. What happens in the classroom is part of a wider social context with intended and unintended influences flowing in and out. Secondly, education is not a deterministic system of mechanistic 'push and pull,' but a *semiotic system*, that is, a system that works by means of communication and interpretation. Put simply, students need to make sense of what teachers tell them or present to them and this is a matter of interpretation, not of stimulus-and-predictable-response. Thirdly, unlike the unidirectionality of the clockwork, education systems are *recursive*, which means that the 'elements' in the system (teachers and students) can think for themselves, make up their own minds, and, based on this, can decide to act in a number of different ways. How the system evolves does, in other words, feed back into the system.

Acknowledging that education is an open, semiotic, and recursive system may make one wonder whether anything can work at all in education in that whether any connection between what teachers do and what students take from it can be established or secured. With so many uncontrollable factors, and so many complex, open dynamics, it seems as if education is almost impossible. Yet the point we wish to make is that understanding the dynamics of education in this way – that is, seeing education as an open, semiotic, and recursive system – is actually quite helpful because it allows to indicate with much precision what needs to be done to make such a system work in a more predictable way. Everything here comes to reducing the 'degrees of freedom' of the system: reducing the openness of the system (the influences from outside), reducing the semiotics of the system (the opportunities for interpretation), and reducing the recursivity of the system (that is, the way in which the system feeds back onto itself).

Interestingly, reducing openness, interpretation, and recursivity is exactly what educators do. We reduce openness, the interference from the outside, by putting students in classrooms or designated study spaces first and foremost in order to focus the attention of our students. The curriculum is a further step in reducing openness by specifying what students should focus on and what they should be doing. Similarly, while interpretation has, in a sense, no boundaries, the whole point of assessment is to limit the range of interpretations our students generate sometimes to make sure that they get it absolutely right, and sometimes to make sure that they remain within the boundaries of what is meaningful. Thirdly, as educators we also try to influence the recursivity that is happening in our classrooms, basically by helping our students to think in particular ways. In medical education, we encourage our students to think as medical professionals,[30] rather than 'just' as private persons so that, when they make up their minds about what to do with their education, for example, we try to 'frame' this within a particular context (medical practice) rather than let it go in any direction.

When we look at the dynamics of education in this way, we not just have an account of education that makes much more sense than the mistaken assumption that there is a causal connection between teaching and learning. Such connections simply do not exist in social systems such as education. We also have an account that shows how our educational endeavors – our school buildings, classroom settings, curricula, forms of assessment – all contribute to giving the whole process more direction and structure in light of what we seek to achieve with our students. Yet what this approach also brings into view is that if we go too far in all this by closing off the influences from the outside completely, telling our students that there is only one correct way to interpret the curriculum, and only one right way to think, act, and be, we have suddenly turned education into *indoctrination*. While this may be 'effective' from the perspective of qualification and strong socialization, indoctrination is the very opposite of what we should achieve vis-à-vis the domain of subjectification, that is, our ambition to make sure that our students can ultimately think and act for themselves and take responsibility for this. While it is of crucial importance that we generate structure and focus in our educational activities, it is also important that we never turn our students into objects of our control.

Lessons for medical education and medical education research

One important implication for medical education *practice* from the above discussion is that it provides a much more refined language for talking about what medical education is *for* than the rather empty but

nonetheless prevalent language of learning. For *curriculum design* this approach raises helpful questions about what a medical education curriculum should look like. What kind of curricular content do we need to work toward the professional qualification, the professional socialization, and the professional subjectification of medical students? How can we design educational activities such that this content contributes to all three domains in an integrated fashion? The above discussion not just raises questions about particular content students should master in relation to the three domains, but also about what kind of experiences they should encounter during their medical education. Which encounters would create educational opportunities in terms of professional qualification, socialization, and subjectification? With curricular redesign would also come other forms of *assessment* to establish students' progress in light of each of the three domains. How can we design assessment in ways that address development in terms of qualification as well as socialization and subjectification? Can we address all three in an integrated assessment or do we need separate assessments for each? In addition, student *evaluations* of medical education would require a broader focus on all three domains of purpose. We would need to not just ask students about the knowledge, skills, and understanding they may have achieved, but also about ways in which the education has contributed to their professional identity formation[31] and their ability for thoughtful judgment and decision making. To look at medical education in this way rather than in terms of the language of 'student learning' thus gives more precision and more focus to the design and enactment of medical education. This is not to suggest, of course, that current medical education is devoid of these dimensions but the language of 'teaching and learning' is simply insufficient to have meaningful conversations about the aims, structure, and processes of medical education.

