Reflection and Reflective Practice in Higher Education Educators

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Abstract

Decades of research have established reflection and reflective practice as vital to a multitude of vocational fields including education. To improve pedagogy, educators expose their practice to examination in a way that is non-judgemental and secure. Reflective practice is a beneficial strategy to cognize, comprehend and regulate pedagogical performance. Experts concur that reflection has pedagogical benefits for higher education, but it has been well noted that there is limited uptake of reflection in the Higher Education Educator (HEE) domain. The limitations stem from the fact that substantial ambiguity remains regarding the components of reflection and which path should be chosen to scaffold reflection and the lack of a universal framework for facilitating and assessing reflection. Since there exists a paucity of research in the field, it is essential to understand factors influencing reflection in HEEs, such as teaching experience. To address these gaps in the literature, this dissertation is composed of four manuscripts – an overview of the literature, two qualitative studies and a resulting framework. The two qualitative studies examine the key dimensions that influence reflection in HEEs by further subcategorizing them and then empirically studying reflection in medical HEEs. Both studies further address fundamental issues like the influence of teaching experience and the value of being scaffolded by a framework. The dissertation then progresses to present a framework for reflection in HEEs, including a discussion of the implications of a teacher assuming the role of a learner in the reflective process. This research contributes to the literature by bringing some clarity to reflection in HEEs by expanding the understanding of the key aspects of reflection in Higher Education (HE) and the opportunity to scaffold their pedagogical reflection leading to opportunities positively influencing their professional pedagogical practice.

The dissertation ends with a discussion of the practical implications as well as potential avenues for future research in the field.

Résumé

Des décennies de recherche ont établi que la réflexion et la pratique réflexive sont au cœur d'une multitude de domaines professionnels, y compris l'éducation. Afin d'améliorer la pédagogie, les éducateurs exposent leur pratique à l'examination d'une manière qui ne porte pas de jugement et qui est sûre de provoquer un changement. La réflexion sur la pratique pédagogique est une stratégie bénéfique pour connaître, comprendre et réguler ce changement. Les experts s'accordent à dire que la réflexion présente des avantages pédagogiques pour l'enseignement supérieur, mais il a été noté que l'adoption de la réflexion dans le domaine des enseignants de l'enseignement supérieur (EES) est limitée. Cette situation est due au fait qu'une ambiguïté substantielle demeure quant aux composantes de la réflexion et à la voie à choisir pour étayer la réflexion. Comme il existe peu de recherches dans ce domaine, il est essentiel de comprendre les facteurs qui influencent la réflexion chez les enseignants de l'enseignement supérieur et la relation qu'elle entretient avec d'autres facteurs comme l'expérience. Pour combler ces lacunes dans la littérature, cette thèse est composée de quatre manuscrits: un aperçu de la littérature, deux études qualitatives et une structure pour soutenir la réflexion de l'enseignant. Les deux études qualitatives examinent les dimensions clés qui influencent la réflexion dans les EES en les sous-catégorisant davantage, puis en étudiant empiriquement la réflexion dans les EES médicaux. Les deux études abordent également des questions clés telles que l'influence de l'expérience d'enseignement et la valeur d'être soutenu par une structure. La dissertation présente ensuite un structure de réflexion pour les EES. Cette recherche contribue à la littérature en apportant une certaine clarté à la réflexion dans les EESs en élargissant la compréhension des aspects clés de la réflexion dans l'enseignement supérieur (ES) et l'opportunité d'échafauder leur réflexion pédagogique menant à des opportunités influençant

positivement leur pratique pédagogique professionnelle. La dissertation se termine par une discussion des implications pratiques ainsi que des pistes potentielles pour de futures recherches dans ce domaine.

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Contributions of Authors

The dissertation is comprised of four manuscripts. As the author of this dissertation, I was responsible for the review, data analyses, and writing included in the dissertation. Under the mentorship of Prof. Alenoush Saroyan, members of the Higher Education Research Group laboratory (Alejandra Seguera, Lauren Agnew, Maedeh Kazemitabar, Mahwish Tazeem, Raheleh Salimzadeh and Zyanab Sabbagh) helped in developing the theoretical version of the framework presented to participants in Study 1 and 2 as well as data collection included in this dissertation. The contributions made to each of the manuscripts are summarized below:

Chapter 2: Literature Overview

I completed and wrote the overview, with feedback from Dr. Alenoush Saroyan, Dr. Susanne Lajoie and Dr. Cynthia Weston (members of my comprehensive exam committee) initially in fulfillment of the requirements for my comprehensive examination. This manuscript will be submitted to a journal in the field of higher education and will include my co-supervisor and all my committee members (Drs. Saroyan, Lajoie, and Weston) as co-authors.

Chapter 3: Study 1

I helped develop the study, conducted the data analyses, and wrote the full draft of the manuscript. This study was part of a larger study developed by the HERG laboratory under the mentorship of Dr. Alenoush Saroyan. Additionally, Alejandra Seguera and Lauren Agnew (HERG members) helped in initial coding and cross-checking of the transcripts. Dr. Atulya Saxena (Oxford Institute of Population Ageing) provided editorial feedback on the manuscript drafts. Once the draft was completed, Dr. Hall and Dr. Lajoie provided suggestions for improvement. This manuscript will also be submitted to a journal in the field of higher education or medical education and will include my supervisor, co-supervisor and advisor (Drs.

Hall, Saroyan and Lajoie) as well as my lab members (Dr. Salimzadeh, Dr. Sabagh, Ms. Agnew, and Ms. Seguera) as co-authors.

Chapter 4: Study 2

I helped develop the study, conducted the data analyses, and wrote the full draft of the manuscript. This study was part of a larger study developed by the HERG laboratory under the mentorship of Dr. Alenoush Saroyan. Additionally, Alejandra Seguera and Lauren Agnew (HERG members) helped in initial coding and cross-checking of the transcripts. Dr. Atulya Saxena provided editorial feedback on the manuscript drafts. Once the manuscript draft was completed, Dr. Hall and Dr. Lajoie provided suggestions for improvement. This manuscript will also be submitted to a journal in the field of higher education or medical education and will include my supervisor, co-supervisor and advisor (Drs. Hall, Saroyan and Lajoie) as well as my lab members (Dr. Salimzadeh, Dr. Sabagh, Ms. Agnew, and Ms. Seguera) as co-authors.

Chapter 5: The Framework for HE

I synthesized the final framework from the empirical studies we conducted and wrote the full draft of the manuscript. The framework was developed under the mentorship of Prof. Alenoush Saroyan. Members of the HERG laboratory contributed to the development of the initial theoretical framework that was used in the empirical studies. Once the manuscript draft was completed, Dr. Hall and Dr. Lajoie provided suggestions for improvement. This manuscript will also be submitted to a journal in the field of higher education and will include my supervisor, co-supervisor and advisor (Drs. Hall, Saroyan and Lajoie) as well as my lab members (Dr. Salimzadeh, Dr. Sabagh, Ms. Agnew, and Ms. Seguera) as co-authors.

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Chapter 1: Introduction

Reflection in its inceptive form was defined by Dewey (1933) as “an 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 conclusions to which it tends” (p. 9). For educators to advance their pedagogy, they must assume the role of learners as they reflect on their pedagogical approaches and identify new ways to promote their objectives while advancing scholarship. Additionally, reflection blends novel experiences into previously acquired knowledge (Kaufman, 2019) and has remained essential and valuable in higher education (Mälkki & Lindblom-Ylänne, 2012; McAlpine & Weston, 2000; Moon, 2013, 2015). Considering the advantages of educators' various reflections, they constantly reflect on classroom and institutional challenges while focusing on the broader educational context. Occasionally, this contemplation will alter their pedagogical practices (Smith et al., 2017).

Since teaching is multifaceted (Hatton & Smith, 1995; Zeichner & Liston, 2013) and discipline-oriented, ambiguity amid reflection has emerged as a pedagogical paradigm (Crawford et al., 2012; Korthagen et al., 2001), highlighting the need for effective scaffolding to facilitate the reflective process. In the 1970s, scholars such as Vygotsky presented scaffolding as a precise well-timed assistance that provides learners with the pedagogic support that facilitates an elevated level of engagement (Gonulal & Loewen, 2018). Scaffolding in this setting was interpreted as facilitating HEEs to attain a level of reflection beyond their existing abilities.

Furthermore, empirical evidence of the effectiveness of reflection in HE professors remains sparse (Kreber, 2005). Ambiguous reflection paradigms inefficiently scaffold, hindering their pedagogical use. Furthermore, the definition and components of reflection

substantially diverge (Clarà, 2015; Collin et al., 2013; Moon, 2013, 2015; Petsilas et al., 2020). Limitedly empirical HE scholars have primarily emphasized theoretical, methodical, and analytical challenges in conducting such investigation. Researchers diverge in terms of defining what constitutes reflection; Orland (2001) purported that reflective practitioners should collaborate, while Smith (2005) asserted they should represent a subject-matter expert. According to Korthagen et al. (2001), a separate teacher identity remains paramount for reflection. Experts have diverged on what reflection embodies. Korthagen (2010) believed it grows from a gestalt, generating a possible schema to create a theory, while Gelfuso (2016) depicted it as a process leading to warranted assertabilities (logically ordering schema). With sound reasoning, the contrasting theorists have drawn attention to each position's educational ambiguity and complexity. Reflection's multiplicity illustrates how complicated reflection remains. Various reflective practice definitions and dimensions within and across standards obfuscate educators' understanding of reflection (Glasswell & Ryan, 2017).

