

What is reflection? A conceptual analysis of major definitions and a proposal of a five-component model

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CONTEXT Although reflection is considered a significant component of medical education and practice, the literature does not provide a consensual definition or model for it. Because reflection has taken on multiple meanings, it remains difficult to operationalise. A standard definition and model are needed to improve the development of practical applications of reflection.

OBJECTIVES This study was conducted in order to identify, explore and analyse the most influential conceptualisations of reflection, and to develop a new theory-informed and unified definition and model of reflection.

METHODS A systematic review was conducted to identify the 15 most cited authors in papers on reflection published during the period from 2008 to 2012. The authors' definitions and models were extracted. An exploratory thematic analysis was carried out and identified seven initial categories. Categories were clustered and reworded to develop an integrative definition and model of reflection,

which feature core components that define reflection and extrinsic elements that influence instances of reflection.

RESULTS Following our review and analysis, five core components of reflection and two extrinsic elements were identified as characteristics of the reflective thinking process. Reflection is defined as the process of engaging the self (S) in *attentive*, *critical*, *exploratory* and *iterative* (ACEI) interactions with one's *thoughts* and *actions* (TA), and their underlying *conceptual frame* (CF), with a view to changing them and a *view on the change itself* (VC). Our conceptual model consists of the defining core components, supplemented with the extrinsic elements that influence reflection.

CONCLUSIONS This article presents a new theory-informed, five-component definition and model of reflection. We believe these have advantages over previous models in terms of helping to guide the further study, learning, assessment and teaching of reflection.

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INTRODUCTION

Since the concept of reflection was first articulated by Dewey in 1933,¹ reflection has gained traction in multiple disciplines and professional fields.^{2–5} Medicine,^{6–8} nursing^{9–11} and the other health science professions¹² are no exception; reflection in these contexts is viewed as a crucial component of curriculum and practice,^{13–15} and as a requirement for lifelong personal and professional learning.¹⁶ In the last 80 years, reflection has been the subject of inquiry, development and interpretation by many influential authors, notably Schön, who coined the term ‘reflective practice’.¹⁷ As evidence of its popularity, reflection has taken on divergent meanings and has been represented by a number of models,^{6,7} each emphasising different elements required in reflection (e.g. ‘active, persistent and careful consideration of any belief’,¹ ‘affective activities’,¹⁸ assumptions,^{17,19} and ‘meanings in terms of self’²⁰). For both newcomers and experts, reflection is a complex construct for which the literature does not provide a consensual definition.^{21–24}

The lack of a common explicit understanding of reflection has undoubtedly impeded the development of practical methods to analyse, teach and assess it.²⁵ Despite the increasing number of publications on reflection, the evidence in support of its use remains mainly theoretical,⁷ largely as a result of the difficulty of reliably operationalising a construct without a consistent definition.^{26,27} Although practical applications of reflection have been described,^{28–30} the imprecise understanding of reflection has often resulted in dilution of its meaning, which has at times equated to simple thinking.^{31,32} A standard definition of reflection is needed to help guide further studies and applications for learners, teachers and researchers along common pathways.^{27,33}

Objectives

Previous researchers have published excellent systematic reviews on the general concept of reflection in medical education.^{6,7} A few have attempted to specifically clarify the *definition* of reflection,^{3,34,35} without using a formal systematic process with the set aim of providing a unified definition. Because multiple models and definitions of reflection are currently in usage, widespread acceptance of yet another conceptualisation of reflection can only be achieved by accounting for the major definitions previously described. To that effect, this article first

presents a systematic review of major definitions and models of reflection. We identify their common underlying structure and reorganise their key elements to develop an integrative ‘meta-definition’. We finally supplement our definition with a conceptual model and discuss the strengths, limitations and implications of each of these.

METHODS

Definition and model retrieval and extraction

We conducted a systematic literature review using MEDLINE, EMBASE and PsycINFO (Ovid interface), with [*reflection, reflective or reflective practice*] AND [*learning, professional practice and medical education*] as keywords, for articles pertaining to reflection in education. We limited the query to papers published in English from 2008 to 2012. Of the 430 results obtained and screened, 72 articles (18 reviews) included discussions on the definition of reflection. We extracted references to 74 authors or author groups from these articles and retained the 15 most frequently cited authors or author groups. Although the number of citations per author or author group varied (72 articles cited Schön^{17,36} and eight cited Atkins and Murphy⁹), our goal was to obtain a wide range of influential conceptualisations for analysis rather than to compare the relative influence of each author. Figure 1 presents a flow chart showing the selection of authors and definitions.

One of the current authors (QDN) reviewed the selected articles to identify a definition of reflection; when none was available, QDN and NF extracted the article’s model of reflection or the relevant passages in which the concept is discussed. Table 1 summarises the 15 authors and author groups and the major definitions and models extracted.

Exploratory thematic analysis

Using the results in Table 1, QDN conducted the thematic analysis process.³⁵ This consisted of iterative explorations of the data, during which the identified categories were compared and refined.³⁷ At each stage, results were examined by QDN and NF, and any difference in understanding was discussed among all of the present authors to achieve resolution.

At the first stage of exploration, two broad categories were identified: thinking processes, and qualifiers of

