

Influences and Outcomes: A Systematised Review of Reflective Teaching Strategies in Student Healthcare Placements

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Abstract

The development of reflection in tertiary students benefits from facilitation. Educators commonly facilitate the development of affective, cognitive, and meta-cognitive skills associated with reflection. Reflective teaching strategies, that is, guiding comments or questions used within an activity to stimulate cognitive processes, are strategies used by educators to facilitate reflection. This systematised review focuses on the approaches used to measure influences and outcomes of the teaching of reflection in order to enhance educators' understanding of recent evidence for use in the placement setting. The review explores what outcome measures are used in current research, and how the evidence incorporates contextual factors such as time, safety, mentorship, supervision, and emotional and intellectual support to develop reflection in students. Systematised searching of CINAHL®, ProQuest, ERIC, OvidSP, Scopus®, and Web of Science™ databases for the period 2005 to 2015 identified 26 studies, from a pool of 6968 that met the inclusion criteria. Results indicate that a range of reflective teaching strategies are being used by allied and oral health, nursing, and the medical professions that assist movement towards critical reflection. No direct connection between this movement and the presence of contextual factors was established. Review outcomes are limited by the variable quality of the included studies and the lack of high quality tools for measurement of teaching effect on the development of reflection. We recommend that future studies into the use of reflective teaching strategies continue to incorporate contextual factors in combination with valid and reliable measurement practices in the workplace.

Keywords: outcome assessment (health care); reflection; students; workplace

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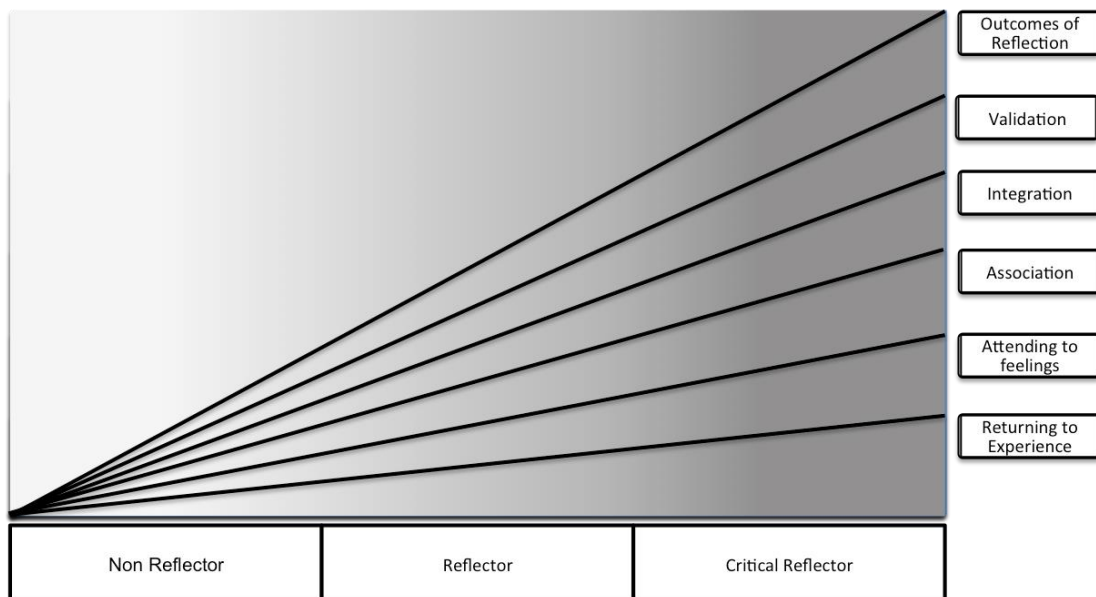
Introduction

The development of reflection is not innate ([Driessen et al. 2008](#)); it requires facilitation ([Ip et al. 2012](#), [Plack, Dunfee, and Rindflesch 2008](#)). Reflection provides tertiary healthcare students with a generic means of furthering skill and knowledge development within a lifelong learning context ([Donovan 2007](#), [Mamede and Schmidt 2004](#), [Paget 2001](#), [Roche and Coote 2008](#), [Stark et al. 2006](#)). The placement environment is a complex learning context for students in allied health (for example speech pathology, physiotherapy, radiation therapy), medicine, and nursing that predominantly occurs in workplace settings such as healthcare centres, private practice, hospitals, non-government organisations, and university clinics. Placements enable students to connect theory to practice, as well as take advantage of practice-based learning supports within their chosen profession, for example supervision and mentoring. The use of reflection within this practice-based learning context is a common education practice facilitated by clinical educators. The development and practice of reflection leads to increased self-efficacy in performance within nursing and allied health ([Kuiper, Murdock, and Grant 2010](#), [Levine, Kern, and Wright 2008](#)), and increased diagnostic accuracy in medicine ([Mamede et al. 2010](#)). Reflection in turn is theorised to assist students to integrate theory and knowledge with their understandings gained from experience ([Boud, Keogh, and Walker 1985](#), [Schön 1987](#)).

