

Study on the Current Status of Teachers' Teaching Competencies in the Context of Evidence-based Orientation

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Abstract. As a result of the radiation of evidence-based medicine, the idea of basing decisions on scientific evidence has become increasingly influential in the educational community, and evidence-based education has been born, and the term evidence-based teaching has been mentioned as a hot topic. In current education and teaching, evidence-based practice has an impact on the quality of teachers' teaching. Enhancing teachers' capacity for evidence-based teaching practice not only helps them to make scientific decisions about the teaching process using scientific research evidence, but also promotes the development of high-quality teaching. It is also necessary to have some understanding of the historical development process of evidence-based education to enhance teachers' evidence-based competencies.

Keywords: Evidence; Decision-Making; Teacher Teaching; Evidence-Based Education.

1. Introduction

As the 20th century progressed, the birth of clinical epidemiology, the introduction of randomised controlled trials and the development of statistical methods combined to challenge traditional clinical medicine. 1972 saw the publication of *Efficacy and Benefit: Randomised Responses in the Health Service* by Archie Lyman Cochrane, a British clinical epidemiologist, who stated "Because of limited resources, medical practitioners should use health care interventions that have been properly demonstrated to be demonstrably effective and for which the most reliable evidence comes from randomised controlled trials." [1] The 1980s marked the formal birth of evidence-based medicine with the publication of the article "Evidence-Based Medicine - A New Approach to Teaching Medical Practice", which established evidence-based medicine as a model for teaching in clinical medicine and advocated that physicians' colleges and universities search the literature and base their clinical decisions on the latest scientific research evidence. In recent decades, with the innovation and development of evidence-based decision-making in medicine, the concept and idea of evidence-based medicine has become a hot issue in education and the focus of many scholars' research. 2022 On 2 April, the Ministry of Education and eight other departments issued the Plan for Stronger Teachers in Basic Education in the New Era, which calls for "following the law of teacher growth and development, taking the training of high-quality teacher talents as the lead, and a high-level teacher education system". Leading the way, supported by the construction of a high-level teacher education system ...The plan calls for "following the law of teacher growth and development, leading with the training of high-quality teachers, and supporting with the construction of a high-level teacher education system".[2]The article refers to the overall improvement of the quality of teachers' competence in teaching. As one of the mainstays of education, teachers urgently need to improve their competence literacy in order to achieve high-quality teaching. Evidence-based teaching literacy is a comprehensive quality of teachers' evidence-based teaching[3], who can help to overcome, to some extent, the limitations of teacher educators' experience-led teaching, subjective decisive teaching and imitation-following teaching[4]. Breaking away from the traditional empirical model of teaching alone, it has become a new way of teaching based on the latest and best available research evidence, combined with teachers' own professional wisdom and practical teaching experience, in order to make scientific teaching decisions. Therefore, it is imperative to strengthen teachers' core competencies, promote teachers' teaching based on research evidence and enhance their evidence-based literacy.

2. Current status of research

2.1 Status of research abroad

2.1.1 The beginnings of evidence-based teaching practice in the UK:

After the 1970s, the growing influence of evidence-based medicine led to a debate about whether evidence-based practice could be used in education, and by the 1990s, the UK academic community and government were increasingly focused on the theory and practice of 'evidence-based policy'[5] and the role of evidence. With the increasing use of evidence-based practice in medicine, the possibility of evidence-based practice in teaching became a key concern for academics and government departments in the UK.[6] The reasons that led to the development of evidence-based practice in the UK are several more:

Firstly, it is difficult for educational research findings to provide scientific evidence for improvements in teaching and learning. [In 1996, David Hargreaves, a member of the Teacher Training Agency (TTA), published a report on the impact of evidence-based practice in the UK. Hargreaves' report to the Teacher Training Agency in 1996 introduced evidence-based practice into the field of education, arguing that the introduction of evidence-based practice into education might provide a satisfactory outcome for the development of teaching and learning.[7] In 2013, the Department for Education commissioned Dr Ben Goldacre, who has a medical background, to look at how evidence can be used to inform teaching and learning in schools, which gave further impetus to the claims of evidence-based teaching and learning, and since then, evidence-based teaching and learning practices in the UK have begun to move from shallow to deeper aspects. Thirdly, the UK's high-society regulatory school mechanism provided a good basis for evidence-based teaching. High social regulation is manifested in the fact that schools are allowed to be regularly evaluated by the Education Standards Authority, the national education inspectorate, in order to encourage continuous improvement in the quality of education.[6] This school monitoring mechanism also means that teaching and learning needs to be constantly reformed and improved, and further evidence of what works must be provided, thus providing more opportunities for evidence-based teaching and learning.