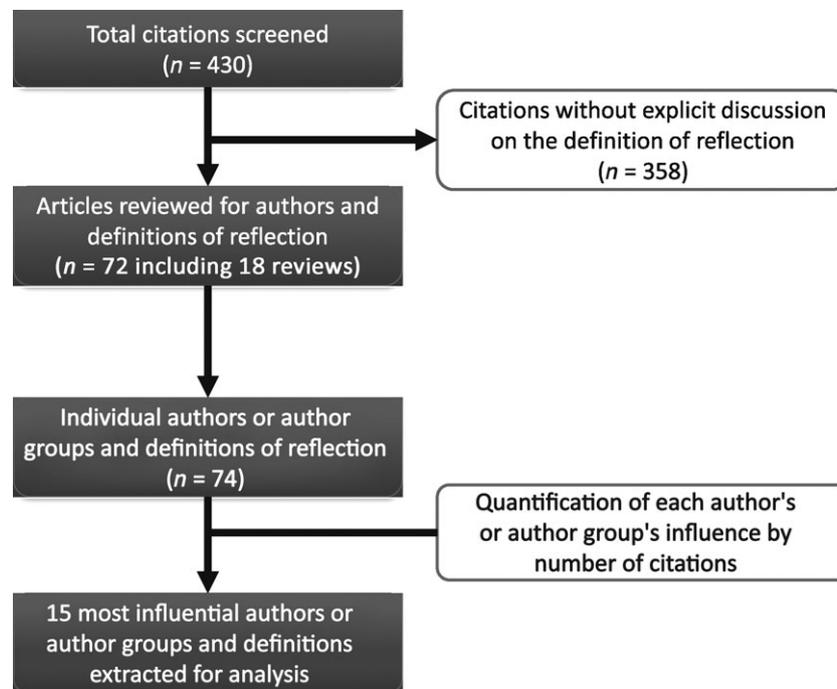


Figure 1 Flow chart showing the selection of definitions

thinking processes. The qualifiers were further clustered; this second stage of analysis identified seven categories encompassing the elements of reflective thinking processes. These were: content; process; self; change; conceptual frame; trigger, and context of reflection.

Process of developing a definition and model

We established which of the seven elements were *constitutional* to reflective thinking and thus warranted inclusion in a definition of reflection. The following criterion was used: constitutional elements *transform* thinking processes and *make them inherently reflective*, whereas extrinsic elements *influence* thinking processes *without necessarily making them reflective*. We identified five constitutional elements (content, process, self, change and conceptual frame) and two extrinsic elements (trigger and context).

Following further analysis, we recognised that three constitutional elements were related to both the *content* and *process* of reflection (the other two constitutional elements). We thus better isolated each constitutional element by reorganising and rewording them into five distinct *core components*, which we used to frame our draft definition. To obtain the final wording, we conducted iterative refinements to formulate an increasingly generic, non-linear, integrative and operational definition. To construct our

model, we analysed the interactions between core components; these were outlined and supplemented with the extrinsic elements. Figure 2 summarises the exploratory thematic analysis and development process of our definition and model.

RESULTS

Table 1 presents the 15 most cited authors or author groups and their definitions or models of reflection. This aggregate view of reflection reveals both commonalities and discrepancies. Other than the inevitable variety of wording, major differences between the definitions include: (i) the concepts included or excluded by each author/author group, and (ii) the level of detail and contextualisation of the concepts. By breaking down each definition into its basic concepts, we reconciled these differences to construct a unified definition of reflection, without oversimplifying it or stripping it of its meaning.³⁸

The definition of reflection

The nature of reflection: reflection as a thinking process

The early stages of the thematic analysis revealed that the nature of reflection, common to all of the reviewed definitions, is first and foremost that of a thinking process. Dewey, who is considered the

Table 1 Major authors and their definitions or models of reflection

Author(s)	Year	Definition or model
Dewey ¹	1933	'Active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends'
Argyris & Schön ^{41,42}	1974, 1978	Double-loop learning 'occurs when error is detected and corrected in ways that involve the modification of an organisation's underlying norms, policies and objectives'
Schön ^{17,36}	1983, 1987	'Questioning the assumptional structures of knowing-in-action' and thinking 'critically about that thinking that got us to fix this opportunity'
Boyd & Fales ²⁰	1983	'The process of internally examining and exploring an issue of concern, triggered by an experience, and which creates and clarifies meaning in terms of self, and which results in a changed conceptual perspective'
Kolb ⁵⁷	1984	Reflection is conceptualised as one stage and pole of the four-stage cycle of Kolb's experiential learning
Boud et al. ¹⁸	1985	'Generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to a new understanding and appreciation'
Korthagen ⁴⁵	1985	ALACT model: '1. Action. 2. Looking back at the action. 3. Awareness of essential aspects. 4. Creating alternative methods of action. 5. Trial'
Brookfield ¹⁹	1990	A process comprising three interrelated phases: '1. identifying the assumptions that underlie our thoughts and actions; 2. scrutinising the accuracy and validity of these in terms of how they connect to, or are discrepant with, our experience of reality; 3. reconstituting these assumptions to make them more inclusive and integrative'
Mezirow ⁴⁰	1991	'The process of critically assessing the content, process, or premise(s) of our efforts to interpret and give meaning to an experience. [...] Premise reflection involves us becoming aware of why we perceive, think, feel or act as we do and of the reasons for and consequences of our possible habits'
Atkins & Murphy ⁹	1993	'1. Awareness of uncomfortable feelings and thoughts; 2. Critical analysis of feelings and knowledge; 3. New perspective'
Hatton & Smith ³⁹	1995	'Deliberate thinking about action with a view to its improvement'
Moon ⁵⁹	1999, 2004	'A form of mental processing with a purpose and/or anticipated outcome that is applied to relatively complex or unstructured ideas for which there is not an obvious solution'
Kember et al. ^{43,44}	2000, 2008	Reflection and critical reflection are viewed as two levels on a four-scale continuum of reflective thinking Reflection 'operates through a careful re-examination and evaluation of experience, beliefs and knowledge' and 'leads to new perspectives'; critical reflection, the highest level of reflection, 'involving perspective transformation', 'necessitates a change to deep-seated, and often unconscious, beliefs and leads to new belief structures'
Mann et al. ⁷	2009	'Purposeful critical analysis of knowledge and experience, in order to achieve deeper meaning and understanding'
Sandars ⁶	2009	'A metacognitive process that occurs before, during and after situations with the purpose of developing greater understanding of both the self and the situation so that future encounters with the situation are informed from previous encounters'

father of reflection, conceived of it as a distinct and specific form of thinking, rooted in the scientific method.³⁵ Other authors perceive the act of reflection as one of 'questioning', 'thinking', 'examining', 'scrutinising', 'mental processing' or 'analysis', all of which are cognitive activities. However, that

reflection is a thinking process does not mean that reflecting and thinking are synonyms. All definitions of reflection include further elements that delineate how reflection, as a *specific* form of thinking, differs from other thinking processes. We identified seven such elements and classified five as