The increasing number of theoretical papers and experimental investigations of reflection in health education literature is illustrated by the numerous definitions of reflection and interpretations of these definitions ([Aronson et al. 2011](#), [Mann, Gordon, and MacLeod 2009](#), [White Fook, and Gardner 2006](#)) that have commonly been based on popular seminal works of [Boud, Keogh, and Walker \(1985\)](#) and [Schön \(1987\)](#). For the purpose of this review, reflection within the context of healthcare practice-based education is defined as “a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to [gain] a new understanding and appreciation” ([Boud, Keogh, and Walker 1985](#): 19). The definition of reflection can be further refined according to timing of the reflective action in relation to the event that is being reflected upon and by depth of reflection by the learner. The timing of implementing reflection and its effect on depth has been explored by [Teekman \(2000\)](#) and the seminal authors [Schön \(1987\)](#) and [Boud, Keogh, and Walker \(1985\)](#). These authors explored the effect of pre-emptive or ‘for action’ reflection ([Teekman 2000](#)); during or ‘in action’ reflection ([Schön 1987](#)); and post or ‘on action’ reflection ([Boud, Keogh, and Walker 1985](#)). The ‘timing’ variable in reflection plays an important role in the reflectee’s motivation to engage in the process and the role that doubt, uncertainty, and/or the presence of conflict can have during professional practice. The focus of recent investigations is predominantly ‘on-action’ ([Aronson et al. 2012](#), [Findlay, Dempsey, and Warren-Forward 2011](#)). This focus as discussed in [Mann, Gordon, and MacLeod \(2009\)](#) is likely secondary to the methodological challenges present in measuring reflection ‘for action’ and ‘in action’. The proficiency with which students use reflective thinking processes in the clinical setting at any time point follows a continuum of reflective depth, from the non-reflective describer to the critical reflector. “Critical reflection is the process by which adults identify the assumptions governing their actions, locate the historical and cultural origins of the assumptions, question the meaning of the assumption, and develop alternative ways of acting” ([Stein 2000](#): 1).

Descriptors used in the literature to gauge progress along this continuum of depth of reflection vary. [Boud, Keogh, and Walker \(1985\)](#) and [Mezirow \(1990\)](#) describe their understanding of the process of reflection using six and three elements respectively ([Figure 1](#)). The affective, cognitive, and meta-cognitive elements described by [Boud, Keogh, and Walker \(1985\)](#) and contained within Mezirow’s reflective concept do not follow a linear hierarchy, rather, as more of each element becomes present in the reflectee’s understanding, the more critical reflection is thought to be. A third seminal author ([Schön 1987](#)) emphasises the cyclical nature of reflection. The artistry in framing, hypothesis testing, and re-framing an incident ([Schön 1987](#)) provides the reflectee with ongoing opportunities for changes to affective, cognitive, and meta-cognitive processes that lead to critical understandings, or to continue after an extract.

Figure 1. Reflective continuum



Reflective elements based on [Mezirow \(1990\)](#) and [Boud, Keogh, and Walker \(1985\)](#) shown in relation to each other. The grey scale gradient in the background represents reflective depth, or quality in the presence of each element.

Studies have used both reflective frameworks and reflection activities to assist student reflection whilst they are on clinical placement. In turn, educators use this combination of reflection frameworks and reflection activities to assist students in their journey towards critical reflection. Reflective frameworks, when used by educators in a placement context, are defined as a set of guiding comments, questions, or statements that stimulate an individual to explicitly or implicitly build thinking strategies associated with an incident in a cyclical manner – see, for example, [Plack, Dunfee, and Rindfleisch \(2008\)](#). These guiding frameworks are often reported in combination with a variety of reflective activities that enable students to communicate reflective outcomes including blogs ([Wright and Lundy 2012](#)), journaling ([Dye et al. 2011](#)), seminars ([Beylefeld, Nena, and Prinsloo 2005](#)), individual and small group discourse ([Peterkin et al. 2012](#), [Toy et al. 2009](#)), electronic programs ([Thomas and Goldberg 2007](#)), storyboards ([Lillyman, Gutteridge, and Berridge 2011](#)), portfolios ([Gordon 2003](#)), and written narratives ([Kleinheksel 2014](#), [Lasater and Nielsen 2009](#)). In this review, the combination of reflective frameworks and reflective activities are referred to as reflective teaching strategies. Whilst these are two separate facets, the combination provides a manner that enables students to communicate reflective outcomes that may be measured.

Over the past 10 years, studies utilising a reflective teaching strategy can be seen to use two broad teaching approaches that aim to progress students along the depth continuum from surface descriptions to critical perspectives. A 'Process' approach ([Hill, Davidson, and Theodoros 2012](#), [Ip et al. 2012](#), [Plack, Dunfee, and Rindfleisch 2008](#)) follows a gradual course that is used repetitively over time to increase depth of reflection in a developmental manner. Conversely, a 'Vertical' approach ([Chretien, Goldman, and Faselis 2008](#), [Stark et al. 2006](#)) is designed to transition the learner (or reflectee) from surface to deep, or critical, reflection within the one occasion. This approach is often more detailed and resource intensive than a Process approach ([Mann, Gordon, and MacLeod 2009](#)). It has yet to be determined if a particular teaching approach is best suited to improving the reflective proficiency of students.

Educators can use a reflective continuum to gauge students' reflection. This continuum, in turn, can support educators' decisions surrounding the need to provide student support. Ideally, educators use measurement or analysis to accurately identify where on the reflective continuum

a student sits in order to support their judicious use of teaching strategies. The majority of research to date has used qualitative content analysis of students' reflective journals as a measurement strategy. Although valuable, this is a resource intensive approach that is challenging to implement in the workplace due to the time and expertise required.