In terms of policy, in 2010, the governing coalition of the Conservative and Liberal Democrat parties began to focus on promoting evidence-based teaching and learning. The UK Department for Education published a White Paper on Schools in 2010, *The Importance of Teaching*, highlighting the claims made at a national policy level in relation to evidence-based teaching and learning, with the aim of ensuring that schools have access to evidence-based, high-quality information.[8] In 2015, the UK Department for Education published the Carter Report on the Evaluation of Pre-service Teacher Education[9] which made the key point of recommending that trained teachers should use research evidence to support their teaching. 2010-2014, the then UK Secretary of State for Education, Michael Gove, recommended that teachers should be allowed to use evidence to decide how to maximise the education of their pupils. In 2016-2018, the then UK Secretary of State for Education, Justin Greening, articulated the goal of his vision for current education: 'Mature, professionalised teaching should have evidence and practice at its heart'.[10]

2.1.2 Initiatives for evidence-based teaching practice in the UK:

(i) In terms of implementation of specific initiatives, the Centre for Educational Research and Use of Evidence was established in 1997 to work on enhancing teachers' professional development. 2007 saw the establishment of the Institute for Effective Teaching and Learning, which provides a bi-weekly Best Evidence Bulletin, thereby providing valuable summaries of research to support evidence-based teaching and learning practices by all parties in schools. 2009 saw the establishment of the Alliance for Evidence-based Education. It provides a platform for the exchange of educational evidence among multiple subjects of evidence-based education, including educational researchers, policy makers and teaching practitioners.

(ii) Providing multiple resource platforms. In order to improve the quality of evidence, a number of evidence-based teaching resources have been developed, such as the Teaching and Learning

Research Project, the Education Evidence Portal, the Best Evidence Encyclopaedia and the Evidence-Driven Teacher Network.

(iii) The claims of evidence-based teaching practice for the professionalisation of teaching in the UK. Sources of evidence rely heavily on experimental research, and teachers are encouraged to actively engage in research to obtain evidence.1. Evidence-based teaching requires teachers to be involved in research to some extent.[6] This proposal was also controversial at the time, with opponents suggesting that the involvement of teachers in research simply included teachers in the shared classroom research of students, effectively making teachers, like students, passive subjects of research, while ignoring the fact that teachers also had the capacity for active research. This limitation was broken down in subsequent surveys by the British Educational Research Association and the Royal Society of Arts, Letters, Manufactures and Commerce. The surveys referred to a shift in the cognitive paradigm of teacher involvement in research, thus breaking the embarrassment of teachers as only the researched.2. Teachers should have the ability to analyse and evaluate evidence of teaching and learning. Evidence obtained by teachers for teaching and learning is not guaranteed to be applicable to any teaching and learning scenario. It is therefore important to develop teachers' ability to analyse and evaluate evidence. The process of evaluating evidence for teaching and learning is not only a process of selecting valid evidence to create one's own 'evidence base', but also a process of 'secondary research' by teachers.[6]3. The rationalisation of teachers' scientific decision-making processes. Teachers make scientific decisions about the implementation of teaching and learning based on the use of an 'evidence base', which is not only a rational process of using evidence for teaching and learning, but also a process of dialogue between teachers and evidence.[6]

(iv) The pathway of evidence-based teaching to the professional development of teachers in the UK. The mechanism of research evidence supply has been continuously improved to promote evidence-based education towards practice through the knowledge mobilisation model; provide various learning opportunities to continuously improve teachers' evidence-based teaching; and develop teachers' evidence-based awareness and create an evidence-based culture through pre-service and post-service teacher training.