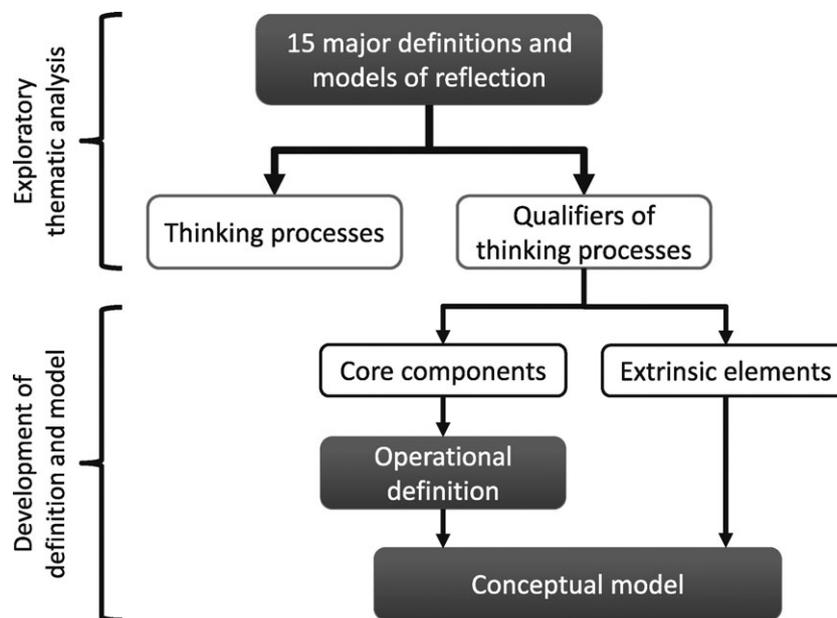


Figure 2 Process of exploratory thematic analysis and the development of the definition and model

constitutional to reflective thinking and two as *extrinsic* to it.

The five core components of reflection

After reanalysis and rewording to better differentiate them, the five identified constitutional elements yielded the *core components* of reflection: (i) thoughts and actions (TA); (ii) attentive, critical, exploratory and iterative processes (ACEI); (iii) the underlying conceptual frame (CF); (iv) the view on change (VC), and (v) the self (S). These components are the key attributes that allow a thinking process to become reflective.

At their most basic, all thinking processes involve some form of content that is processed. Hence, if reflection is a distinct form of thinking, it must differ by its *content* (i.e. *what* one thinks about when reflecting) or by its *process* (i.e. *how* one thinks when reflecting). Accordingly, we classified the five core components in terms of (i) content, (ii) process or (iii) both content and process, as shown in Fig. 3.

Content-related component of reflection (TA)

The first core component we identified, thoughts and actions (TA), is related to the content of reflection, or 'what must one think about in order to be reflecting?' The definitions do not provide a consistent answer to this question; they refer to 'beliefs', 'experiences', 'knowledge', 'action', 'situation' and 'ideas'.

The level of precision in descriptions of the content of reflection varies widely, from Boyd and Fales' broad 'issue of concern'²⁰ to Schön's specific 'assumptive structures of knowing-in-action'.¹⁷ There is no easy way to integrate these divergent views, except by arguing that one's 'thoughts and actions' (TA) would encompass the entire range of content on which one can reflect. The TA component is meant to include cognitive content (e.g. knowledge, ideas, problem solving), non-cognitive content (e.g. actions, experience), and potential affective content. In Mezirow's words, it encompasses all that one can 'perceive, think, feel or act'.³² Thus, the first component of reflection is thinking about thoughts and actions. Although it is true that reflective thinking involves thinking about thoughts and actions, such a stripped-down understanding of reflection does not distinguish it from other forms of thinking. Additional components are required to delineate what is specific to the reflective thinking process.

Process-related component of reflection (ACEI)

How must one think about thoughts and actions in order to be reflecting? The second component of reflection, the attentive, critical, exploratory and iterative component (ACEI), refers to the *process* of reflective thinking. For Dewey, one's thinking should be 'active, persistent and careful'.¹ For Schön,¹⁷ Mezirow³² and Mann *et al.*,⁷ reflective thinking should be 'critical.' Boyd and Fales²⁰ and Boud *et al.*¹⁸ highlight the exploratory aspect of reflection. It is more

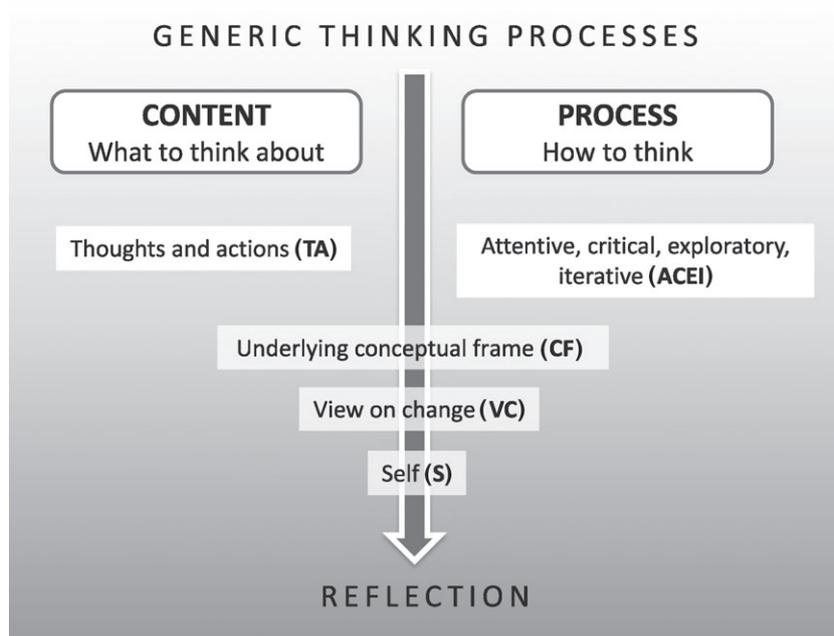


Figure 3 The five core components of reflection

important to recognise that reflective thinking entails a certain analytical and ameliorative way of processing one's thoughts and actions than to pinpoint the exact, specific way. Because each author has his or her preference, we contend that a better approximation is that reflective thinking must be attentive, critical, exploratory and iterative (ACEI). Thinking about our thoughts and actions attentively, critically, in an exploratory and iterative fashion does mirror more concise definitions of reflection, such as Hatton and Smith's 'deliberate thinking about action with a view to its improvement'.³⁹ However, most definitions are more elaborate and include three additional components that refer to both the content and the process of reflection.