Furthermore, reflection does not always change educator behaviour (Hatton & Smith, 1995; Mälkki & Lindblom-Ylänne, 2012), as oftentimes they perceive it as a chore or check-box exercise (Clark, 2011). Additionally, Cornish and Jenkins (2012) unveiled that educators who frequently reflect only do it superficially. Their thoughts do not provide any reasons for choices or acts, do not directly challenge presumptions, and do not offer any appraisal beyond generalisations (p.165). Even though educators frequently unmask their pedagogical weaknesses and professional development needs (Pekkarinen & Hirsto, 2017), certain situations may obstruct transformation, thwarting change. Impediments, such as reflection reason clarity, superficial best practice knowledge, inadequate reflection scaffolding, time and commitment restraints, and fear of criticism can negatively influence pedagogical growth (Al-Riyami, 2015;

McAlpine & Weston, 2000). When faced with the requirement to reflect on pedagogy, many educators as learners remain unsure of what they should do and thus unengaged (Grant et al., 2017).

Expert frameworks supporting educator reflection could inform the reflection process (Carrington & Selva, 2010) and boost its frequency. A universal reflection model would not suffice given that reflection remains highly personal, differing between domains (Wass & Harrison, 2014). Thus, a unique scaffold should direct HE educator reflection to improve pedagogy and student learning.

While reflecting, educators focus on their pedagogical values, beliefs, and attitudes to enhance instruction and serve the learners' needs. Understanding reflection goals and recognizing the appropriate scaffolds supports educator pedagogy and student learning. This proposed work will address several shortcomings in the existing reflection and reflective practice research in higher education educators to advance pedagogy. Limited empirical research has illuminated a poor understanding of reflection components, and appropriate scaffolds to foment reflection remains nebulous, elucidating a theoretical and practical void in reflection research. Addressing the scholarship gaps, this research seeks to uncover the principal HE educator reflection components, advance understanding reflection and develop a scaffold to support HE educators' reflection appropriately.

Research Questions and Methodology

Educators reflect to actualize optimal student outcomes and improve their pedagogy. However, a dearth of HE reflection research and issues with reflection engagement have unmasked an exigent demand for further research. This project aims to examine a single overarching question:

How can HE educators' reflection be supported to advance pedagogy?

Additionally, three research questions will guide the study:

Question 1: What themes emerge from HE medical educators' reflections?

Question 2: Do self-reflection themes vary with teaching experience?

Question 3: How do medical educators perceive our reflection framework's utility?

This dissertation is composed of two qualitative studies examining reflection in medical educators leading to a proposed framework. The intent is to scaffold educator reflection with an aim to positively influence their pedagogy. Broadly, this dissertation studies various aspects of reflection in the higher education environment and further identifies key elements of the teaching-learning dynamic which play a key part in engaging in academic reflection. The overarching goal is to gain a better understanding of reflection and to develop a scaffold to support educators in higher education academic environments, where the practice has been historically underutilized and ineffective. The rest of this dissertation is divided into the following sections:

Chapter 2

This chapter gives an overview of the available research that is pertinent to the following query: What is the status quo regarding reflection and reflective practice in higher education? Why is there limited engagement in reflective practice in HE? The overview highlighted that although reflection is viewed as being essential to enhancing instructional practice, professional development, pedagogical technique, decision making processes and self-awareness, there are issues with its comprehension and implementation. To deepen our understanding on reflection and appreciating that reflection is essentially an attempt to learn more about ourselves to improve, I first analysed the concept of reflection as a self-regulated learning approach. Next,

maintaining the cognitive line of thought, I looked at the modes and models of reflection that currently inform the field. A key fact surfaced that reflection is field specific and also engaged in for professional development.

Likewise, a fundamental problem came to light that—that generalizability of a reflection scaffold is not possible—and emphasised the fact that there is no clarity on the components of reflection in higher education as well as a dearth of useful scaffolding to assist educators in engaging in reflection. Therefore, despite educators' commitment to adopting reflection to improve their pedagogy, there is a widespread lack of clarity and little resources. It was also noted that medicine is the only field in which reflection is part of its core competency and in order to maintain a licence to practice medicine, professionals in the field are required to engage in reflection on a regular basis, highlighting a potential research opportunity. Other potential avenues for future research were suggested underscoring the ambiguity and potential for developing HE field specific scaffolds to support educator engagement.

Chapter 3

Existing discourse while highlighting the prevailing paucity of research in reflection and reflective practice in higher education has largely operated under the implicit assumption that to a certain extent, reflection is generic in nature and that models and frameworks used in reflection can be used across varied domains. As such, Study 1, being more exploratory in nature focuses on reflection in higher education medical educators. The study in this cohort was important because medicine is one of the limited fields where reflection and reflective practice is core to its practice. We engaged with medical educators and allowed them to reflect freely on their pedagogy. We also attempted to identify any link between teaching experience and the

extent of reflection. Furthermore, using existing literature, we developed a framework and noted the participant suggestions and insights on our conceptual framework.

Chapter 4

Furthering our previous research (Study 1) that had entirely relied on the participants reflecting freely on their pedagogy, Study 2 focused on scaffolding the participant medical educators prior to and during reflection on their pedagogy using the conceptual framework. This helped us identify if any advantage was afforded by the scaffolding (framework). I further did a comparative analysis between Study 1 and 2 using the R software package to compare the reflective responses of participants by examining how the framework influenced the reflection results, as well exploring the relationship between teaching experience and the extent of reflection. Additionally, we documented the participants' suggestions and insights on our conceptual framework.

Chapter 5

Combing existing literature with similar ongoing research on the topic and based on results of the two studies that are part of this thesis, we developed a conceptual higher education reflective framework. The framework is based on Colton and Sparks-Langer (1993), Low et al.'s (2009) Reflective Teacher, Korthagen's (2004) Onion Model, and Murray's (1983, 2007) 60-item Teaching Behaviour Inventory (TBI). The framework comprises six aspects, which are key to the reflective process, namely: the educator, their teaching, the learner, their learning, the content taught and the context in which the educational process is happening. These six aspects were further sub-categorized. The dissertation concludes with a general discussion of the implications of the findings from the two empirical investigations, as well as limitations and recommendations for future study.

Significance of the Study

This aim of this research is to improve HE educators' pedagogical reflection understanding and to develop a coherent and practical framework to scaffold their reflection to positively influence their pedagogy. The current study provides significant contributions by attempting to fill key shortcomings in the area of higher education educator's reflection and reflective practice. First, the study adds to the limited research on reflection in higher education educators. With the field being so vast and multidimensional, this project is amongst the first to explore HE educator reflection cognitively as a route to comprehend the process of reflection in the HE educator domain to develop a theoretically driven and empirically supported practically viable framework for reflection. Second, while engaging the educators in developing a framework for scaffolding their pedagogy, we took the opportunity to research factors such as experience and an understanding of reflection, allowing us to address existing research in the field and augment it.

Finally, focusing on HE educators in the medical domain, this research qualitatively engaged with educators and identified key areas that are essential to the reflective process in HE. During this research, we incrementally developed a framework using a ground up approach – initially developing a barebone framework based on existing theory and then during the course of this research enriching the framework by directly incorporating feedback of HE educators. After reflecting, educators can self-evaluate to identify their strengths and areas for improvement and to understand their teacher selves and teaching styles, promoting professional growth. Additionally, reflecting on and understanding how students learn, educators can effectively leverage the most effective teaching strategies, promoting student learning outcomes (Kreber & Castleden, 2009). Furthermore, having educators who are engaged in pedagogical

reflection will advance best practices across the whole institution. A productive workplace is a consequence of allowing these factors to work together. Finally, scholars highlighting HE educator reflection can build on this research to bridge the existing research gap.

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Chapter 2: An Overview of Reflection and Reflective Practice in Higher Education

Abstract

For decades, reflection has taken center stage in the field of education. Yet there is much ambiguity about what it means and what it entails. Even though research in these fields is pervasive, the terms *reflection*, *metacognition*, *self-regulation*, and *self-regulated learning* have limited distinction and are used interchangeably. Furthermore, while significant research has been done on reflection in K-12, there are significant distinctions between K-12 and higher education (HE) and the existing research cannot be applied directly across the two domains. Engaging a theoretical framework perspective to existing literature in the field, this review details the key aspects of reflection in HE. It further attempts to bring cognizance and recrudesce a discussion of the various approaches used while highlighting key issues and criticisms of reflection that persist in higher education. Withal, as reflection is both complex and multifaceted, its success depends on the practitioner's comprehension and the support of the environment. While many HE educators may wish to engage in reflection to positively influence their pedagogy, having limited clarity and no clear practical path to follow hinders them, frequently reducing pedagogical reflection to more of a perfunctorily performed activity. Finally, building on the key findings presented in the paper, inferences have been formed, presented alongside potential directions for future research in the field.