Translation of insights gained from research exploring the use of reflection by educators into actual workplaces is vital. [Mann, Gordon, and MacLeod \(2009\)](#) identified that the most influential elements in "enabling the development of reflection" ([Mann, Gordon, and MacLeod 2009](#): 608) are emotional and intellectual support, mentoring, time, safety in the expression of opinions, and supervision practices that accommodate individual learner styles. Given this positive influence, it presents educators and researchers alike with evidence for the inclusion of these contextual factors into reflective teaching strategies in order to achieve optimal outcomes.

Implementation of a growing quantity of evidence is an ongoing challenge faced by educators. The range and diversity of reflective teaching strategies are matched with an assortment of definitions, and resource intensive measurement methods used for the interpretation of reflection across an array of modalities. Owing to this complexity of intertwined concepts and practices, educators face a difficult task in judiciously using the evidence to implement an approach that supports the development of reflection in students.

This review focuses on the approaches used to measure influences and outcomes of the teaching of reflection in students whilst they are on clinical placement. It will explore what evidence there is to support the use of reflective teaching strategies in professional healthcare clinical education; what, if any measures have been used in current research; and how current research is integrating the use of contextual factors to support student reflection.

Method

A systematised search ([Grant and Booth 2009](#)) was undertaken of the CINAHL®, ProQuest, ERIC, OvidSP, Scopus®, and Web of Science™ databases for the period 2005 to 2015. This timeframe was decided upon as the last major review of this topic ([Mann, Gordon, and MacLeod 2009](#)) encompassed papers up to 2005. Search terms gathered from keywords used in seminal and frequently cited papers on this subject were utilised in order to cover the wide variety of terms used to describe reflection and its associated outcomes ([Table 1](#)).

Table 1. Search terms

Population	Intervention	Outcomes
"Allied Health Student*", "Health Science* Student*", "Nursing Student*", "Medical Student*", "Health Occupation Student*"	"Reflective Journal*", "Reflective Portfolio", "Reflective Narrative*", "Reflective Activit*", "Critical incident technique", "Critical conversation*", "Critical conversation*", "Reflective cognitive process*", "Reflective framework", "Reflective model", "Reflective tool", "Reflect* program", "Reflecti* technique", "Reflect* strateg*", "Reflective learning framework"	Reflection, "Critical thinking", "Critical Reflect*", "Reflect* practice", "transformational thinking", "Critical awareness", "Critical consciousness", "Critical inquiry", "Critical self-awareness", "Self Reflective ability", "Reflective learning", "Self- Reflection", Reflectivity

The search identified 6968 potential articles. The lead reviewer, through screening of title, abstract, and then whole paper, refined results down to 26 using the inclusion criteria detailed in

[Table 2](#) and the refinement process illustrated in [Figure 2](#). The McMaster critical review guidelines ([Law et al. 1998](#)) were used to ensure quality of the papers included. This guideline was chosen as it can be applied to a wide variety of methodologies, whilst providing a consistent grounding from which quality and subsequent inclusion/exclusion decisions can be made. Qualitative studies were included in the review when overall rigour (i.e. creditability, transferability, dependability and confirmability) was both justified and adequate as per the McMaster analysis form. Quality of quantitative studies was determined by design appropriateness, sampling method, data analysis and conclusions in keeping with results. Studies that did not clearly report or justify methods used were excluded from the final collection of studies in the review. Studies were also excluded if they only confirmed the value of reflection, a valuable though already established outcome. Authors MP and GN confirmed consistent use of the McMaster guidelines, with 100% consensus with ratings by the primary author from a selection (n=6) of the included studies. This selection of six papers contained papers that were of borderline and of high quality, ensuring a range of quality standards was considered.