Content- and process-related components of reflection (CF, VC, S)

An ACEI thinking process about one's TA will inevitably blur the line between content and process. Because content is cognitively processed, it is inevitably transformed into a new state, which becomes hard to categorise as purely content- or process-related. As we will discuss, the last three core components (CF, VC and S) are related to both the content and process of reflection.

The underlying conceptual frame component (CF)

When Dewey¹ asks one to consider 'the grounds that support' one's TA, when Schön¹⁷ and

Brookfield¹⁹ talk about 'assumptional structures' and 'assumptions', or Atkins and Murphy⁹ talk about 'perspectives', they are all referring to a third core component: the conscious or unconscious conceptual frame (CF) that underlies our thoughts and actions. For authors, reflection involves: (i) the process of 'becoming aware of' this underlying conceptual frame which reveals 'why we perceive, think, feel or act as we do',⁴⁰ and (ii) making this underlying conceptual frame the new content of reflective thinking by 'scrutinising [its] accuracy and validity'.¹⁹ In organisational learning, it is this questioning of the underlying conceptual frame that leads to Argyris and Schön's 'double-loop learning'.^{41,42} Thus, along with ACEI thinking about TA, reflection differs from other thinking processes in that it also requires thinking aimed at 'one's understanding of the problem [...] rather than aimed simply at trying to solve it'.²⁴ Mezirow⁴⁰ (premise reflection) and Kember *et al.*^{43,44} (critical reflection) consider this thinking 'critically about that thinking that got us to fix this opportunity' (in Schön's words¹⁷) as the highest level of reflection. Thinking about one's underlying conceptual frame appears to be required for reflection to occur.

The view on change component (VC)

Why does one reflect? The reflective thinking process also differs from general thinking in terms of its purpose. The majority of definitions view the purpose of reflection as leading to some form of

change, the most explicit being Boyd and Fales' definition, in which reflection 'creates and clarifies meaning' and 'results in a changed conceptual perspective'.²⁰ Others use less precise descriptors, such as 'new', 'deeper' and 'alternative'. Having a view on change (VC) is the fourth core component we identified. Mezirow's consideration of critical reflection as instrumental in his transformative dimensions of adult learning⁴⁰ attests to the importance of a view on change in reflection. Analogous to the CF component, the VC component pertains to both the process and content of reflection. The aims of reflection are: (i) to process one's TA and CF with a view to change (how to think), and (ii) to reprocess this envisioned change as the content of further reflective thinking (what to think about). By viewing how the envisioned change can be changed further, the reflective process can 'spiral onwards' (Jay and Johnson³⁸), involving 'trial' (Korthagen⁴⁵) and experimentation (Schön¹⁷ and Ross⁴⁶). One should think with the purpose of change in mind in order to be reflecting.

The self component (S)

The word 'reflection' stems from the Latin root *reflexio*, which refers to the act of 'bending back'. The idea of reflection as a thinking process concerned with the self appears in most definitions in implicit or explicit form. Sandars⁶ uses the term 'self', whereas others use possessive adjectives such as 'their' and 'our' or first-person pronouns such as 'us' and 'we'. Although a thinking process can be ACEI, deal with TA and CF, and aim for a VC, it becomes reflective particularly when these four components are linked to the fifth component, namely

the self (S). The less developed models of reflection regard the self component as pertaining solely to the *content* of the reflective thinking process (thinking about oneself or one's TA). However, as Boyd and Fales²⁰ make clear, the self component is also linked to the *process* of reflective thinking. When clarifying meaning in terms of self, one uses the self to examine how one's TA, CF and VC are firstly related to the self and, secondly, informed by the self. There is a significant difference between thinking about something related to the self (whereby the *content* is related to the self: e.g. *my* actions) and thinking about something *as related* to the self (whereby the *process* is related to the self: e.g. what do my actions *say about me?*). Reflective thinking should include both.

The operational definition of reflection

Our conceptual analysis has established reflection as a specific thinking process comprising five distinct components (TA, ACEI, CF, VC, S), as shown in the lower portion of Fig. 4. After multiple refinements to the wording, we coined the following final definition of reflection:

Reflection is the process of engaging the self in attentive, critical, exploratory and iterative interactions with one's thoughts and actions, and their underlying conceptual frame, with a view to changing them and with a view on the change itself.

Using this definition and its five core components as an underlying structure, Table 2 presents the 15 reported definitions and their interrelationships.

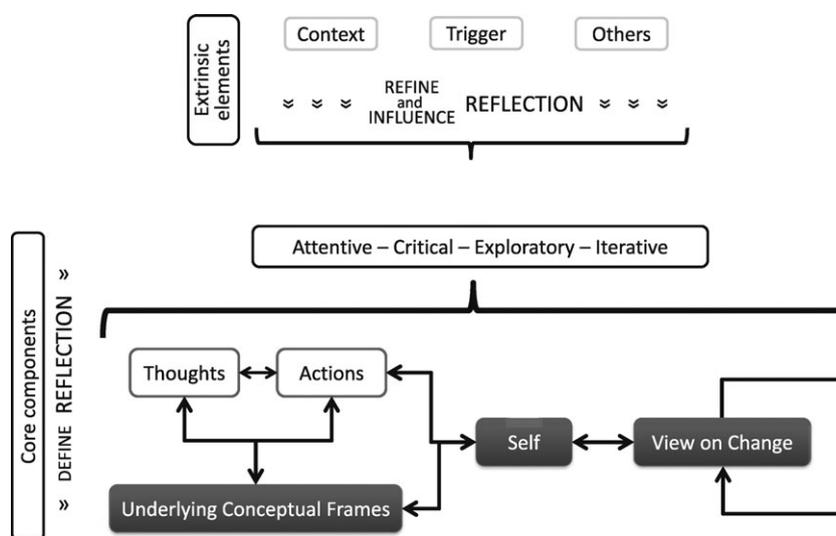


Figure 4 Conceptual model of reflection

Table 2 Breakdown of the definitions according to the core components of reflection