Keywords: *Reflection, Reflective practice, Higher education, Self-Regulated learning, Metacognition*

Introduction

In 1910, Dewey introduced reflection, and Mezirow (1981), Schön (1983), and Habermas (1987) expanded the concept in the 1980s. Reflection, pedagogically, engenders an active process where an educator, during or after a teaching session, reviews one's performance to evaluate one's reactions, develops a new self-cognizance, and scrutinizes the teaching approach (Boud et al., 1985; Jarvis, 1992; Mezirow, 1981, 1991; Schön, 1987, 1995).

Many in the field regard reflection as an integral attribute for professional educational competence. Reflection leads the educator to concentrate on the observable teaching components such as their actions, delivery, presentation, content organization, and students. The purpose of reflection guides educators to focus on their pedagogical values, beliefs, and attitudes to enhance instruction and satisfy learner needs (Moon, 2015; Osterman & Kottkamp, 2004).

Teaching embodies the educator developing broad knowledge with multiple competencies (Cáceres, et al., 2020). This multidimensionality bridges the gap between theory and practice, effectively supporting student learning and educational outcomes (Davis & Sumara, 2014). Reflection, therefore, helps self-aware educators self-monitor and self-regulate to promote growth. Reflection, a vital educator activity, helps the professional evaluate practice, improve it, and advance personal learning.

Although experts in most professions, particularly in teaching, have highlighted self-reflection (Brookfield, 2017; McAlpine et al., 1999; Petsilas et al., 2020; Saroyan & Amundsen, 2004; Schön, 1995), substantial ambiguity remains regarding the definition and components of reflection (Clarà, 2015; Collin et al., 2013; Moon, 2013, 2015; Petsilas

et al., 2020). Limited empirical higher education research has resulted primarily from various theoretical, methodical, and analytical challenges in conducting such investigation (Kreber, 2005; McAlpine & Weston, 2000; McAlpine et al., 2004; Winchester & Winchester, 2011, 2014).

As constructivist learning theory grounds reflective practices, they remain laden with complexities as the educators focus on multiple teaching facets, such as content and skill, the environment, task execution, and learner characteristics (Hatton & Smith, 1995). Reflection encompasses equally internal and external processes. Kemmis (1985) presented reflection as dialectical, where a person inwardly concentrates on the individual's thoughts and outwardly focuses on the situation. On the one hand, the educator connects experiences with perceptions to self-evaluate and inform oneself. Reflection externally focuses on the issues at hand. The individual analyzes one's practice and how personal beliefs relate to one's performance, metacognitively connecting with the situation to evaluate and revise cognition.

Delving further into the reflection, Mezirow (1991) described three reflection levels: content, process, and premise. According to Mezirow (1990; 2000), content reflection relies on pre-existing knowledge, beliefs, and values to interpret the situation, while process reflection involves challenging one's knowledge without focusing on the belief structure inherent in decision-making. Thus, the person examines the chosen method used to solve the problem. In premise reflection, the individual explores the ingrained underlying assumptions, biases, beliefs, and values employed, leading to a new understanding, and transforming future behavior. These three components can also help

explain reflection, how to implement it, and unveil its benefits (Greenfield et al., 2015; Kreber & Castleden, 2009; McAlpine et al., 2004; Sellheim & Weddle, 2015).

Buttressing Schön (1987) and McAlpine et al. (2004), Jensen and Mostrom (2012) clarified reflection when they illustrated varied points in time that reflections could occur. First, reflection-in-action (thinking while doing) addresses thinking while things are happening, potentially adapting to the situation based on the experience at hand. Second, reflection-on-action constitutes retrospectively contemplating, revisiting the experience, reviewing actions, thoughts, and feelings to gain a new perspective, and transforming future behavior. Third, reflection-for-action comprises planning and preparing for an upcoming event using the knowledge of prior experience[1] to influence a future event. Reflection helps the educator engage with their personal beliefs, biases, and expectations, providing insight into their experience-based assumptions to improve pedagogical practice (Jensen & Mostrom, 2012; McAlpine et al., 2004; Schön, 1987).

Due to limited research in the field, I have reverted to the term 'reflection' and then attempt to situate it within the context of higher education. Furthermore, to understand the concept fully and the confusion surrounding it, I have stepped back to the building up from understanding and situating the term 'reflection' in HE educators. Hence, this paper will uncover existing empirical evidence to illuminate how reflection-on-action exists within higher education. Next, it will attempt to uncover its relationship to metacognition and self-regulation. Additionally, modes and models that have the potential to simplify the reflective process will be identified and addressed. Furthermore, while studies have attempted to explain reflection, no single reflective approach exists; rather, it

[1] This experience could be the product of reflection-in-action and/or reflection-on-action

is understood as a complex concept encompassing many domains (Wass & Harrison, 2014). Hence, this review will conclude by discussing how reflection may be relevant in various educational environments.

Reflection-on-Teaching Practice in Higher Education

Scholars have established reflection as a crucial to general professional practice, particularly in teaching (Amundsen et al., 1996; Korthagen, 2017; McAlpine et al., 1999; Schön, 1995). However, significant ambiguity regarding what constitutes reflection exists (Clarà, 2015; Collin et al., 2013; Leigh, 2016; Moon, 2013). According to Clarà (2015), this uncertainty in defining reflection stems from the approach to the concept of reflection. Dewey (1933) and Schön (1983) purported reflection engenders psychological phenomena occurring naturally during contemplation. This idea evolved into educator reflection, where Valli (1997) proposed reflective educators retrospectively assess events, modifying instruction design to construct and investigate ethical understanding.

However, a dearth of empirical research probing reflection in higher education exists (Kreber, 2005; McAlpine et al., 2004; Winchester & Winchester, 2011, 2014). Even though significant research exists regarding teacher reflection, the focus does not directly apply to higher education (see Huang et al., 2016; Jensen, 2014; Kember, 1997). Critical differences exist between primary and secondary educators (school teachers) and higher education educators (college and university lecturers and professors) in terms of the required experience and training requirements. (Jensen, 2014; Kember, 1997; Parsons, 2015; Saxena, 2017).

In Canada and the USA, there are strict requirements for teaching licences in the K-12 sector. For example, in the province of Ontario, Canada, a teaching candidate must

undergo a four-semester teacher's training program, requiring a "minimum of 400 hours of practice teaching or at least one year of teaching experience as a certified teacher" (p.1), along with an undergraduate degree. Similarly, the Interstate Teacher Assessment and Support Consortium (InTASC, 2011) mandate rigorous requirements to practice as a licensed primary or secondary teacher in the United States. Higher education institutions hiring lecturers and professors, per Pekkarinen and Hirsto (2017), emphasize content expertise, typically a PhD in the field with a significant number of academic publications to attract research funding. Therefore, many academics view university instruction as an obligation tied to their academic positions, requiring no formal training (Bailey et al., 2022; Kember, 1997; Kreber, 2010; Lefebvre et. al., 2022; Nevgi & Löfström, 2015). The Browne Review (2010) in the United Kingdom, suggested university faculty need teacher training, recommending universities report teaching faculty and teaching qualifications.

Moreover, educators' classroom roles and expectations in primary and secondary versus those in higher education differ significantly (Parsons, 2015; Saxena, 2017). According to Schwartz et al. (2008), the school encompasses a teaching environment focused on acquiring facts and skills, where students glean knowledge from an educator. However, a higher education setting offers a learning environment placing the responsibility of knowledge acquisition primarily on the student. As reflection evolved into a pedagogical archetype, ambiguity emerged (Crawford et al., 2012; Korthagen et al., 2001), primarily due to teaching's multidimensionality (Hatton & Smith, 1995; Zeichner & Liston, 2013). For example, Orland (2001) asserted reflective practitioners should work collaboratively; however, according to Smith (2005), a reflective practitioner should be a domain expert, while Korthagen et al. (2001) proposed distinctive teacher identity remains

fundamental to reflection. Experts possess multiple perspectives concerning what constitutes reflection. For example, Gelfuso (2016) portrayed it as a process resulting in warranted assertability[2], while Korthagen (2010) understood it evolved from the gestalt (grounded in practical experiences), forming a potential schema and crafting a theory (logically ordering the schema). While each perspective embodies reasoning, the diverging theorists have highlighted its pedagogical ambiguity and multi-facetedness. According to Rodgers (2020), the vagueness's two primary reasons entail the lack of a shared framework when discussing reflection and standardization while examining its occurrence (also see, Al Riyami, 2015; Clarà, 2015).