Table 2. Inclusion criteria

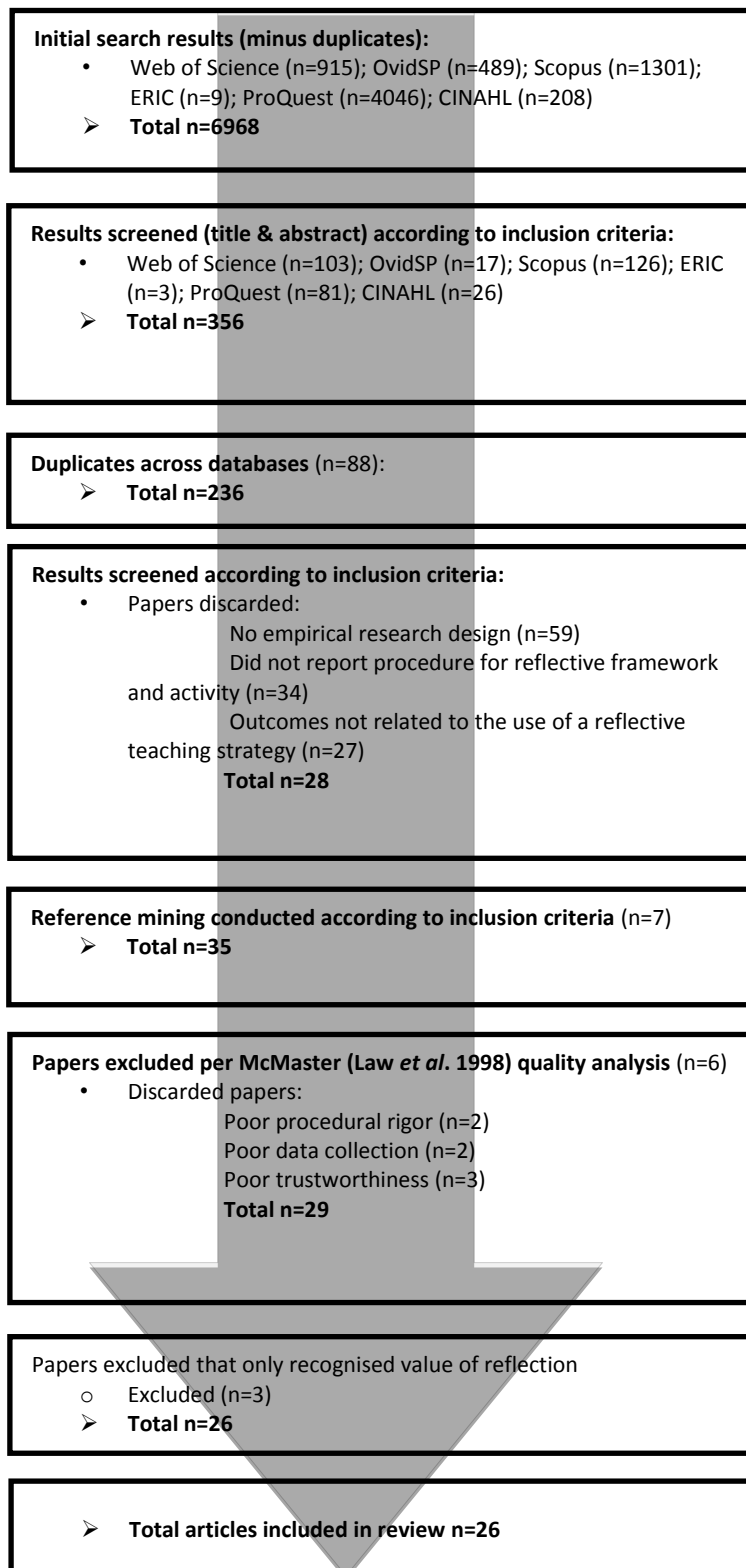
1. Based on an empirical research design
2. Included student participants from allied health (Health Education and Training Institute (HETI) n.d.), nursing, and medicine
3. Identified and explained the use of a reflective framework within a reflective activity; for example, a guide to use when completing a journal
4. Described outcomes related to the use of a reflective teaching strategy

Results

A summary of the papers included in this review utilising key elements that relate to the focus of the paper are illustrated in [Table 3](#). Headings listed along the horizontal axis include the reported aim of each study, the approach used to develop reflection, and the contextual factors reportedly used to assist in the process of reflective development. The use of contextual factors across all studies varied. To ensure consistency in analysis, contextual factors were considered to have been utilised if key words synonymous with each contextual factor were expressed in relation to the environment in which the reflective teaching strategy took place.

The dominant structural approach used to develop reflection was the Process approach ([Table 3](#)). This approach was used by 16 of the 26 papers. A further eight papers used the Vertical approach. Evidence for an emerging structural approach using a Vertical structure in a repeated, or Process manner to develop reflection was also found in one paper ([Jensen and Joy 2005](#)). Only 33% of papers included in this review made use of seminal theoretical understandings, for [Mezirow \(1990\)](#), [Schön \(1987\)](#), as a foundation to define the reflective depth of participants. Novel, or non-defined criteria to assess outcomes made up the majority of the included studies at 52%. The remainder used rubrics based on previous literature.

Figure 2. Refinement process of search results



The common theme running throughout this review is that of variation. This variation is demonstrated in the reported aims of each of the identified papers. These varying aims included investigation of the effect of timing of feedback on reflection ([Dye et al. 2011](#)); cultural competence associated with reflection ([Lie et al. 2010](#)); emotional intelligence ([Harrison and Fopma-Loy 2010](#)); and development of reflection ([Aronson et al. 2012](#), [Ip et al. 2012](#), [Makoul et al. 2010](#)). An equally diverse range of analysis techniques were used to support these aims as illustrated by professional consensus ([Makoul et al. 2010](#)), qualitative methodologies including 'immersion-crystallization style' ([Wald et al. 2009](#)), and descriptive statistics ([Aronson et al. 2012](#), [Wald et al. 2009](#)). The theme of variation is also demonstrated by the duration of interventions used to enhance or support reflection during clinical placements. Intervention duration ranged from one session ([Lillyman, Gutteridge, and Berridge 2011](#)) through to two years ([Wald et al. 2009](#)). Some studies only reported overall placement duration, rather than specific time set aside to support or teach reflection.

All studies reported positive outcomes from the implementation of reflective teaching strategies. Further exploration of these findings highlights the influence of repetition, indicating the more exposure a student had to a particular reflective strategy the greater the incidence of reflective elements appearing in practice ([Kuiper, Murdock, and Grant 2010](#)) and the greater students' movement along the reflective continuum ([Tsang 2012](#), [Wald et al. 2009](#)). Conversely findings from [Findlay, Dempsey, and Warren-Forward \(2011\)](#) and [Chirema \(2007\)](#) demonstrate that critical reflection can also be achieved from a single exposure. This conflict in the evidence is further complicated by findings from [Jenson and Joy \(2005\)](#) who found a decrease in reflective elements over time in students' journaling. [Aronson et al. \(2011\)](#) and [Wald et al. \(2009\)](#) also report decreased engagement in the reflective process with reports of constraint from static reflective teaching strategies as time progressed ([Table 3](#)).