Author(s)	Core components				
	TA	ACEI	CF	VC	S
Dewey ¹	'supposed form of knowledge'	'active, persistent and careful'	'grounds that support it'	'further conclusion to which it tends'	–
Argyris & Schön ^{41,42}	–	–	'underlying norms, policies and objectives'	'modification' 'corrected'	–
Schön ^{17,36}	'knowing-in-action'	'questioning' 'critically'	'assumptive structures'	–	–
Boyd & Fales ²⁰	'issue of concern'	'exploring'	'conceptual perspective'	'creates and clarifies meaning' 'changed'	'internally' 'in terms of self'
Boud et al. ¹⁸	'experiences'	'explore'	–	'lead to new understanding and appreciation'	'their'
Korthagen ⁴⁵	'action'	'awareness of essential aspects'	–	'creating alternative methods of action' 'trial'	–
Brookfield ¹⁹	'thoughts and actions'	'scrutinising the accuracy and validity'	'assumptions that underlie'	'reconstituting' 'make them more inclusive and integrative'	'our experience of reality'
Mezirow ⁴⁰	'experience'	'critically assessing'	'premise(s)' 'why we perceive, think, feel or act' 'reasons for and consequences of our possible habits'	'give meaning'	'our'
Atkins & Murphy ⁹	'uncomfortable feelings and thoughts' 'feelings and knowledge'	'critical analysis'	'perspective'	'new'	–
Hatton & Smith ³⁹	'about action'	'deliberate thinking'	–	'view to its improvement'	–
Moon ⁵⁹	'complex or unstructured ideas'	'mental processing'	–	–	–
Kember et al. ^{43,44}	'experience, beliefs and knowledge'	'careful re-examination and evaluation'	'deep-seated [...] beliefs' 'belief structures'	'new perspectives' 'perspective transformation'	–
Mann et al. ⁷	'knowledge and experience'	'purposeful critical analysis'	–	'achieve deeper meaning and understanding'	–
Sandars ⁶	'situations'	–	'metacognitive'	'developing greater understanding' 'future encounters [...] are informed from previous encounters'	'the self'

TA, [one's] thoughts and actions; ACEI, attentive, critical, exploratory and iterative [thinking]; CF, [the underlying] conceptual frame; VC, a view on the change; S, self.

The extrinsic elements of reflection

Our definition introduces five core components that together define what reflection *is*. However, because reflection cannot occur in a vacuum, it is also influenced by certain extrinsic elements, which, although not informative of the *nature* (i.e. definition) of reflection, add to its understanding. Extrinsic elements alter *instances* of reflective thinking processes, but do not alter thinking processes to make them reflective *per se*. Given that they feature significantly in our model of reflection, we will briefly discuss two extrinsic elements identified in our review (i.e. the trigger and context of reflection), along with others reported in the literature.

The trigger of reflection

Boyd and Fales identify the trigger of reflection as being ‘experience’.²⁰ As an experience triggers reflection, what is recognised or recalled of the experience is held onto as the content to be fed into the reflective thinking process. Because what is *recognised* or *recalled* of an experience can differ widely from the *actual* experience, the distinction between the trigger and the actual content of reflection is worth emphasising. The trigger of reflection, or what Eraut calls the focus of reflection,⁴⁷ usually pertains to our thoughts and actions (TA), but should also pertain to our underlying conceptual frames (CF), view on change (VC), or view of self (S).

The context of reflection

How reflection unfolds will vary according to innumerable contextual factors such as the academic field, the setting and so on.³¹ The most commonly mentioned contextual factor in reflection is timing. In his definition, Sandars specifies that reflection occurs ‘before, during and after situations’.⁶ This mirrors Loughran’s anticipatory reflection⁴⁸ (before), and Schön’s ‘reflection-in-action’ (during) and ‘reflection-on-action’³⁶ (after). The vast majority of current definitions, studies and applications of reflection are concerned with reflection that takes place after the situation of interest. However, because reflection varies according to the context, there is an added value in also describing reflection in other contexts (e.g. before or during the action).

Other extrinsic elements of reflection

Other definitions and models have identified more extrinsic elements characterising reflection. For

example, Mamede and Schmidt’s structure of reflective practice includes an ‘attitude of openness towards reflection’,⁴⁹ which can be understood as the *state of the person* undergoing reflection. Boud *et al.*¹⁸ (‘affective activities’) and Atkins and Murphy⁹ (‘analysis of feelings’) describe an *affective* element in reflection, whereas Epstein⁵⁰ and Tremmel⁵¹ relate reflection to *mindfulness*. Both Korthagen⁴⁵ and Schön,^{17,36} in more elaborate descriptions, underline the importance and influence of a *facilitator* for reflection. Aukes *et al.* describe one *outcome* of reflection in medical practice as ‘the benefit of balanced functioning, learning and development’.¹⁶ This non-exhaustive list of extrinsic elements shows how the conceptualisation of reflection can be extensively refined.

A conceptual model of reflection

Our conceptual model of reflection, illustrated in Fig. 4, builds on the five *defining* core components of reflection (TA, ACEI, CF, VC and S) and supplements them with the *influencing* extrinsic elements. It depicts the extrinsic elements as separate external concepts that interact with and refine the core components of reflection.