In higher education, reflection aligns with the active mental process in which an educator develops a new awareness of self and/or of their teaching methods during/after the teaching experience, with the aid of reviewing their performance and evaluating reaction(s) (Clarà, 2015; Moon, 2015). Also, reflection positions an individual appropriately, when immersed in an unknown, ambiguous, ill-structured, or unclear cognizance requiring revisiting before fitting it into the educator's pre-existing schemas (Mälkki & Lindblom-Ylanne, 2012; Moon, 2015). The resulting state does not necessarily mean transforming knowledge or incorporating learning (Sellheim & Weddle, 2015). It merely confirms the transition from an unclear to a clear state of understanding (Clarà, 2015; Mälkki & Lindblom-Ylänne, 2012). According to Moon (2015), academic reflection differs from personal reflection as it is generally pre-planned, purposeful, and directed towards an identified goal. The goal may remain personal, like improving one's pedagogy

[2] Term introduced by Dewey for the status a proposition gains when it is warranted through the ongoing, self-correcting processes of enquiry (Oxford Dictionary of Philosophy, 2016)

or professional practice or evaluating professional development. Williams (as cited in Fragkos, 2016) suggested sustained competence must include “self-consciousness (reflection), continual self-critique (critical reflection),” and expert knowledge (p. 10).

While experts have presented reflection as a cognitive process, Pekkarinen and Hirsto (2017), citing Boud et al. (1985), extended the process to incorporate emotions and the social environment. They professed the affective in parallel with the cognitive transpires while revisiting and assessing an experience. Moon (2015) contended reflection might lead to a broader emotional awareness. This insight remains central to reflection because, when revisiting an experience, a person engages with the situation cognitively and emotionally. McAlpine and Weston (2002) argued emotions (feelings) might represent tacit knowledge, a realization during reflection, but may not have formed into articulation. These views present emotions as playing an essential role in reflection (Boud & Walker, 1998; Mezirow, 1998). Emotions founded on one’s cognitive interpretations and specific situation appraisals remain fundamentally involved in teaching and learning (Fried, 2011; Holmes, 2010; Leathwood & Beatty, 2007; Lefebvre, 2022; Zembylas, 2014). Emotion regulation involves current, foreseen, or recollected emotions controlling and monitoring (McRae & Gross, 2020). Given the vast emerging research exploring emotions and emotional regulation, discussion on emotions, regulation, and impact on reflection and reflective practice falls outside this paper's scope.

Researchers have unveiled the social environment's effects on academic reflection (Connell, 2014; Pekkarinen & Hirsto, 2017). According to Pyörälä et al. (2015), HE educators may reflect on their pedagogical practice and engage in active learning through significant networks where they can deeply collaborate with other educators, irrespective

of their discipline or department (also see Bailey et al., 2022; Mauri, 2019). This vital system supports educators, enabling them to reflect openly with colleagues, family members, and students (Brookfield, 2017). Their association with students can lead to valuable discussions, clarity, and sometimes, a pathway by which the educator may enhance pedagogy (Mauri, et. al., 2019). Research has also shown that having a trustworthy colleague who can provide critical feedback promotes professional competence (see, Mauri et. al., 2019; Pekkarinen & Hirsto, 2017).

An educator's behaviour and actions will not necessarily change as a result of reflection. Certain situations may obstruct the transformation, thwarting change. Impediments can prevent growth, such as clarity of the reason for reflection, superficial best practice knowledge, inadequate reflection scaffolding, time and commitment restraints, and fear of criticism (Hatton & Smith, 1995; Mälkki & Lindblom-Ylanne, 2012; Pekkarinen & Hirsto, 2017; Pekkarinen et al., 2020).

Reflection, Self-Reflection, Metacognition, and Self-regulation

Cognitive scientists have used the term 'self-reflection' rather than 'reflection,' adding confusion and leading to the need to understand the relationship between the two terms. Von Wright (as cited in van Velzen, 2015) expanded reflection to include the 'self' centralizing the individual towards improving proficiency. Von Wright also argued adding the self to reflection indicates a self-made selection, empowering the person to make choices about which alternatives to pursue.

Parallel lines of research have improved on higher education teaching practice, focusing on metacognition and self-regulation. Dinsmore et al. (2008) extensively reviewed 225 studies, elucidating despite the popularity of research in these areas, that the

terms *metacognition*, *self-regulation*, and *self-regulated learning* lacked clear, distinct definitions. Consequently, many scholars have used the terms interchangeably. Dinsmore et al. (2008) further highlighted the misuse and asserted terms' dissimilarity. Winters et al. (2008) professed the research lacks clear conceptual frameworks, obfuscating verbiage leading to erroneous interchanging. A gap exists in studying the relationship between metacognition, self-regulation, and self-reflection, sparking expert interest (Fleming, 2014; Kaplan et al., 2013).

This ambiguity partially arises from academics characterizing metacognition as an ill-defined and vague concept (Schunk, 2008; Thomas & McRobbie, 2013; Veenman 2006). The concept Flavell (1979, 1993) defined originally embodied how one thinks about one's thinking. It referred to an individual's knowledge, control, and awareness of one's cognitive activities in learning processes (Flavell 1993; Jabusch, 2016; Lajoie, 2008; Thomas 2012; Veenman et al., 2006). Flavell (1993) illustrated how four central components (metacognitive knowledge, metacognitive experience, goals, and strategy activation) interplay to improve or deteriorate one's metacognitive proficiencies. Mavens have generally divided metacognition into knowledge and learning process implementation (Flavell, 1993; Lajoie, 2008; Schraw et al., 2006).

Reflection is essentially a process engaged in with an aim to review and learn from the situation. Learning process knowledge engenders conceptual comprehension or epistemological understanding guiding the individual in monitoring cognitive components, while applying learning entails procedural knowledge evoking awareness and regulating learning and strategies (Lajoie, 2008; Schraw et al., 2006; Veenman et al., 2006). Denton (2011) proposed most reflection in one way or another involves metacognition. Using

metacognition for self-awareness can considerably measure a student's progress towards respective goals. It can also help people understand their behaviors during the process, shedding light on the project. According to Allan and Driscoll (2014), students observing learning and thinking techniques and leveraging that reflection to modify knowledge can enhance metacognitive awareness. Wilson (as cited in Gural & Shulgina, 2015) demonstrated metacognition contained three elements: metacognitive awareness (reflecting on one's learning processes and acquiring an understanding of the learning strategies used in a given situation), metacognitive evaluation (assessing one's intellectual competencies and confining employment in the given situation), and metacognitive regulation (individually modifying one's thinking; p.5).

Yancey (1998) similarly asserted that during reflection, the learner experiences three progressions: projection (goal setting), retrospection or review (goal and achievement strategies), and revision (assessing goals realization) (p. 6). According to Allan and Driscoll (2014), the three Yancey stages lie within the framework of metacognition. Metacognition then draws a parallel and emerges as a form of reflection. Baird et al. (1991) claimed "adequate metacognition empowers the learner to undertake the constructivist processes of recognition, evaluation, and revision of personal views" (p. 164). Daniels (2002) posited reflection and metacognition constituted monitoring, regulating, and controlling a person's thoughts regarding one's thinking. Hence, metacognition depicts the adjective used to describe the thinking awareness, whereas reflection comprises the verb reflecting the process of thinking. Moreover, metacognition encompasses fundamental self-regulation necessary to learn successfully (Lucangeli & Cornoldi, 1997). Kuiper (2002) acceded those with a higher academic achievement

possess self-regulation and strategize metacognitively. He also emphasised that once someone engages in metacognition, it stimulates introspective thinking, nurtures responsibility, and increases self-confidence, enabling one to make better decisions.

Bandura (1986) focused on self-regulation and developed the social cognitive theory (SCT) of human behavior. Zimmerman (1989), extending Bandura (1986), proposed "the self-regulated learner" that "students can be described as self-regulated to the degree that they are metacognitively, motivationally, and behaviourally active participants in their own learning process" (p. 329). According to Lajoie (2008), self-regulated learning (SRL) surfaces as self-regulation in academic learning (Kaplan, 2008; Pintrich, 2004; Zimmerman, 1989). Like metacognition, its parts define SRL, such as epistemological beliefs, background knowledge, metacognitive knowledge, diverse motivational concepts, metacognitive regulation, and apt strategy adoption (Schunk, 1995; Schunk & Ertmer, 2000; Sitzmann & Ely, 2011; Winne, 1996; Zimmerman, 1995). Fox and Riconscente (2008) noted broadly hypothesized metacognition and self-regulation reside "within the broad spectrum for all human actions, all ages and at varying points of development," whereas "self-regulated learning is, by and large, limited to students in academic contexts" (p. 374).

Zimmerman's (1989, 2000) model proposed SRL involved sequences consisting of three learning phases: forethought, performance, and self-reflection. During forethought, the individual analyzes the task to set completion and learning goals. Next, while controlling performance, the person engages and monitors strategies (sometimes adjusting) to accomplish the task. The final self-reflection occurs after the performance control phase, where the learner assesses one's performance and infers future tasks and

goals. Zimmerman (2000) posited self-reflection as a multifaceted cognitive process containing the sub-processes of self-judgment and self-reaction. Thus, he illustrated that learners purposefully engaged in reflecting on their learning will start to adjust their strategies or develop new ones to improve future problem solving (Cleary & Zimmerman 2012).