No clear pattern was found in respect to the number of, or type of contextual factors present and its influence on reported outcomes. The majority of the identified studies reported that students' reflection was enhanced from the use of reflective teaching strategies, despite variability in the number of contextual elements present. This is demonstrated by [Aronson et al. \(2012\)](#), [Ip et al. \(2012\)](#), and [Tsang \(2012\)](#) who incorporate three or four of [Mann, Gordon, and MacLeod \(2009\)](#) contextual factors. Conversely [Lie et al. \(2010\)](#), [Levine, Kern, and Wright \(2008\)](#), and [Stark et al. \(2006\)](#) incorporated one or two different factors, yet also reported enhanced reflective depth. Investigation of this conflict is challenging, as there is no common or high quality measurement tool presently used to allow comparison, nor is there a pattern evident in the literature for type of contextual factor and its impact on students' ability to reflect in practice.



Table 3. Results

Reference	Study Characteristics	Study Aim	Teaching Structure	Contextual elements considered [^]	Measurement Tool / Criteria	Analysis Approach	Author Reported Outcomes
Aronson <i>et al.</i> (2010)	60 participants. Study conducted over 2 clerkships [#]	To determine the influence students' storytelling or writing skills had on reflective ability when using a validated scoring rubric.	Vertical	Support, Safety, Time	Novel. Based on Learman, Autry, and O'Sullivan (2008) and O'Sullivan <i>et al.</i> (2010)	Descriptive statistical analysis of dependent and independent variables using a general linear model.	No significant correlation was found between reflective ability and either storytelling or writing skills in either the guided or unguided reflection cohorts.
Aronson <i>et al.</i> (2011)	115 participants. Study conducted over one year [#]	To determine whether a guide enhances reflective writing and its correlation to satisfaction.	Vertical	Mentorship, Support, Safety	Novel. Based on Learman, Autry, and O'Sullivan (2008) and O'Sullivan <i>et al.</i> (2010)	Content analysis against a validated rubric Learman, Autry, and O'Sullivan (2008) , O'Sullivan <i>et al.</i> (2010) by two independent raters.	The reflective learning guide improves learners' written reflection. No correlation found regarding interest in reflection or gender.
Aronson <i>et al.</i> (2012)	149 participants divided into three cohorts. Study conducted over one week per cohort	To determine the effect different experimental conditions have on reflective skill in medical students' written narratives.	Process	Support, Safety, Supervision, Mentorship	Novel. Based on Learman, Autry, and O'Sullivan (2008) and O'Sullivan <i>et al.</i> (2010)	Content analysis against a validated rubric Learman, Autry, and O'Sullivan (2008) by two independent raters.	The provision of critical reflection guidelines improved reflective ability compared with the provision of only a definition of critical reflection.

Asselin (2011)	10 participants. Study conducted over one semester [#]	To describe the experience from students' perspective of using reflective teaching strategies and how it facilitated performance change	Process	Safety, Support	(Kim 1999) model of reflection	Qualitative phenomenological approach using voluntary participants.	The quality of students' reflections improved with greater exposure to reflective teaching strategies. This in turn facilitated performance change.
Canniford and Fox-Young (2015)	163 participants. Study conducted over one semester [#]	To evaluate the use of a reflective learning package with nursing students.	Process	Safety, Support	Lasater and Nielsen (2009)	The Lasater clinical judgment rubric (Lasater 2007)	Students' self-rated evaluations strongly agreed (76.3%) that reflection had value to them.
Chirema (2007)	42 participants. Study conducted over a one year [#] period	To examine the use of reflective journals in post-graduate nursing students to determine level and extent of reflection.	Vertical	Safety, Supervision	Wong et al. (1995) and)	Qualitative content analysis using the process defined in (Miles and Huberman 1994) by two independent raters. 0.5-.0.75 agreement reached.	Two thirds of respondents (n=28) illustrated varying levels of reflection according to the Wong et al. (1995) defined criteria. Results indicate that guided journals are a useful tool to promote reflection.
Chretien, Goldman, and Faselis (2008)	91 participants. Study conducted over a four week period	To promote reflection on professional development using a novel approach.	Vertical	Support, Safety, Mentorship	Mezirow (1991)	Qualitative content analysis by two raters independently using a modified version of the Moustakas method (Moustakas 1994)	The reflection process assisted students' educational experience and the affective components involved with this. 169 of 177 posts were defined as reflective according to the criteria.

Dye et al. (2011)	15 participants. Study conducted over a 16 week period	To determine the effects delayed or immediate specific email feedback had on physical therapy students' journals.	Process	Support, Supervision, Safety, Mentorship	Novel. Based on Williams et al. (2000)	Qualitative content analysis by two independent raters for consensus using the criteria validated in (Williams et al. 2000)	No statistically significant difference identified between delayed or immediate feedback type cohorts over the course of investigation.
Findlay, Dempsey, and Warren-Forward (2011)	6 participants. Study conducted over a four week period	To validate the Newcastle Reflective Inventories, and Reflective Analysis Tool to assess guided reflective writing.	Vertical	Time, Support	Boud, Keogh, and Walker (1985)	Independent analysis by two raters prior to consensus using the validated 'Deep Analytic Newcastle Reflective Analysis Tool' (Findlay, Dempsey, and Warren-Forward 2011)	A statistically significant difference was found in the level of reflection achieved in free-form versus guided journals. All participants in the guided journal cohort demonstrated critical reflection per the defined criteria.
Harrison and Fopma-Loy (2010)	16 participants. Study conducted over 16 weeks	To test the effect ten reflective journal prompts had on nursing student emotional intelligence.	Process	Safety, Support	Not defined	Analysis completed using author consensus on selected competencies from (Goleman, Boyatzis, and McKee 2001) (Emotional Intelligence Framework)	Qualitative analysis using an emotional intelligence framework found the prompts elicited reflective responses across all targeted emotional intelligence domains.
Hill, Davidson, and Theodoros (2012)	52 participants. Study conducted over one semester [#]	To describe the depth and breadth of reflective skills in speech-language therapy (SLT) students' structured journals.	Process	Support, Safety, Supervision	Schön (1987) , Bloom (1956) , and Mezirow (1990)	Qualitative content analysis as detailed in Plack and Greenberg (2005)	SLT students were shown that they can reflect on their experiences, with the majority categorized as 'reflectors' (94%) as per the defined criteria.