A second implication of this discussion is for teachers in medical education *practice* to carefully consider any research findings about the supposed effectiveness of particular teaching interventions or methods. What does existing research have to say in relation to each of the three domains of qualification, socialization, and subjectification? Also, any indication that a particular approach may work for one domain or aspect of a domain does not automatically mean that it will also work for the other domains or aspects of them and also not that it will be neutral with respect to (aspects of) the other domains. It may also be counterproductive, and this is crucially important in considering any alleged evidence at all. For example, a disproportionate emphasis in the domain of qualification on, say, knowledge retention and reproduction, may do little for developing informed, self-confident professional identities just as checking long lists of acquired competencies may do little, and may actually hinder, the formation of robust professional judgment. While the point may be obvious, it is crucial also not to forget that what allegedly has worked in one setting – which also means: under the particular conditions of that setting – may not do anything at all in a different setting, under different conditions.[1,3,13,32] Dealing with the local contingencies of teaching, teachers cannot but approach research evidence as suggestions to be translated and applied flexibly according to circumstance and context, but as nothing more than that.[5]

For medical education *research*, the main lesson to draw from what we have presented above is the need to move beyond one-dimensional research designs that either focus on just one domain – qualification, socialization, or subjectification – and 'forget' to explore the interactions between the three or, even worse, that continue to investigate the 'impact' on 'learning' without specifying about and for what the learning is supposed to be. Moreover, the ideas outlined above suggest a different focus for medical education research – not a search for correlations in order to identify 'effective factors,' but rather a thorough and thoughtful exploration of the construction of educational 'ecologies,' that is, of how, through arranging the openness, semiosis, and recursivity of educational practices, meaningful education can be established. Such an approach cannot confine itself to just looking at education from the 'outside' or looking for collections between inputs and outcomes, but needs to engage with teachers and students and their own meaning making and interpretation. Such research would not only tell us whether a new (or, for that matter, an established) practice would influence students' grades or help them meet professional standards more quickly or efficiently (qualification). It would also give us insight into the ways that this practice helps students be, do, and feel like professionals of their sort (socialization) and is significant for their ability to act and judge in meaningful and responsible ways (subjectification).

Conclusion

In this paper we have argued that there is a need to move beyond the rather simplistic 'medical model' of

education that sees teaching as an intervention and learning as its effect, and that suggests that the sole task of medical education research is to find out which interventions 'work' to produce the intended effects. We have raised questions about the narrowness of the language of 'learning' and have suggested that more precision can be reached if we begin to discuss the purposes of medical education in terms of professional qualification, professional socialization, and professional subjectification. We have also raised questions about the causal assumptions that seem to underlie the medical model and that suggest a particular approach for medical education research. Here we have suggested that it makes much more sense not to understand education as a closed, causal system but as an open system that works through communication and interpretation and the thoughtful actions of teachers and students. In such a view, teaching, curriculum, assessment, and evaluations no longer appear as 'factors' to produce 'outcomes' but become meaningful aspects of the practice of educators to steer the educational process toward particular purposes – always bearing in mind that too much steering runs the risk of reducing meaningful education to problematic forms of indoctrination. Along these lines we hope to have made a contribution to the discussion about the future of medical education and medical education research away from the simplicities of the 'medical model' toward approaches that are able to grasp what is really going on when medical educators teach and students take part in medical education.

Declaration of interest

The authors declare no competing interests.

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References

1. Davies P. What is evidence-based education? *Br J Educ Stud*. 1999;47(2):108–121. doi:10.1111/1467-8527.00106.
2. Slavin RE. Perspectives on evidence-based research in education—What works? Issues in synthesizing educational program evaluations. *Educ Res*. 2008;37(1):5–14. doi:10.3102/0013189X08314117.
3. Pirrie A. Evidence-based practice in education: the best medicine? *Br J Educ Stud*. 2001;49(2):124–136. doi:10.1111/1467-8527.t01-1-00167.
4. Thomas G. After the gold rush: questioning the "gold standard" and reappraising the status of experiment and randomized controlled trials in education. *Harv Educ Rev*. 2016;86(3):390–411. doi:10.17763/1943-5045-86.3.390.
5. Davis A. It worked there. Will it work here? Researching teaching methods. *Ethics Educ*. 2017;12(3):289–303. doi:10.1080/17449642.2017.1361267.
6. McKnight L, Morgan A. A broken paradigm? What education needs to learn from evidence-based medicine. *J Educ Pol*. 2019;34:1–17. doi:10.1080/02680939.2019.1578902.
7. Simpson A. The evidential basis of "evidence-based education": an introduction to the special issue. *Educ Res Eval*. 2019;25(1-2):1–6. doi:10.1080/13803611.2019.1617979.
8. Biesta GJJ. Why "what works" won't work: evidence-based practice and the democratic deficit in educational research. *Educ Theory*. 2007;57(1):1–22. doi:10.1111/j.1741-5446.2006.00241.x.
9. Harden RM, Grant J, Buckley G, Hart IR. BEME guide no. 1: best evidence medical education. *Med Teach*. 1999;21(6):553–562. doi:10.1080/01421599978960.
10. Fincher RME, Work JA. Perspectives on the scholarship of teaching. *Med Educ*. 2006;40(4):293–295. doi:10.1111/j.1365-2929.2006.02404.x.
11. Smith R. Expertise and the scholarship of teaching. In: Kreber C, ed. *Scholarship Revisited: Perspectives on the Scholarship of Teaching*. San Francisco, CA: Jossey-Bass; 2001:69–78.
12. Chen F, Lui AM, Martinelli SM. A systematic review of the effectiveness of flipped classrooms in medical education. *Med Educ*. 2017;51(6):585–597. doi:10.1111/medu.13272.
13. Regehr G. It's NOT rocket science: rethinking our metaphors for research in health professions education. *Med Educ*. 2010;44(1):31–39. doi:10.1111/j.1365-2923.2009.03418.x.
14. Norman G. RCT = results confounded and trivial: the perils of grand educational experiments. *Med Educ*. 2003;37(7):582–584. doi:10.1046/j.1365-2923.2003.01586.x.
15. Horsley T, Custers E, Tolsgaard MG. Fundamentals of randomized designs: AMEE Guide No. 128. *Med Teach*. 2020;52:486–492. doi:10.1080/0142159X.2019.1681389.