Another leading SRL model proposed by Pintrich encompasses four phases: forethought; planning and activation; monitoring and control; and reaction and reflection, within four areas of cognition, motivation, behavior, and context (Pintrich, 2000). He contended learners advance through these phases in a loose sequence while learning; they can occur in parallel or dynamically. However, this does not indicate they are necessarily hierarchically or linearly sequenced (Schunk, 2005; Zimmerman & Schunk, 2011).

The reaction and reflection phase is similar to Zimmerman's model and includes attributions, appraisals, and performance self-assessments (Pintrich, 2000). The inclusion of motivation at this stage illustrates the learner's opportunity to assess motivation and refocus or enhance their efforts if they feel motivation declines. Thus, this cognizance allows the learner to assess whether poor performance directly resulted from effort or ability (internal attribution). A principal factor also constitutes engaging emotions, including motivational reaction resulting from contentment or frustration from the task's success (Pintrich, 2000; Schunk, 2005).

SRL ties in with the idea of helping the learner-educator transform performance proactively by self-directing to gain a strong command of the learning process (Dinsmore et al., 2008; Lajoie, 2008; Pintrich, 2000; Zimmerman, 1998, 2000, 2008). The learner needs to remain motivated and committed to self-improvement and engage with

established strategies that help learn, manage time, resources, and the learning environment (Cleary & Zimmerman, 2012; Sitzmann & Ely, 2011; Zimmerman, 2008). Engaging one's knowledge, control, and awareness of one's cognitive activities in the self-regulated learning processes, a person can consolidate metacognition as a crucial learning component (Ertmer & Newby, 1996; Schraw et al., 2006; Thomas & McRobbie, 2013).

Winne and Hadwin (1998, 2008) developed an SRL theory based on the information processing theory (IPT) to supplement Pintrich (2000) and Zimmerman (2000). IPT experts aimed to enhance understanding of the cognitive learning processes when comparing the human mind to a computer, suggesting that the brain has similar capabilities to a computer, such as long and short-term memories, data storage, retrieval, and processing. Moreover, IPT scholars assert the human mind uses functions like a computer, such as the conditional expression if-then-else, to help with its strategy and decision-making. This approach evolved from cognitive and educational psychological constructs and theories, adopting quantitative strategies used during learning in higher education (Biggs, 1993; Dyne et al., 1994; Marshall, 2019).

Winne and Hadwin (1998) postulated four weakly-sequenced and recursive phases that occur during learning: defining the task, setting goals and planning, reviewing strategies, and modifying them to metacognition. These stages help learners switch between phases or adjust their actions within the same one (Winnie, 2001). SRL's recursiveness indicates the person metacognitively monitor events and cognitive operational outcomes at any time, necessarily adjusting to the next step.

Winne and Hadwin's (1998) IPT model does not incorporate reflection, but instead, it describes an optional modification to metacognition phase, enabling learners to

contemplate if they should change the elements in any of the three previous sequences (Winnie, 2010). Although presented as a metacognition step, considering the previous three phases and analyzing the components allow the learner to reflect on them based on evaluation. They choose whether they needed to modify them.

SRL researchers have empirically tested Winne and Hadwin's (1998) model in various learning situations (Azevedo et al., 2008; Hadwin et al., 2001; Jamieson-Noel & Winne, 2003). In a thorough review of four-phase SRL, Greene and Azevedo (2007) identified the paradigm's essential contributions and proposed new research directions pointing out areas Winne and Hadwin (1998) needed to address. One significant contribution they made to the SRL entails that it complements the previous SRL scholars (e.g., Pintrich, 2000; Zimmerman, 2000), recommending an increasingly detailed description of specific cognitive learning processes (Winne, 2001). Their model buttressed Pintrich (2000), distinguishing between goal-setting and planning as opposed to task definition. According to Winne and Hadwin (1998), under the category of conditions, motivation and context play a lesser role than Pintrich (2000) suggested. Another contribution involved its recursiveness, describing how, during learning, information processing and operations in one phase can change other facets (Greene & Azevedo, 2007).

Additionally, Winne and Hadwin (1998) clarified phase four's role in the learning process, addressing motivation regulation and integrating cognitive development literature (Azevedo et al., 2005). Hence, their model explains learning over a life span. However, according to Greene and Azevedo (2007), their approach did not account for student characteristics, such as cognitive ability and SRL usage with or without learning

disabilities (Ruban et al., 2003). Winne and Hadwin (1998) clarified how long-term changes occur in cognitive conditions and operations in explaining phase four.

Azevedo et al. (2005) expanded Winnie and Hadwin's (1998, 2008) SRL model, formulating five assumptions:

1. Successful learners adeptly monitor and regulate essential cognitive, affective, and metacognitive (CAM) processes.
2. SRL engenders context-specific techniques to which learners apply SRL at varying rates and times.
3. Learners must control internal (prior knowledge) and external (learning environment) factors.
4. Successful learning also requires accurate conclusions derived from employed CAM processes.
5. Learners must remain involved in their learning or problem-solving tasks through motivational processes, such as self-effectiveness, task value, and interest (Azevedo et al., 2013).

They also theorized SRL represents a dynamic, cyclical event assuming SRL methods can vary in frequency during the learning process (Azevedo et al., 2010). According to Azevedo et al.'s (2013) model, three macro-level processes occur during learner self-regulation: reading, metacognitive monitoring, and discovering strategies. Accordingly, reading comprises:

- Choosing content pertinent to the task at hand and devoting ample time to reviewing it
- Setting sub-goals at the beginning of the learning task and monitoring the progress

- Accurately assessing knowledge while also linking prior knowledge to the content
- Utilizing suitable learning tactics and adapting learning behavior with the help of internal evaluation and external pedagogical agents.

Ideally, a self-regulating learner will engage in continuous metacognitive monitoring and control to adapt and modify task benchmarks and decide on what, when, and how to regulate them (Pintrich, 2000; Winne, 2005; Winne & Hadwin, 2008; Winne & Nesbit, 2009; Zimmerman, 2008; Zimmerman & Schunk, 2011). Motivation, such as self-efficacy and epistemic beliefs, can sway this monitoring and control (Schunk & Usher, 2011). Students continuously refine appraisals, such as task value, influencing activity emotions, impacting how they self-regulate learning (Pekrun, 2006). Incorporating continuous metacognitive monitoring and control, utilizing suitable learning tactics, and adapting learning, the learner reflects on approach and, based on the evaluation, adapts and modifies the task benchmarks.

Triangulating research in the field has shown self-reflection positions itself as metacognitive in nature and a key component of the self-regulation phase. With the focus of metacognition and reflection on how students think about their thinking and the associated process of how they monitor and regulate their thinking, the two terms may be seen as significantly intertwined. This intersectionality has indicated why ambiguity exists when trying to differentiate the two terms. Similarly, self-regulation and metacognition are closely integrated. Metacognition involves self-engaging to improve learning (Ertmer & Newby, 1996; Schraw et al., 2006; Thomas & McRobbie, 2013). Inherent component interdependency and a learner focused improvement leads one to self-regulate, reflect, and metacognitively monitor to control one's approach to effective learning. Thus, the three

concepts symbiotically intertwine and educators engaging in reflection need to self-regulate and metacognitively monitor their learning to improve their pedagogical practice.

Modes of Reflection

Educators have demonstrated their understanding and integration of reflective thinking through modes of instruction. Multiple researchers have suggested reflection moves through distinctive cognitive levels (Grimmett et al., 1990; McAlpine & Weston, 1999; Taggart & Wilson, 2005; Valli, 1992; van Manen, 1977, 1991). For instance, Grimmett et al. (1990) proposed four modes of thinking while Taggart and Wilson (2005) proposed three levels of reflection on teaching practices. The latter defined reflective thinking as "the process of making informed and logical decisions on educational matters, then assessing the consequences of those decisions" (p. 1). According to Danielson (2009), situational complexity dictates reflective engagement. Situations like routine decisions spark reflection of technological/technical thinking, where pre-existing knowledge directly addresses the situation. In comparison, a dialectical, moral thinking reflection transpires during higher complexity predicaments.

Although most researchers have proposed a structured, sequential progression from the various levels, empirical evidence has insufficiently supported this view. Taggart and Wilson (2005) contended reflective thinking structure varies between scholars. A clarification of reflection in higher education educators came from McAlpine and Weston (1999) when they portrayed the process was not necessarily sequential or ordered but can transpire in various realms. Table 1 illustrates how authors have conceptualized the various reflective thinking.