Hulsman, Harmsen, and Fabriek (2009)	304 participants. Study conducted over one semester#	To develop a rating criteria for the assessment of students' level of reflection.	Process	Time, Safety, Support, Mentorship	Novel. Based on investigation	Assessment criteria developed from iterative process using 20% of data prior to complete analysis and author consensus.	Four separate rating criteria were identified during the investigation. Using this criteria nursing student level of reflection was primarily at the 'description' criteria.
Ip et al. (2012)	38 participants. Study conducted over a four week period	To evaluate the change in levels of reflection pre and post intervention.	Process	Mentorship, Safety, Support, Supervision	Wong et al. (1995)	Qualitative content analysis as detailed in Huberman and Miles (2002) by two raters independently.	Statistical analysis identified 73.7% of participants progressed from descriptive reflectors to reflectors, whilst another 13.2% were rated as critical. Both percentages rose 7.9% and 0% respectively from baseline.
Jensen and Joy (2005)	20 participants. Study conducted over a 12 week period	To measure the level of reflection in nursing student journals.	Process	Nil	Mezirow (1981)	Qualitative content analysis conducted independently by two raters using a reported process.	18% of participants achieved critical reflection levels, 40% achieved discriminate reflection as per the defined criteria. The investigation also highlighted a gradual decrease in reflective elements over time (12 weeks).
Kuiper, Murdock, and Grant (2010)	26 participants divided into two cohorts who received either 60 or 120 hours of clinical opportunities	To determine if an increase in practicum hours influences nursing student clinical cognition as assessed through journals.	Process	Supervision, Safety, Support	Novel. Based on reported meta-cognitive elements	Qualitative content analysis using 'Retrospective Verbal Protocol Analysis' Kuusela. and Pallab (2000) .	Qualitative narrative analysis using a defined criteria found that the 120 clinical hours cohort demonstrated a higher incidence of meta-cognitive strategies when compared to the 60-hour cohort.

Levine, Kern, and Wright (2008)	32 participants. Study conducted over a one year# period	To determine the influence of prompting on reflection.	Process	Safety, Support	Novel. Based on definition by Bolton (2010)	Qualitative analysis using the 'editing analysis style' conducted independently by two authors.	Iterative qualitative approach identified that prompting lead to deeper reflection in 19/20 participants.
Lie et al. (2010)	188 participants. Study conducted over a four week period	To enhance students cultural competence using guided reflective narratives.	Process	Safety	Not defined	Descriptive statistical analysis of Likert-scale student responses, and author consensus on qualitative themes	Qualitative thematic analysis identified seven primary themes that students explored to come to novel understandings during guided narratives.
Lillyman, Gutteridge, and Berridge (2011)	41 participants. Study evaluated post one intervention	To determine the effect of storyboarding on student nurse level of reflection.	Vertical	Safety, Support, Mentorship, Time, Supervision	Not defined	Novel qualitative questionnaire based on pilot study findings and aspects of teaching and learning.	Qualitative content analysis suggested that a high proportion of students achieved critical thinking and deeper reflection when using the reported storyboarding technique.
Makoul et al. (2010)	315 participants. Study conducted over a four month period	What effect an online forum with structured templates had on reflection.	Vertical	Safety, Support, Time	Not defined	Qualitative content analysis using a reported process by two raters, then author consensus.	Structured templates encouraged reflection and dialogue about difficult conversations.
Plack, Dunfee, and Rindflesch (2008)	7 participants. Study conducted over a four week period	To determine the effect virtual action learning had on reflection and cognition across two cohorts.	Process	Time, Support, Safety, Mentorship	Schön (1987) , Bloom (1956) , and Mezirow (1990)	Qualitative content analysis by two raters. Consensus confirmed by a third independent rater to confirm creditability.	No statistically significant difference was reported between the two cohorts (mentor facilitated & peer facilitated) regarding timing of reflection or level of reflection.

<u>Stark et al. (2006)</u>	250 participants. Study conducted over three separate periods, each lasting three days	To determine the outcomes of combined critical incident technique on guided reflection using written narratives.	Vertical	Supervision, Safety	Novel	Qualitative content analysis using a constant comparative approach, which was independently coded to >80%.	Thematic content analysis identified five primary themes which students expressed during guided reflection (communication, professionalism, team work, organisation of care, & student learning issues). All submitted narratives (n=238), bar two, achieved 'some reflective capacity'.
<u>Thomas and Goldberg (2007)</u>	59 participants. Study conducted over a four week period	To determine the effect guided reflection using PDA prompts has on medical student reflection.	Process	Time, Supervision, Safety, Mentorship, Support	Correlated to reported meta-cognitive elements	Qualitative thematic analysis using a reported process.	Statistically significant correlations were illustrated between meta-cognitive process use relating to diagnostic thinking and therapeutic observations, when assessed using data obtained from student electronic entries.
<u>Tsang (2012)</u>	17 participants. Study conducted over a one year# period	To determine the levels of reflection shown by oral health students.	Process	Support, Safety, Mentorship	<u>Boud, Keogh, and Walker (1985)</u> and <u>Mezirow (1991)</u>	Qualitative thematic analysis using Leximancer™ (v2.25) software.	Thematic analysis indicated students increased the critical components of reflection over the course of investigations. 26% illustrated the highest level, whilst the majority (58%) illustrated the third level (relating).