16. Love JN, Messman AM, Merritt C. Improving the learning experience through evidence-based education. *West J Emerg Med*. 2019;20(1):1–5. doi:10.5811/westjem.2018.10.41320.
17. Hattie J, Nepper Larsen S. *The Purposes of Education: A Conversation between John Hattie and Steen Nepper Larsen*. New York, NY: Routledge; 2020.
18. Biesta GJJ. Good education in an age of measurement: on the need to reconnect with the question of purpose in education. *Educ Asse Eval Acc*. 2009;21(1):33–46. doi:10.1007/s11092-008-9064-9.
19. Bruner J. *The Culture of Education*. Cambridge, MA: Harvard University Press; 1996. doi:10.1007/s11092-008-9064-9.
20. Egan K. *The Future of Education: Reimagining Our Schools from the Ground up*. New Haven, CT: Yale University Press; 2008.
21. Lamm Z. *Conflicting Theories of Instruction: Conceptual Dimensions*. Berkeley, CA: McCutchan; 1976.
22. Musselman LJ, MacRae HM, Reznick RK, Lingard LA. 'You learn better under the gun': intimidation and harassment in surgical education. *Med Educ*. 2005;39(9):926–934. doi:10.1111/j.1365-2929.2005.02247.x.
23. Chandran L, Iuli RJ, Strano-Paul L, Post SG. Developing "a Way of Being": deliberate approaches to professional identity formation in medical Education. *Acad Psychiatry*. 2019;43(5):521–527. doi:10.1007/s40596-019-01048-4.
24. Cruess RL, Cruess SR, Boudreau JD, Snell L, Steinert Y. Reframing medical education to support professional identity formation. *Acad Med*. 2014;89(11):1446–1451. doi:10.1097/ACM.0000000000000427.
25. Irby DM, Cooke M, O'Brien BC. Calls for reform of medical education by the Carnegie Foundation for the Advancement of Teaching: 1910 and 2010. *Acad Med*. 2010;85(2):220–227. doi:10.1097/ACM.0b013e3181c88449.
26. Jarvis-Selinger S, Pratt DD, Regehr G. Competency is not enough: integrating identity formation into the medical education discourse. *Acad Med*. 2012;87(9):1185–1191. doi:10.1097/ACM.0b013e3182604968.
27. Biesta GJJ. How does a competent teacher become a good teacher? On judgement, wisdom and virtuosity in teaching and teacher education. In: Heilbronn R, Foreman-Peck L, eds. *Philosophical Perspectives on Teacher Education*. Oxford: Wiley Blackwell; 2015:3–22.
28. Biesta GJJ. Why 'what works' still won't work: from evidence-based education to value-based education. *Stud Philos Educ*. 2010;29(5):491–503. doi:10.1007/s11217-010-9191-x.
29. Osberg DC, Biesta GJJ, (eds). *Complexity Theory and the Politics of Education*. Rotterdam, The Netherlands: Sense Publishers; 2010.
30. Fuks A, Boudreau JD, Cassell EJ. Teaching clinical thinking to first-year medical students. *Med Teach*. 2009;31(2):105–111. doi:10.1080/01421590802512979.
31. Goldie J. The formation of professional identity in medical students: considerations for educators. *Med Teach*. 2012;34(9):e641–e648. doi:10.3109/0142159X.2012.687476.
32. Cowen N. For whom does "what works" work? The political economy of evidence-based education. *Educ Res Eval*. 2019;25(1–2):81–98. doi:10.1080/13803611.2019.1617991.
33. Biesta GJJ. Risking ourselves in education: qualification, socialisation and subjectification revisited. *Educ Theory*. 2020;70(1):89–104. doi:10.1111/edth.12411.
34. Biesta GJJ. Can the prevailing description of educational reality be considered complete? On the Parks-Eichmann paradox, spooky action at a distance, and a missing dimension in the theory of education. *Pol Futures Educ*. 2020. doi:10.1177/1478210320910312.