Table 1

Reflective Thinking Modes

Researcher & Year	# of E/L	Key Elements/Levels	Description of Elements/Levels
Van Manen (1977)	3	1. Technical rationality 2. Deliberative rationality 3. Critical rationality	*1- Technical rationality* emphasizes achieving the curriculum objectives without considering any problems that the classroom, school, or social contexts may pose *2- Deliberative rationality* emphasizes clarifying the values of the context. At the highest level, critical rationality, social conditions, moral and ethical values are considered. *3- Critical rationality* involves "a constant critique of domination, institutions, and repressive forms of authority."
Grimmett et.al. (1990)	4	1. Technological thinking 2. Situational thinking 3. Deliberate thinking 4. Dialectical thinking	*1- Technological*, demands a prescribed set of solutions, *2- Situational* refers to making decisions while focusing only on information embedded in a specific context at a specific time. *3- Deliberate* is when an educator seeks more information than the immediate context provides. *4- Dialectical* relies on the teacher's ability to think beyond the repertoire of pedagogical strategies and avoid displaying judgments.
Valli (1990)	4	1. Technical rationality 2. Practical decision making 3. Indoctrination 4. Moral reflection	*1- Technical rationality* emphasizes measurable performance, in which the teacher's role is delineated by others (non-reflective). *2- Practical decision-making* refers to analyzing actions within the limits of determined goals. *3- Indoctrination* involves a strong moral, ethical, and social belief system about teaching, but in a non-reflective way. *4- Moral reflection* focuses on the social and moral aspects of teaching.
McAlpine & Weston (1999)	3	1. Practical reflection 2. Strategic reflection 3. Epistemic reflection	*1- Practical reflection* focuses on improving actions in a particular course or class. *2- Strategic reflection* involves paying attention to generalized knowledge or approaches to teaching that are applicable across contexts. *3- Epistemic reflection* represents a cognitive awareness of one's reflective processes and how they may impede reflection and enactment of plans.
Taggart & Wilson (2005)	3	1. Technical level 2. Contextual level 3. Dialectical level	*1-* The focus is on teacher competency towards meeting outcomes concerning course content, behaviors, and skills regarding students' past experiences at the technical level. *2- The contextual level* focuses on relating content to context, students' needs, and considering alternative practices. *3- The dialectical level* focuses on disciplined inquiry, individual autonomy and self-understanding, and consideration of moral, ethical, and socio-political issues.

Van Manen (1977) introduced reflective thinking with three modes. The first mode, technical rationality, focused on accomplishing objectives presented in the curriculum. This level represents a lower-level of reflective thinking similar to a plug-and-play system, serving as a template in the studies of Grimmett et al. (1990), Valli (1990), McAlpine and Weston (1999), and Taggart and Wilson (2005). Variations exist when describing this degree. Valli (1990) purported it as non-reflective, while McAlpine and Weston (1999), from a higher education perspective, referred to it as a practical reflection focusing on "improving actions in a particular course or class" (p.110). Taggart and Wilson (2005) described this level as concentrated on teacher competency and set outcomes concerning course content and student experiences, behavior, and skills.

At this stage, Grimmett et al. (1990) and Valli (1990) added another facet: situational thinking and practical decision making, respectively. Grimmett et al. (1990) described this situational thinking where one makes decisions based only on the information about a specific context at a specific time. On the other hand, Valli (1990) displayed practical decision-making as evaluating actions within the goal-determining framework and saw it as reflective. Teachers reflectively made decisions analyzing their actions and their consequences (contrary to nonreflective, technical rationality).

The second mode of reflective thinking Van Manen (1977) outlined entailed deliberative rationality, clarifying the contextual value. An educator purposefully attempts to discover more than is seen from the immediate context. This level remained the same for Grimmett (1990), while McAlpine and Weston (1999) addressed strategic reflection with their higher education perspective. They thus describe it as observing generalized knowledge or teaching approaches that may be applicable across various contexts. Taggart

and Wilson (2005) called this phase the contextual, which focuses on the educators' pedagogical acumen to deliver content based on the context while addressing students' needs based on their prior knowledge, as well as considering alternative approaches. Valli (1990) interestingly adopted a distinct viewpoint at this juncture, dubbing it indoctrination. According to her, this non-reflective level involves the teacher having a work related, robust ethical, moral, and social belief system. Valli (1990) referred to this emphasis as "strongly but non-reflectively promoting a belief system about teaching" (p. 19).

According to Van Manen (1977), the third mode comprises critical rationality, questioning moral and ethical concerns related (both directly and indirectly) to teaching techniques. The educator purposefully looks to find more information than the immediate context while contemplating concerns about ethics and politics in instructional preparation and implementation. This phase equates to Grimmett's (1990) dialectical and, to some extent, Valli's (1990) moral reflection. However, both Valli's (1990) indoctrination reflection and moral reflection addressed parts of Van Manen's (1977) critical rationality. Valli's moral reflection (1990), though, is reflective instead of his non-reflective indoctrination. Both address both moral and social teaching aspects. From the higher education perspective, McAlpine and Weston (1999) illustrated this level as epistemic reflection. The focus is on the cognitive understanding of one's reflective processes and how they may hinder reflection and plans execution. On the other hand, Taggart and Wilson (2005), like Grimmett (1990), called this dialectical, focusing on disciplined inquiry, individual autonomy, self-understanding, and moral, ethical, and sociopolitical consideration.

These modes represent a transition from lower-level (helpful for making routine judgments) to higher-level (needed for complex problems) thought. Each mode needs greater cognitive investigation and data gathering. For example, a novice educator lacking experience usually technically attempts to improve the class (Taggart & Wilson, 2005).

However, empirical researchers have established reflective thinking as a capability that has the potential to be learned and improved (Cropley & Hanton, 2011; Dervent, 2015), impacting pedagogical practice (Wlodarsky, 2018). A reflective educator engages in high-order thinking, improving their pedagogical practice by adapting to the environment (Knowles & Saxton, 2010). An educator should evaluate their pedagogical practice, advance their reflective thinking, gain a cognitive awareness of their reflective processes, and consider moral, ethical, and socio-political issues.

Reflection Models

Reflective thinking requires a balance between the situational context and the background of experiences that the individual brings to the episode. Models of reflection, otherwise known as frameworks for reflection, engender a structured process that guides the process of reflection.

When reflecting, using a model can enable focusing on learning and self-awareness in order to essentially avoid the simple retelling of events. Various models of reflection exist in the literature; however, some may be only used generally, across the domain in multiple academic disciplines; whereas with others, the model is either adopted for specific requirements or a new model is developed based on the field practitioner needs. Some over-simplified models are incapable of addressing all essential concerns because they allow users to approach the process superficially. Others are extremely complicated,

more regimented, and prescriptive, making them difficult to comprehend without a guidebook. (Forrest, 2008).

Dewey (1933) suggested five phases to reflective thinking: considering suggestions, problem or intellectualization, hypothesis formation, reasoning, and testing. To him, reflection encompasses an experience—critically evaluating one's personal behaviour and choices and rationalizing them in the experiential context. Schön (1987), extending Dewey (1933), suggested reflection in action to think about or reflect while engaged in the activity and become proactive in one's practice (Schön, 1987). Ekeburgh (2007) proposed that reflection must remain retrospective since one cannot distance themselves from the lived situation in order to reflect while being engaged in the moment.

Due to multifaceted reflection and its diverse use in various fields, multiple perspectives have led to a "proliferation of different versions and models to operationalize reflective practice" (Finlay, 2008, p. 7). Several researchers have developed models presenting reflection as transitions between phases (Atkins & Murphy, 1993; Boud, 1995; Kolb, 1984; Mamede & Schmidt, 2004). However, others have postulated frameworks illustrating reflection as prompts or questions guiding the learner to reflect on one's experience, emotions, actions, context, and goals (Bower, 2015; Johns, 2006). Various approaches exist in which the structure merely tries to break down a situation to evaluate it (Driscoll, 1994; Gibbs, 1988; Kolb, 1984). Conversely, in the more complex scenarios, building on the basics to change a person's personal beliefs challenges their assumptions. For example, Borton's (1970) reflection is based on students asking themselves about what happened and how it affected them. Then, they postulate how to use the answers to the questions can for self-improvement. In comparison, Casey's (2014) stages of reflection

begin with concrete, descriptive reflection and then moves in stages to more abstract and more contextual reflection so that each stage adds complexity. The phases move the student from an objective perspective to a relativistic one, and ultimately, contextual.

However, many reflection frameworks engender common elements: a cyclical nature (Greenaway, 2002; Johns, 2006; Korthagen, 2001; McAlpine et al., 1999; Tynjälä & Gijbels, 2012; Zimmerman, 1989, 2000), an awareness/experience of a situation, revisiting/reflecting on the situation and awareness/learning from the situation (see Table 2). Hence, one looks back at experiences and examines them to build one's knowledge incorporating the reflection to manage future situations (Mann et al., 2009). In order to understand and identify how various models provided support, we stepped out of the HE domain and aimed to identify the diverse models/frameworks existent in various fields. Reviewing seminal reflection literature in various academic disciplines, we found that a majority of scholars addressed their field and/or sub-field's needs. Table 2 presents the various models developed for structuring reflection. The review identified 34 models/frameworks dispersed as follows: teacher education (n = 13); healthcare (n = 8); adult education (n = 8); management (n = 2); higher education (n = 2); and law (n = 1). The three core themes integral to the models entailed awareness/experience of a situation, revisiting/reflecting on the situation, and awareness/learning from the situation.