2.1.3 The beginnings of evidence-based teaching practice in the USA

In terms of historical process, the formation of evidence-based instructional decision-making in the US has gone through three stages: test-result-based decision-making, measurement-based instruction, and evidence-based instructional decision-making[11]. In the 1970s and 1980s, US states required schools to make plans for student development and process-based educational decisions based on student test results; in the 1980s and 1990s, schools were fully committed to educational decision-making based on In the 1980s and 1990s, schools became fully committed to educational decision-making based on standardised test data. At this time, standardised tests became synonymous with measuring student learning outcomes, and measurement-based instruction became the focus of attention, leading to a series of standardisation movements in the US. In fact, however, the movement for standardisation in American education took shape in the 1980s: in 1981, the National Commission on Quality Education was established; in 1983, the publication of *The Nation in Crisis* marked the emergence of a large number of "quality" movements in the United States, at which time so-called "national standards" and "national standards" for various subject curricula emerged. "National Standards" and "standardized tests" for various subject curricula.[12] In 2002, the No Child Left Behind Act was signed by then President George W. Bush and included numerous references to education being based on scientific research evidence.[12] The Act also requires that data on student learning be valued, that all aspects of student performance be assessed, and that student test scores be made available to the entire community as evidence of the effectiveness of local and school-based efforts to enhance student learning. The Act marked the culmination of the standardisation movement in the US and the birth of evidence-based teaching and learning. But then in 2015, the No Child Left Behind Act was repealed and replaced by the Every Student Succeeds Act, which was enacted by Barack Obama, and which rejected the shortcomings of the previous Act, but continued to use the idea of 'evidence-based', and in the new Act, it provided for a hierarchy of evidence similar to that in

the field of evidence-based medicine. In the new Act, it sets out a slogan similar to the hierarchy of evidence in the field of evidence-based medicine, calling for the creation of an evidence-based culture.

2.1.4 Initiatives for evidence-based teaching practice in the USA:

The concept of evidence-based education was first introduced in the field of education to address the disconnect between theory and practice, and was subsequently influenced by evidence-based medicine, which led to the development of evidence-based guidelines for education. Since the 21st century, the term evidence-based has become the dominant discourse for school reform in basic education in the United States, and a theoretical model of "evidence-based + evidence-based interventions + evidence-based decision-making + best outcomes" has been developed.[11] In 2002, the Institute of Education Sciences (IES) was established as the main body to lead and promote evidence-based teaching and learning reform in the US. Its first director, Whitehurst, pointed out that "evidence-based teaching does not mean the negation of teachers' subjective agency and teaching experience; rather, it provides teachers with a scientific basis and support for their teaching diagnosis and decision-making, thus making their teaching behaviour more precise and efficient." [14]

In the United States, a structural framework of evidence-based teaching has been constructed to realise evidence-based teaching [14], and along the lines of this framework, a series of explorations of evidence-based teaching practices have been carried out in the American academia. For example, Harvard University has implemented the "Evidence Wisdom to Improve the Teaching Process" project. For example, Oregon's Evidence Literacy for Pre-Service Teachers programme follows the approach of "assessing teachers' evidence literacy needs → developing curriculum content based on needs → creating an evidence literacy training team → conducting embedded evidence literacy training" to develop teachers' evidence literacy skills and help them develop. The programme is designed to help students develop the ability to use evidence to inform their teaching and student learning. Subsequent empirical research has shown that teacher educators who have undergone this programme have significantly better academic performance when teaching students after they enter the profession.[15] For example, the University of Massachusetts and Worcester Polytechnic Institute have jointly developed a pre-service teacher evidence literacy programme that focuses on "The Nature of Evidence," "Managing Evidence," "Storing Evidence," and "Using and Sharing Evidence. For example, the University of Massachusetts and Worcester Polytechnic Institute have jointly developed a pre-service teacher education programme, which includes modules on "The Nature of Evidence", "Evidence Management", "Evidence Storage", "Evidence Use and Sharing" and "Evidence Ethics".[16] At Syracuse University, in-service teachers are trained in evidence literacy through thematic modules on "Evidence Basics, Evidence Management Methods and Other Evidence Issues".[17] Since 2005, the US federal government has been coordinating the efforts of state governments, schools, research institutions and social organisations to build a "longitudinal educational evidence resource base", which aims to create a system of educational evidence that covers all stages of student learning.[14] Evidence, evidence-based interventions, evidence-based decision-making and outcomes are the four basic components of the theoretical model of evidence-based school reform in basic education in the US.[13] Evidence, evidence-based interventions and evidence-based decision-making are the prerequisites, process variables and implementation measures of evidence-based school reform; student achievement, staff achievement and other school achievements are the expected outcomes of evidence-based school reform.

2.2 Current status of domestic research

Evidence-based education is a topic that has only become popular in China's academic community in the last decade.

Zhu Zhibo [18] and others talk about the three basic characteristics of evidence-based education, namely scientific, applicability and collaboration, to examine the current situation of teachers' teaching decisions, and can find that teachers have some practical dilemmas in making teaching decisions: many teachers often find it difficult to make scientific and effective teaching decisions because they are limited to their personal intuition and experience, difficult to make reasonable and

appropriate teaching decisions due to the lack of changeable coping strategies, and difficult to make comprehensive and reasonable teaching decisions due to too much. They also have difficulties in making comprehensive and rational teaching and learning decisions because they rely too much on themselves or within the school organisation. In order to improve teachers' ability and level of teaching decision-making and ensure scientific and effective teaching, we can start from three aspects: building an evidence base for evidence-based teaching decision-making to break the boundaries of teachers' individual experiences; cultivating teachers' literacy in evidence-based teaching decision-making to eliminate the obstacles of fixed programmatic thinking; and establishing an evidence-based teaching decision-making community to break through the limitations of teachers' single subject.