DISCUSSION

Multiple definitions and models currently exist and have contributed to the accrual of multiple meanings of reflection, which we believe have impeded its consensual development. Lest our coining of another conceptualisation of reflection will worsen this problem, we first present the theoretical strengths and practical benefits of our process of defining reflection and the resulting model, before addressing their limitations and implications.

Theoretical strengths of our process and model

As the numerous models cited in our review show, contemporary reflection has come to represent more than any single author has conceived of it: to fully grasp the nature of reflection requires basing our understanding on more than the *separate* conceptions of Schön,^{17,36} Dewey¹ or Boud *et al.*¹⁸ To the best of our knowledge, the current article is the first to report on a systematic approach to *defining* reflection, improving on previous analyses based on a single author³⁵ or on multiple authors without systematic sampling.^{3,34} Because our approach was planned with the specific aim of unifying the

models and definitions, we have developed a new conceptualisation that is uniquely integrative and all-encompassing. As shown in Table 2, our conceptualisation accounts for the key elements of previous models, without emphasising one at the expense of another. This allows it to serve as a unification model, providing the features missing from other models (e.g. the lack of a CF component in the model of Boud *et al.*¹⁸ and the lack of a self component in the definitions of Dewey¹ and Schön^{17,36}). Furthermore, although it is more inclusive than previous models, we believe that our proposal strikes a better balance between excessive simplicity (e.g. Hatton and Smith³⁹) or complexity (e.g. Brookfield,¹⁹ Kember *et al.*^{43,44}). Providing a clear distinction between what is the core of reflection and what is extrinsic to it has allowed us to coin a definition that is both representative of those that precede it and discriminant of what reflection truly entails. To facilitate understanding and operationalisation, our definition uses generic wording and is self-contained, unlike, for example, Schön's model,^{17,36} which is not easy to grasp without lengthy exploration of his writing.²²

Practical benefits of our model

In the process of becoming more reflective, learners are regularly asked to engage in reflection. Generally unaware – or, rather, uninformed – of what reflection entails, learners attempt to produce *reflective* thinking, which is often hard to distinguish from any *diligent* thinking. One regularly reads detailed accounts of learners' thoughts and actions (TA component), which are sometimes attentive, critical, exploratory and iterative (ACEI). Only seldom will learners' spontaneous reflective thinking tackle the underlying conceptual frames (CF), the view on change (VC), and the self (S), which are critical features of reflection. The importance and value of each component of reflection are illustrated in Table 3, which shows how thinking processes become increasingly reflective and how the power to accelerate learning grows as each component is added.

Because our model explicitly describes the structure of reflection and its core components, it can be used as a basis for the teaching of richer and more effective reflection. By including and focusing on all five core components in their reflective thinking, learners can experience fully developed reflection and clearly distinguish it from diligent thinking or generic metacognitive thinking.⁵²

Although reflection can be broken down into components, this does not mean that reflection can be equated to the sum of its parts. Even if all the components are present, reflection will unleash its full potential only when the systemic components interact. The most significant interaction is the reciprocity between one's TA and their CF, which the reflective process should promote. This uniquely human capacity to 'think inside the box' (thinking about our TA) and 'outside the box' (thinking about the CF underlying our TA) is instrumental in fostering high-level reflection and in changing one's ways of being, doing and thinking. Similarly, analysing how the self explains and influences (or is influenced by) our thoughts and actions and our conceptual frames is undoubtedly key to effective reflection. Because reflection comprises both the individual components and the many interactions among them, it is easy to see how non-linear, complex, subjective and potent it can become, and why reflection can be so hard to assess and teach.

By distinguishing the core components from the extrinsic elements, our model allows reflection to be *informed* by the extrinsic elements, without being bound to them. Reflection thus remains universally applicable and understandable independent of context. Reflection, in our model, can involve any discipline, any medium (e.g. portfolios, oral sessions), any timing (i.e. before, in, or after action), and so forth. It can draw on affective content if appropriate, as Boud *et al.* suggest,¹⁸ or can forgo it if not. By pinpointing its fundamental components, and by prescribing only those, our definition allows reflection to assume many different forms without diluting its meaning.

Limitations of our process of defining reflection

To achieve a manageable dataset for analysis, we first retrieved definitions reported by major authors, and extracted an author's or authors' model only when no definition was obtained. Although we made every effort to ensure accurate representation, we acknowledge that the excerpts presented in Table 1 may be considered condensed or fragmentary. This is a telling example of the difficulties encountered when seeking to understand reflection. Additionally, inherent to any qualitative analysis, a risk for bias in interpretation exists. To lessen this possibility, results were discussed at each research stage, and any disagreements were outlined and resolved. Albeit that we recognise these limitations, we believe these shortcomings in retrieval or analysis

Table 3 An example of increasingly reflective thinking processes

Core components	TA	TA + ACEI	TA + ACEI + CF	TA + ACEI + CF + VC	TA + ACEI + CF + VC + S
Nicolas and issues at work	Nicolas thinks about issues at work	Nicolas thinks about issues at work in ways that are attentive, critical, exploratory and iterative	Nicolas thinks about the <i>underlying</i> reasons for the issues at work in an ACEI way	Nicolas thinks about the issues at work and the reasons underlying them in an ACEI way, and tries to resolve both the issues and the underlying reasons	Nicolas thinks about <i>his</i> issues at work and the underlying reasons. He thinks about what these say about him and how they relate to him. He does so in an ACEI way in order to change the way he behaves and works

TA, [one's] thoughts and actions; ACEI, attentive, critical, exploratory and iterative [thinking]; CF, [the underlying] conceptual frame; VC, a view on the change; S, self.

have not significantly impacted our proposed definition of reflection, as the key *defining* features of authors' models are accounted for. Furthermore, whereas our definition is considered comprehensive, our model voluntarily allows for the unmentioned elements of other models to be integrated as 'other' extrinsic elements, as shown in Fig. 4.