Table 2

Models for Reflection

No.	Author(s)	Year	Concept/Framework/Model
1	Dewey	1933	"active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and further conclusions to which it leads"
2	Borton	1970	"What - So what - Now what"
3	Argyris and Schön	1978	Single loop learning When a practitioner or organisation, even after an error has occurred and a correction is made, continues to rely on current strategies, techniques or policies when a situation again comes to light. Double loop learning Involves the modification of objectives, strategies or policies so that when a similar situation arises a new framing system is employed
4	Schön	1983,87	The Reflective Practitioner (theory). -Reflection-in-action -Problematic situation -Frame/reframe the problem -Experimentation -Review consequences/implementation (He identified reflection-in-action and reflection-on-action)
5	Kolb	1984	Kolb's Reflection Cycle 1. Plan/Test 2. Do/Experience 3. Reflect 4. Link/Conceptualise
6	Boud, Keogh and Walker	1985	The key elements of this model are 'return to experience', 'attending to feelings' and 're-evaluation of the experience' - It is this working with experience that is important in learning

7	Brookefield	1987	Four Complementary Lenses The lens of their autobiography as learners of reflective practice, The lens of other learners' eyes, The lens of colleagues' experiences, and The lens of theoretical, philosophical and research literature
8	Gibbs	1988	Reflective Cycle Description - what happened ? Feelings - what were you thinking and feeling ? Evaluation - what was good and bad about the experience ? Analysis - what sense can you make of the situation ? Conclusion - what else could you have done ? Action plan - what will you do next time ?
9	Smyth	1989	Framework for Reflection-on-action (a) describing (What do I do?), (b) informing (What does this mean?), (c) confronting (How did I come to be like this?), and (d) reconstructing (How might I do things differently?).
10	Peters	1991	The DATA Process - Describe - Analyse - Theorise - Act
11	Mezirow	1991	Transformative Learning Theory -Adults exhibit two kinds of learning: instrumental (e.g., cause/effect) and communicative (e.g., feelings) -Learning involves change to meaning structures (perspectives and schemes). -Change to meaning structures occurs through reflection about content, process or premises. -Learning can involve - refining/elaborating meaning schemes, learning new schemes, transforming schemes, or transforming perspectives.
12	Atkins and Murphy	1993	Three stages of the reflective process: awareness of uncomfortable feelings and thoughts, a critical analysis of feelings and knowledge and the development of a new perspective. Both cognitive and affective skills are prerequisites for reflection and these combine in the processes of self-awareness, critical analysis, synthesis and evaluation

13	Stockhausen	1994	Clinical Learning Spiral Model Reflective practice is related to professional growth; Clinical learning consists of preparative phase, constructive phase, reflective practice and reconstructive phase.
14	Driscoll	1994	Driscoll's Model (Cyclic) - What? (Describe the event.) +Purposeful reflection on selected aspects of the experience - So what? (An analysis of the event.) +Discovering the learning arising from reflection - Now what? (Proposed actions after the event.) +Actioning the new learning from the experience
15	Hatton and Smith	1995	Types of Reflective Writing framework 1- Descriptive writing 2- Descriptive reflective 3- Dialogic reflection 4- Critical reflection
16	Seidel and Blythe	1996	Compass Model (Model encourages you to look in "four directions" while reflecting) - Inward (Feelings about situation) - Backward (Thoughts about the situation) - Outward (Influence of Culture & Society) - Forward (Outcome of the reflective process)
17	Cowan	1998	Facilitating development through varieties of reflection (Kolb Coils) -Prior A Reflection-for-action B Exploratory C Reflection-in-action D Consolidating E Reflection-on-action -Further Learning

18	Schunk & Zimmerman	1998	Self-Regulated Learning Model (Cyclical) -Performance Phase • Self Control • Self-Observation -Self-Reflection Phase • Self-Judgement • Self-Reaction -Forethought Phase • Task Analysis • Self-Motivational Beliefs
19	Moon	1999	Five Stages of Learning Stage 1: Noticing Stage 2: Making sense Stage 3: Making meaning Stage 4: Working with meaning Stage 5: Transformative learning
20	McAlpine, Weston, Beauchamp. et al.	1999	Metacognitive Model of Reflection Cyclical Model with six components of metacognition: -Goals, -Knowledge, -Action, -Decision making, -Monitoring and -Corridor of tolerance
23	Stahl	2000	Model of Collaborative Knowledge-Building Computer support should provide a workspace in which ideas can be articulated, can come into interaction with other ideas from multiple viewpoints, can be further developed and can approach consensus
24	Korthagen	2001	ALACT Model of Reflection Reflection is a cyclic process of: -Action, -Looking back on action, -Awareness of essential aspects, -Creating alternative methods of action, and -Trial
25	Rolfe, Freshwater, & Jasper	2001	Framework of Reflexive Learning - What? (Describe the situation.) - So what? (Theory & knowledge building.) - Now what? (How to improve the situation.)

26	Greenaway	2002	3 Stage Model 1. DO - have an experience 2. REVIEW - review what happened and what can be learned 3. PLAN - plan a way to approach the next round of experience
27	Rodgers	2002	Four Phase Reflective Cycle -Presence to experience -Description of experience -Analysis of experience -Intelligent action/experimentation
28	Mamede and Schmidt	2004	Five-factor model of reflective practice • Deliberate induction • Deliberate deduction • Testing and synthesising • Openness for Reflection • Meta-reasoning
29	Korthagen and Vasalos	2005	Onion Model of Reflection It outlines six distinct layers in which teacher learning can take place: (a) environment, (b) behavior, (c) competencies, (d) beliefs, (e) identity, and (f) personal mission
30	John	2006	Model of Structured Reflection Cyclic Structure of stages: -Description -Reflection -Alternatives -Changes -Bringing the mind home
31	Gänshirt	2007	Four step Design Cycle Thinking, Expression, Tools, Perception

32	Tynjälä & Gijbels	2012	The Integrative Pedagogy Model Specifies an ideal learning environment in which all the elements needed to develop expertise—theoretical knowledge, practical skills, and self-regulation (reflective and metacognitive skills)—are integrated
33	Casey	2014	Stages of Reflection Model 1. Competence 2. Difference and Choice 3. Internal Context 4. External Context 5. Societal Context 6. Metacognition
34	Bower	2015	Bowers Reflective Model · Why is this reflection important to me? · What happened? · Why is it important to analyse this event? · Analysis of the event with supporting literature / research. · What have I learned that could improve events in the future? · Action Plan – what do I need to do now?

Awareness of a Situation

This stage addresses a situation and how the analyzed experience is incorporated into one's new learning. One would summarize the experience and clarify the background and problems contributing to the event to identify the primary issue. Gibbs (1988) referred to this stage as description (what happened?) while Driscoll (1994) identifies it as a description of the event (what is the situation?). However, Korthagen et al.'s (2001) ALACT model split these two phases, identifying awareness of a situation as an event experience and ideal awareness of a situation, considering one's limitations. This divide brought detail into the reflection process. However, awareness of a situation not only constitutes consciousness and remembering, but also positions the situation to be appropriately approached, considering all aspects in the description and detail (Wloarsky,

2018). Components like behavior, affective state, and responses are needed to provide a complete picture for reflection.

Reflection on the Situation

Boud et al. (1985, 2013) detailed the reflective process's vital elements as revisiting an experience, addressing associated feelings, and re-evaluating it. Likewise, Moon (1999) illustrated this phase as making meaning and working with meaning. The learner systematically analyzes, processes, organizes, and summarizes the information to reflect on the experience (Moon, 2015). While Johns (2000, 2017) portrayed this element as reflection and alternatives, Mamede and Schmidt (2004) split this stage into two phases, deliberate induction and deduction. Deliberate induction involves the educator thoughtfully considering a foreign issue, following (or overlapping) deliberate deduction, where an educator rationally infers the outcomes based on numerous potential conjectures. Gibbs (1998) and Bower (2015) elaborated on this phase when they emphasized the need to analyze supporting literature and research. When reflecting on the situation, a clear distinction emerges between thinking and reflecting given that the learner probes, questions, and sequentially processes the experience within one's epistemic structure. This procedure involves the learner revisiting the experience and critically analyzing the situation, questioning thought process and beliefs, and then often incorporating theory and research to guide the process (Wlodarsky, 2018).

Learning from the Situation

Boud et al. (1985, 2013) proposed the reflection enables one to gain a new perspective, so the individual encounters four aspects: association, integration validation, and appropriation, whereby the person examines the new knowledge and integrates it into

the one's understanding. Similarly, Moon (1999) explained this phase as transformative learning, where the learner applies the knowledge gained to engage with new experiences. Korthagen et al. (2001) addressed this stage as core quality actualization, where the individual experiments with the new behavior.

Researchers have illustrated a spiraling, with each cycle progressing the learner on to the next comprehension stage. Many researchers have also revealed this phase as a reflection for action or sometimes reflection before action. When learning from a situation, the person integrates the insights gained from the reflection into the learners' understanding, providing a template for future use. Due to the cyclical nature of reflection, this process helps the learner construct an in-depth pedagogical understanding, fine-tuning it to enhance teaching and learning.