Cui Youxing[19] points out that evidence-based teaching literacy, as an important part of the core literacy system of teacher educators, must be strengthened, and is the key to transforming teacher educators from shallow to deep teaching, and is an important factor in the quality of teacher education. It reflects the comprehensive quality of teacher educators' evidence-based teaching practice, and its structure is expressed in a three-dimensional structural system of "one axis and three layers": "one axis" refers to the evidence-based literacy of teacher educators as the axis, through the structural system of evidence-based teaching literacy; The "three tiers" are knowledge, competence and methodological literacy at the bottom, emotional and thinking literacy at the middle, and spiritual literacy at the top. Conceptual shaping, "knowledge and ability" enhancement, thinking transformation and cultural support are important pathways for teacher educators to cultivate evidence-based teaching literacy.

Evidence-based education is the pursuit of the word "evidence-based" and the making of scientific judgments based on evidence. Zhou Jiaxian[20] mentions that in evidence-based education, educational evidence is obtained through five types of research: randomised experiments, quasi-experiments, correlational studies using statistical methods, correlational studies without "statistical" methods, and case studies. There are different levels of reliability of evidence obtained from different educational research methods, with randomised trials yielding scientific evidence that meets the gold standard. The culture between science, practice and policy is very different and the rules for obtaining and using evidence in these three areas must be defined in order to cross the gaps that exist between them.

In light of the above-mentioned fundamental aim of evidence-based education to address the disconnect between theory and practice in the field of education, Xu Wenbin[21] argues that to address this disconnect between theory and practice, a real solution may require a shift in mindset, and 'evidence-based education' may provide us with such a shift. Evidence-based education may provide us with the means to do so. "Evidence-based education seeks to integrate professional wisdom with the best available empirical evidence in the process of teaching and learning, and its methodological characteristics are mainly reflected in its interdisciplinary nature and the two-way interaction between theory and practice. Its methodological characteristics are mainly reflected in its interdisciplinary nature and the two-way interaction between theory and practice. Therefore, its practical application requires us to start from the specific problems in education and teaching practice, pay attention to the stakeholders, the generation and selection of evidence, and take the initiative to build an "evidence-based culture".

3. Concluding remarks

Compared to the development in the UK and the US, evidence-based education is still relatively late in China, and most of the research in the literature is still only at the theoretical stage. The emergence of evidence-based education has indeed had an impact on our educational field. According to the research of many scholars in academia on evidence-based education, its evidence-based concept can indeed change the subjective empiricist teaching model of teachers, but there are still relatively few examples of evidence-based teaching practices realized in schools in China. Whether

evidence-based education can really change the problems highlighted in current education, many scholars have also in this doubt raised questions.

In an article by Sun Yuantao et al [22] on the risks and methodological considerations of evidence-based education, it is also mentioned that unlike the current academic community in China that actively promotes evidence-based education, there has been a debate abroad about the pros and cons of evidence-based education. The practice of evidence-based education with a technological orientation is, in a sense, an alienation of human practice into a rigid procedure under the control of technical rationality. By its very nature, education cannot be strictly evidence-based, either as a value-first practice or as a contextualised practice. Not only can education not move towards full evidence-based practice, but it needs to be somewhat wary of the temptation to be evidence-based in the ever-changing discourse of reform. Evidence-based philosophy has entered the field of education through evidence-based medicine, and has chosen the path of 'evidence-based guidance' in evidence-based medicine to enter the practice of education. This means that research and decision-making in education must be based not only on evidence, but also on rigorous, scientific data to demonstrate the validity of the evidence. This has seen 'evidence-based' move increasingly from the conceptual to the methodological. Central to this dilemma is the tendency towards 'scientism' in educational research and the globalisation of the neoliberal educational agenda, which assumes that all aspects of the universe can be understood through the scientific method. The so-called 'scientism', in which all aspects of the universe can be understood through the scientific method.[12]

The double-edged sword exposed by evidence-based education is therefore also a warning that we must only be sensible about the nature of things and not blindly pursue so-called 'science'. Education can prudently use some of the evidence to improve practice, but at least so far, evidence-based practice is only a small part of education.

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