Wald et al. (2009)	8 participants. Study conducted over a two year# period	To determine the effect of guided reflective writing and individualized feedback on reflection.	Process	Safety, Support, Mentorship, Time, Supervision	Not defined	Qualitative content analysis using an independent 'immersion-crystallization' style.	Qualitative content analysis found that the guided reflection approach with individualised feedback promoted reflection and professionalism as defined within the context of this study.
Walker et al. (2013)	89 participants. Study conducted over a 12 week period	The effect a learning circle strategy has on practice and the learning environment.	Vertical	Time, Support, Safety, Supervision	Not defined	Qualitative content analysis using a reported process by two raters.	The structured learning circles technique facilitated reflection on difficult issues and topics that assisted to increase awareness to alternative methods.
Wright and Lundy (2012)	12 participants. Study conducted over 6 days	To assess the development of reflective thinking in allied health students from a collaborative blog.	Process	Time, Support, Safety	Boud, Keogh, and Walker (1985) and Mezirow (1981)	Qualitative content analysis conducted by two raters independently.	Repeated blogging using a guiding structure increased the incidence of Boud's reflective elements, with 'deeper' elements demonstrated in the latter half of the investigation.
<p>^ Mann, Gordon, and MacLeod (2009) (Contextual elements including mentorship, time to reflect, supervision, support, and a safe environment benefit the practice of reflection).</p> <p>#Exact study duration not explicitly stated. Study duration referred to in terms of semester, or year length.</p>							

Discussion

The foci of this review are explored in this section using data obtained from analysis of the included studies. Positive findings, gaps, and inconsistencies are discussed with a view to supporting translation of reflective teaching strategies into practice.

What evidence is there to support the use of reflective teaching strategies in professional healthcare clinical education?

The identified papers use a range of evidence to support the practice of using reflective teaching strategies during placements with healthcare students. Investigations have been undertaken into students' perceptions of the worth of reflection ([Canniford and Fox-Young 2015](#)), the change in depth of reflection demonstrated over time ([Dye et al. 2011](#), [Ip et al. 2012](#), [Levine, Kern, and Wright 2008](#), [Wright and Lundy 2012](#)), the effect of various mediums (for example, electronic, written narrative, verbal discourse), the influence on meta-cognition ([Thomas and Goldberg 2007](#)), professionalism ([Wald et al. 2009](#)), and what was reflected upon ([Lie et al. 2010](#), [Makoul et al. 2010](#), [Walker et al. 2013](#)). This diversity of evidence demonstrates the breadth of outcomes possible, and the potential influence reflective teaching strategies may have when used judiciously to support learner reflection whilst on placement.

This variety in evidence is extended through to the theoretical underpinnings of the identified studies. This is understandable given the range of professions represented in reviewed studies. Each profession is seen to have a preference for a theoretical basis on to which the evidence was developed. Nursing for example, which provided the majority of papers included in this review tends to use the work of [Mezirow \(1990, 1991\)](#) and subsequent work by [Wong et al. \(1995\)](#) that draws from Mezirow. The allied and oral health studies incorporate multiple theoretical underpinnings ([Hill, Davidson, and Theodoros 2012](#), [Plack, Dunfee, and Rindflesch 2008](#), [Wright and Lundy 2012](#)). These studies use combinations of [Bloom \(1956\)](#), [Boud, Keogh, and Walker \(1985\)](#), [Mezirow \(1990, 1991\)](#), and [Schön \(1987\)](#) in an effort to build on reflective learning from an established foundation. This grouping of nursing, allied, and oral health is juxtaposed with the included medical studies. This later cohort uses theories that have been developed from within the profession, for example that developed by [Epstein \(1999\)](#). This context-specific foundation allows unique adaptations that may assist delivery within a specific setting. However, it also has potential to narrow the perspective ([Hulsman, Harmsen, and Fabrick 2009](#), [Stark et al. 2006](#)), or limit potential gains made from the application of reflective teaching strategies in isolation when compared to a strategy built upon clearly stated theoretical foundations that incorporates affective, cognitive, and meta-cognitive processes.

Generalising findings that reflective teaching strategies positively influence reflection must be done with caution because of the quality of the evidence upon which these findings have originated. As demonstrated above, the majority of evidence does not use a defined criterion. If it is present, this criterion is reported upon using descriptors that suit the context (for example [Lillyman, Gutteridge, and Berridge 2011](#)) rather than the cognitive or meta-cognitive elements shaping the reflection. This in turn limits translation of findings to other contexts.

Evidence from this review suggests that deepening of reflection can result from repetitive exposure to reflective teaching strategies. This is likely a result of increased familiarity with, or skill in, the process of reflecting when using a specific strategy. Analysis of the evidence also highlights the tendency for the majority of participants to reach the conceptual middle of the depth of reflection continuum, whilst comparatively small numbers achieve a critical depth. This trend occurs regardless of criterion or strategy used. Determining when, and which, students to apply either structural approach with appears the more apt question. It is logical to posit that students less familiar, or less adept at developing reflection are more suited to a Process approach that allows gradual introduction to both the concepts and application, whilst those who learn a strategy quickly, or achieve critical depth of reflection, are likely more suited to Vertical

approaches that can be applied to critical incidents rather than the more gradual Process approach. This transition between approaches, dependent on student performance, may assist in maintaining engagement in the reflective process long term.