A few implications of our model

Professional development and autonomy

Schön viewed reflection as a primary way for practitioners to learn in practice.¹⁷ Of the various means of learning, reflection has earned a prominent place in the pedagogy of professional disciplines. We believe that the popularity of reflection is partly attributable to the autonomy it affords. Because professional practice *per se* entails the notion of autonomy, professionals should learn in ways that foster autonomy. By placing the self component at the centre of the reflective process, our model of reflection clearly focuses on autonomous practice. Further, whereas our model prescribes five components of reflection, it allows substantial leeway in the content within these components. One's reflection and the resultant learning can be as deeply personal and autonomous as one's practice. Moreover, because reflection is grounded in one's unique conceptual frame, any operationalisation of reflection must take into account its inherent subjectivity.

Assessment and teaching

Our model of reflection has implications for the assessment and teaching of reflection. Firstly, because reflection comprises five components, it cannot be fully assessed in a monolithic, one-dimensional manner from non-reflective to reflective, as most scales do.^{29,30,43,53} Our model allows a more in-depth understanding of reflection through separate understanding of each of the components and their interactions. For example, one might think in an attentive, critical, exploratory and iterative fashion without ever thinking about one's underlying conceptual frame. Whereas a one-dimensional assessment of reflection will not distinguish a functioning ACEI component from an absent CF component, a multi-dimensional scale will do, and will therefore have the ability to inform the personalised teaching and development of reflection.

Secondly, because of the multi-component nature of reflection, its assessment should not be simply dichotomised into 'reflective' and 'non/pre-reflective'.^{54–56} Although the most mature and powerful form of reflection involves all five components, this does not mean that any thinking short of that is unreflective. Instead, we prefer to think of reflection as a continuum, with many degrees of development for each component. Teaching the art of reflection means moving towards full reflection.

Thirdly, by clearly defining reflection irrespective of timing, our model can be used to assess and teach both reflection-*in-action* and reflection-*on-action*, unlike other models or applications of reflection such as reflective writing, which concerns mainly reflection after the action.

Finally, because reflection is explicitly conceptualised as a process, without reference to any predetermined extrinsic outcome, we believe that our model will help prevent the error of teaching and assessing the *outcome* of an instance of reflection (what – the content – we want one to learn) rather than its *process* (how to learn). As Kolb⁵⁷ has said of learning, reflection is a process, not an outcome. When assessing reflection, we should not measure the final destination of reflection or the distance travelled using it, but, rather, the reflective journey itself, as conveyed by the five core components.

CONCLUSIONS

Through a systematic and unified analysis of the most cited definitions of reflection, we developed a new definition and model. Our operational definition includes five distinct core components (TA, ACEI, CF, VC, S), which distinguish reflection from other thinking processes. Our model of reflection supplements the core components with extrinsic elements that inform and refine instances of reflection.

In light of the aforementioned strengths, benefits and limitations, we propose that our conceptualisation, rather than amplifying the problem of the lack of common understandings and applications of reflection, may serve as a current meta-definition and meta-model to provide a sound framework for understanding and operationalising reflection.

In Kurt Lewin's thoughtful words, there is nothing as practical as a good theory.⁵⁸ Ultimately, the usefulness and validity of our definition and model will depend on their capacity to inform practical applications. Although our understanding of reflection will certainly evolve with further research, we hope that the process we have described here will bring us closer to developing more comprehensive learning, teaching and research about reflection.

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REFERENCES

- 1 Dewey J. *Think We. A Restatement of the Relation of Reflective Thinking to the Educative Process*. Boston, MA: D C Heath & Co. 1933.
- 2 Roglio KDD, Light G. Executive MBA programmes: the development of the reflective executive. *Acad Manage Learn Educ* 2009;**8**:156–73.
- 3 Foster RD, Stines A. Experience, thinking and learning: an integrated definition and framework of reflection. *Organ Dev J* 2011;**29**:9–19.
- 4 Roberts A. Encouraging reflective practice in periods of professional workplace experience: the development of a conceptual model. *Reflect Pract* 2009;**10**:633–44.
- 5 Hickson H. Critical reflection: reflecting on learning to be reflective. *Reflect Pract* 2011;**12**:829–39.
- 6 Sandars J. The use of reflection in medical education: AMEE Guide No. 44. *Med Teach* 2009;**31**:685–95.
- 7 Mann K, Gordon J, MacLeod A. Reflection and reflective practice in health professions education: a systematic review. *Adv Health Sci Educ Theory Pract* 2009;**14**:595–621.
- 8 Bernard AW, Gorgas D, Greenberger S, Jacques A, Khandelwal S. The use of reflection in emergency medicine education. *Acad Emerg Med* 2012;**19**:978–82.
- 9 Atkins S, Murphy K. Reflection: a review of the literature. *J Adv Nurs* 1993;**18**:1188–92.
- 10 Burton A. Reflection: nursing's practice and education panacea? *J Adv Nurs* 2000;**31**:1009–17.
- 11 Nelson S. The lost path to emancipatory practice: towards a history of reflective practice in nursing. *Nurs Philos* 2012;**13**:202–13.
- 12 Ng SL. Reflection and reflective practice: creating knowledge through experience. *Semin Hear* 2012;**33**:117–34.
- 13 Frank JR, ed. *The CanMEDS 2005 Physician Competency Framework. Better Standards. Better Physicians. Better Care*. Ottawa, ON: Royal College of Physicians and Surgeons of Canada 2005.
- 14 Sox HC. Medical professionalism in the new millennium: a physician charter. *Ann Intern Med* 2002;**136**:243–6.
- 15 Gans R. Mentoring with a formative portfolio: a case for reflection as a separate competency role. *Med Teach* 2009;**31**:883–4.