What, if any measurement tools have been used in current research?

A measurement tool would ideally be based on theory, be reliable and valid, and demonstrate not only the depth of reflection a student is demonstrating, but also the change in depth following repeated exposure to a reflective teaching strategy. There are tools already available in the literature that reflect this; for example, Sobral's 'Reflective Learning Scale' (Sobral 2005) that captures cognitive components and self-regulation strategies. The Kember and Leung reflection questionnaire (Lethbridge *et al.* 2013) uses Mezirow's theoretical foundations to measure depth of reflective thinking. The Groningen Reflection Ability Scale (GRAS) (Andersen *et al.* 2014, Aukes *et al.* 2007) has been reported to yield valid and reliable measurement of personal reflection. Finally the 'REFLECT' measurement tool (Wald *et al.* 2012) measures reflective capacity according to four defined criteria. However, none of these tools has been incorporated into the reviewed studies despite the gains in research quality that can come from using valid and reliable measurement.

The failure of the majority of studies to use valid and reliable measurement tools results in considerable variation in the reported analysis strategies. This variation is demonstrated by the introduction of novel analysis practices. Canniford and Fox-Young (2015) used student perception, Dye *et al.* (2011), Chretien, Goldman and Faselis (2008) and Ip *et al.* (2012) each used different qualitative methodologies, and Aronson *et al.* (2010) used a marking rubric. In addition to these analysis strategies, a majority of the papers in this review have used consensus methods where reflective elements are first defined then confirmed by independent raters during analysis (Harrison and Fopma-Loy 2010, Lillyman, Gutteridge, and Berridge 2011, Makoul *et al.* 2010). These latter-mentioned studies do not consistently outline the manner in which reliability and validity is determined. Therefore, confidence in these results can be questioned. Conversely, the professional consensus methodology reported in Jenson and Joy (2005), Levine, Kern, and Wright (2008), and Wald *et al.* (2009) used clear decision-making guidelines and a defined classification system that assists validity and reliability. This variation in analysis strategies, in addition to the inconsistencies of defined reflective criteria to which outcomes are applied, throws doubt on the validity of the positive outcomes reported from assisting students to reflect.

How is current evidence integrating the use of contextual factors to support reflection?

The study by Mann, Gordon, and MacLeod (2009) outlined the role that context has on the development of reflection. To ensure optimal outcomes in the use of a reflective teaching strategy, five contextual factors (time, mentorship, supervision, support, and safety) were identified by Mann, Gordon, and MacLeod (2009) as influential in the development and practice of reflection in the placement context.

No clear pattern was found in this review in respect to the presence of contextual factors and influence on reported outcomes. The majority of studies reported that reflective teaching strategies positively influence outcomes in assisting students to reflect regardless of the number of contextual factors incorporated. This finding is likely a consequence of the variable methodologies and measurement practices used in the included studies, rather than the impact *per se* of the factors. The utility of contextual factors has already been established by Mann, Gordon, and MacLeod (2009). It is likely that more explicit consideration of these factors, and the influence they can have on reflection in future research, will assist researchers and educators alike in regard to how to integrate these into practice.

Conclusions

Current research suggests that reflective teaching strategies may progress healthcare students along a reflective continuum. The diversity in the quality of the evidence, the utility of the analysis strategies, and the integration of contextual factors that can assist the development of reflection remain inconsistently applied despite the foundations laid by [Mann, Gordon, and MacLeod \(2009\)](#). Interestingly, irrespective of the number of contextual factors, all identified papers reported that students either progressed along a reflective continuum towards a critical depth of reflection, or displayed improvements to meta/cognitive elements (e.g. self-awareness) that underpin critical reflection. No paper reported negative outcomes, which may be the results of poor research design or data analysis, or bias in data selection for publication.

A limitation of this review paper could be considered to be the foci on approaches used to measure outcomes and influences of the teaching of reflection during healthcare students' clinical placement, rather than specifics of teaching strategies, student behavior change and/or improved patient outcomes associated with reflective practice. The latter being the primary goal of critical reflection in healthcare settings by clinicians. Sound measurement practices in reflection will provide a basis for analysis of behavior change, patient outcomes and a range of other areas that reflection may influence. This review deliberately focused on this foundation rather than explore teaching strategies in order to collate information pertaining to a vital aspect of holistic understanding of reflection in the placement setting. Moreover, until valid and reliable measures are routinely used, exploration of improved patient outcomes is unlikely to result in definitive findings.

This systematised review of the evidence between 2005 and 2015 has identified that, despite publication of valid and reliable measurement tools, these appear to be under-utilised in published studies. These tools may assist the development of reflection through objective measurement, resulting in modification of reflective teaching structure to suit individual student learning proficiency. We suggest that future studies into the use of reflective teaching strategies in healthcare placement education investigate the adaptive use of structural approaches dependent on objective measurement of student reflections, with consideration of appropriate contextual factors. We hypothesize this will facilitate student movement along the reflective continuum, whilst managing ongoing engagement and learner self-regulation in the use of reflective strategies to encourage their own future life-long learning.

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