- 16 Aukes LC, Geertsma J, Cohen-Schotanus J, Zwierstra RP, Slaets JP. The development of a scale to measure personal reflection in medical practice and education. *Med Teach* 2007;**29**:177–82.
- 17 Schön DA. *The Reflective Practitioner: How Professionals Think in Action*. New York, NY: Basic Books 1983.
- 18 Boud D, Keogh R, Walker D. *Reflection: Turning Experience into Learning*. London: Kogan Page 1985.
- 19 Brookfield S. Using critical incidents to explore learners' assumptions. In: Mezirow J, ed. *Fostering Critical Reflection in Adulthood: A Guide to Transformative and Emancipatory Learning*. San Francisco, CA: Jossey-Bass 1990;177–93.
- 20 Boyd EM, Fales AW. Reflective learning key to learning from experience. *J Humanist Psychol* 1983;**23**:99–117.
- 21 Eraut M. The practice of reflection. *Learn Health Soc Care* 2004;**3**:47–52.
- 22 Ixer G. There's no such thing as reflection. *Br J Soc Work* 1999;**29**:513–27.
- 23 Pitts J, ed. *Portfolios, Personal Development and Reflective Practice*. Edinburgh: Association for the Study of Medical Education 2007.
- 24 Eva KW, Regehr G. 'I'll never play professional football' and other fallacies of self-assessment. *J Contin Educ Health Prof* 2008;**28**:14–9.
- 25 Bengtsson J. What is reflection? On reflection in the teaching profession and teacher education. *Teach Teach Theory Pract* 1995;**1**:23–32.
- 26 Leung KH, Pluye P, Grad R, Weston C. A reflective learning framework to evaluate CME effects on practice reflection. *J Contin Educ Health Prof* 2010;**30**:78–88.
- 27 Koole S, Dorman T, Aper L, Scherpbier A, Valcke M, Cohen-Schotanus J, Derese A. Factors confounding the assessment of reflection: a critical review. *BMC Med Educ* 2011;**11**:104.
- 28 Sobral D. An appraisal of medical students' reflection-in-learning. *Med Educ* 2000;**34**:182–7.
- 29 Plack MM, Driscoll M, Marquez M, Cuppernull L, Maring J, Greenberg L. Assessing reflective writing on a paediatric clerkship by using a modified Bloom's taxonomy. *Ambul Pediatr* 2007;**7**:285–91.
- 30 Boenink AD, Oderwald AJ, de Jonge P, van Tilburg W, Smal JA. Assessing student reflection in medical practice. The development of an observer-rated instrument: reliability, validity and initial experiences. *Med Educ* 2004;**38**:368–77.
- 31 Boud D, Walker D. Promoting reflection in professional courses: the challenge of context. *Stud High Educ* 1998;**23**:191–206.
- 32 Mezirow J. *Fostering Critical Reflection in Adulthood: A Guide to Transformative and Emancipatory Learning*. San Francisco, CA: Jossey-Bass 1990.
- 33 Collin S, Karsenti T, Komis V. Reflective practice in initial teacher training: critiques and perspectives. *Reflect Pract* 2013;**14**:104–17.
- 34 Rogers RR. Reflection in higher education: a concept analysis. *Innovat High Educ* 2001;**26**:37–57.
- 35 Rodgers C. Defining reflection: another look at John Dewey and reflective thinking. *Teachers Coll Rec* 2002;**104**:842–66.
- 36 Schön DA. *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions*. San Francisco, CA: Jossey-Bass 1987.
- 37 Creswell JW. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks, CA: Sage Publications 2013.
- 38 Jay JK, Johnson KL. Capturing complexity: a typology of reflective practice for teacher education. *Teach Educ* 2002;**18**:73–85.
- 39 Hatton N, Smith D. Reflection in teacher education: towards definition and implementation. *Teach Teach Educ* 1995;**11**:33–49.
- 40 Mezirow J. *Transformative Dimensions of Adult Learning*. San Francisco, CA: Jossey-Bass 1991.
- 41 Argyris C, Schön DA. *Theory in Practice: Increasing Professional Effectiveness*. San Francisco, CA: Jossey-Bass 1974.
- 42 Argyris C, Schön DA. *Organizational Learning: A Theory of Action Perspective*. Reading, MA: Addison-Wesley 1978.
- 43 Kember D, Leung DY, Jones A et al. Development of a questionnaire to measure the level of reflective thinking. *Assess Eval High Educ* 2000;**25**:381–95.
- 44 Kember D, McKay J, Sinclair K, Wong FKY. A four-category scheme for coding and assessing the level of reflection in written work. *Assess Eval High Educ* 2008;**33**:369–79.
- 45 Korthagen FA. Reflective teaching and preservice teacher education in the Netherlands. *J Teach Educ* 1985;**36**:11–5.
- 46 Ross DD. First steps in developing a reflective approach. *J Teach Educ* 1989;**40**:22–30.
- 47 Eraut M. Schön shock: a case for reframing reflection-in-action? *Teach Teach Theory Pract* 1995;**1**:9–22.
- 48 Loughran JJ. *Developing Reflective Practice: Learning about Teaching and Learning through Modelling*. London: Falmer Press 1996.
- 49 Mamede S, Schmidt HG. The structure of reflective practice in medicine. *Med Educ* 2004;**38**:1302–8.
- 50 Epstein RM. Mindful practice. *JAMA* 1999;**282**:833–9.
- 51 Tremmel R. Zen and the art of reflective practice in teacher education. *Harv Educ Rev* 1993;**63**:434–59.
- 52 Cleary TJ. The use of reflection in medical education: guide supplement 44.1. Viewpoint. *Med Teach* 2011;**33**:500–1.
- 53 King PM. The reflective judgement model: transforming assumptions about knowing. *J Coll Student Dev* 1997;**4**:141.
- 54 Jarvis P. Reflective practice and nursing. *Nurse Educ Today* 1992;**12**:174–81.
- 55 Boyd LD. Development of reflective judgement in the pre-doctoral dental clinical curriculum. *Eur J Dent Educ* 2008;**12**:149–58.
- 56 Wald HS, Davis SW, Reis SP, Monroe AD, Borkan JM. Reflecting on reflections: enhancement of medical

- education curriculum with structured field notes and guided feedback. *Acad Med* 2009;**84**:830–7.
- 57 Kolb DA. *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, NJ: Prentice-Hall 1984.
- 58 Lewin K. *Field Theory in Social Science: Selected Theoretical Papers*. New York: Harper & Brothers 1951.

- 59 Moon JA. *A Handbook of Reflective and Experiential Learning: Theory and Practice*. London: Routledge 2004.

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