Recently, as reflection and reflective practice have permeated other professions, experts have shifted from generic reflection to adapting and developing approaches addressing specific reflection practices. For instance, using established models as a guide, Casey (2014) followed the general staged, sequential approach advancing from fundamental to advanced thought. However, he focuses on the needs of the legal educator in teaching reflection. Similarly, Bowers (2015) developed the Bowers reflective model for healthcare students, supporting students who like to scaffold to reflect on their practice. Thus, they might reflect on a specific event that had impacted them, emphasizing what they considered significant and reflecting on individual and professional competence. Tynjälä and Gijbels (2012) highlighted teacher reflection and reflective practice and proficiency by developing an integrative pedagogy, postulating learning best

occurs when including comprehensive expertise (practical, theoretical, self-regulative, and sociocultural) and leveraging it.

Cowan (1998) and McAlpine et al. (1999) developed two models for university educators. Cowan (1998) combined analytical reflection from Kolb's experienced-based learning cycle (experience–reflect–generalize–test) with Schön's (1983, 1987) evaluative reflection depicting reflection loops. This cycle portrays experience acted upon through reflective observation, forming the basis for active experimentation followed by feedback, producing a practical change (Kolb, 1984). Therefore, Schön's (1983, 1987) reflection-for-action occurs before actions. In contrast, his reflection-in-action and the actual action to perform Kolb's reflection-on-action embodies more systematic acts than reflection-in-action when transitioning from experience to conceptualization.

McAlpine et al. (1999) developed their metacognitive reflection explicitly for higher education. They studied exemplary professors, as experts can express themselves and have more elaborate knowledge structures and metacognitive abilities. They unveiled internal processes that consisted of six components: goals, knowledge, action, monitoring, decision-making, and tolerance corridor. They presented the interaction between these components as "reflection…driven by goals, resulting in plans drawn from the action, leading to actions that are constantly being revised and updated as feedback is monitored through the corridor of tolerance and decisions lead to adjustments in action" (McAlpine et al., 1999, p. 109).

However, scholars have criticized this premise. Although Johns (2006) encouraged reflexivity, his model remains prescriptive, for it restricts thinker values, priorities, and evaluations from critical examination (Quinn, 2000). Gibbs (1988) offered a clear

structure and simple format, which did not allow reflexive and critical approaches. Therefore, a person cannot transcend practice to explore values and progressively transform while pursuing quality and respecting diversity (Finlay, 2008, p. 8).

In summary, while scholars have attempted to generalize reflection, no one universal reflection approach exists, unmasking reflection as a multifaceted concept spanning various domains. This existing diversity in reflection makes moving towards a generic model for reflection extremely difficult. However, we also need to acknowledge the fact that a model vitally scaffolds the reflection process, opening the opportunity for field specific scaffolds and models. Platzer et al. (1997) summed effective reflection-based learning transpires if one understands the structure's frameworks. These elements can guide reflection. Furthermore, they purported implementing one reflection mode as a core, but based on the need, the individual can adapt and use relevant scaffolding from other models.

Reflection in Other Education Domains

Over the past few decades, reflective practice has become more popular in a variety of professional practice and educational settings. It has also evolved into one of the key characteristics of competence in certain professions. As a multifaceted concept, reflection is easily seen as valuable across various domains. However, variations in perception and application exist in various fields. For example, in health and medical education, integrative reflection focuses on developing clinical competence. It engages with issues, such as dealing with challenging, disturbing situations like deadly illnesses, preserving life, and death or near-death situations. According to Ryan (2010), reflection can positively influence the health domain “through detailed descriptions and aesthetic

inquiry into important and often complex events that occur during the daily practice of medicine" (p. 102). Thus, healthcare education deals with improved decision-making, coping mechanisms for trainees, emotional states and reactions to situations, approach, and relationship with society (including colleagues, patients, and patient families), and the patient care framework (Kim et al., 2010). Similarly, reflective practice in social work focuses on issues based around compassion fatigue, emotional depletion (a consequence of repeatedly interacting with recalcitrant clients), high workloads, and issues related to power and oppression (Heron, 2005; Murphy et al., 2010). Due to heightened emotions in healthcare and social work, emotional regulation remains paramount for reflection. Emotional regulation entails "the processes by which individuals influence which emotions they have when they have them, and how they experience and express these emotions" (Gross, 1998, p. 275).

While social work and healthcare involve catering to client welfare, the interactions significantly differ from those of other fields. This variation emerges in the strategies used to reflect and the eventual improved professional practice. Reflection in social work additionally deals with frustrations and disillusionment, contributing to burnout (Murphy et al., 2010), whereas healthcare additionally emphasizes coping, emotional management, and patient care (Goldie, 2008; Kim et al., 2010; Seddon & Anderson, 2012). This difference distinguishes healthcare and social work from education reflective practice. In the latter, educators scrutinize themselves on all levels: their current beliefs, attitudes as well as their relationships with their students, parents, and peers (Boud et al., 1985), to enhance pedagogical effectiveness (Ferraro, 2000; Korthagen & Wubbels, 1995).

In management, Roessger (2015) suggested reflective practice can assist decision making, enabling managers to adapt or adjust their behavior and actions and comprehend the culture and politics within which actions occur. Mackay and Tymon (2016) bolstered this premise, concluding that 68 human resource practitioners found reflection "stimulates dynamic discussion" and fosters appropriate reflective skills that "enable business practitioners to confront unpredictable work situations" (p. 332). Thus, reflection in management also differs from higher education.

In cognitive science research, reflection depicts an SRL phase. Students self-evaluate and reflect over post-performance on their real academic learning achievements instead of their previously established goals as in health and social work (Schunk & Zimmerman 1998). Students must also evaluate how they dealt with distractions in the performance stage to ascertain which conditions in their work environment aided performance (Cleary et al., 2012). As a direct result of their self-reflection, they may shift comprehension and behavior, altering performance and completing the SRL cycle (Cleary et al., 2012). Although reflective practice scholars in medical education have professed self-reflection remains consistent with the cyclical feedback loop, the subprocesses underlying it are often not well defined. Thus, people tend to pay less attention to the forethought and performance dimensions of SRL (Cleary et al., 2013). Due to the dynamic nature of higher education, educators often deal with uncertain or ill-structured problems requiring rapid responses, so the SRL model, self-reflection phase connects directly with it.

Law students must reflect as part of their legal training (Anzalone, 2010; Casey, 2014). According to Casey (2014), legal externships must strictly adhere to the American

Bar Association (ABA) accreditation standards. Hence, programs must provide foster learner reflection, centered around justice and personal beliefs, experiences, and values, either blending or conflicting with the land's laws and the legal profession. Thus, educational reflective practice experts differ from the legal profession because of these field-specific topics. However, reflection leading to students' questioning and adapting core issues, like personal beliefs, experiences, and values, exists in both fields.

Schwartz (2005) identified self-directed learning as the best practice to help law students enhance legal education. Schwartz's SRL paralleled Zimmerman's (1989, 2000), as both affirmed legal education presents self-directed learning as cyclical, whereby learners appropriately order the issues involved with their learning assignment, plan and implement learning strategies, self-monitor strategic efficacy simultaneously, and afterward reflect on process success, such as how they would handle a comparable future task.

Many researchers have developed reflection in various fields, such as health and welfare, law, management, business, and education, in research and practice, making it challenging to define and delineate its usage. Habermas (1971) and Schön (1983) affirmed scientists' instrumental practice is not problematic, as, in such science-driven professions as medicine and engineering, theory more naturally guides practice. However, in social work and education, secure knowledge instrumentally guiding practice does not exist, causing confusion. These latter fields represent hermeneutic knowledge[3] (Habermas,

[3] Jürgen Habermas coined the term "knowledge interests" (*Erkenntnisinteresse*). He unveiled three knowledge facets fundamental to specific object and scientific evaluation. Although forecasting remains organic in the natural sciences, hermeneutics typifies the humanities. The social scientists pursue knowledge liberatively, to alter circumstances and change the society and societal alternatives (Jensen 2021).

1971), implying that knowledge on a given subject matter is interpretive and not rooted in fact to the same extent as scientific disciplines are. Thus, reflection remains embedded in the teaching methods of review, interpretation, and reconstruction of ideas and processes.

Furthermore, practice in these professions resides on rapid action as educators continuously deal with uncertain or ill-structured problems requiring instantaneous responses (Palmer et al., 1994), minimizing the time for theoretical analysis (Kirby & Teddlie, 1989; Smyth, 1989). Thus, evidence of professional proficiency transpires from actions, not the intellectual quality of the actions (Argyris & Schön, 1974; Schön, 1983). Schön (1983) outlined deliberately intensive professions where the thinker must determine how to progress to attain a particular outcome. The practitioner must choose between actionable alternatives or recombine them when necessary, a practice that characteristically does not exist in other professions, such as engineering, whereby professionals reflect conceptually, as they do not deal with uncertain knowledge. Reflection and reflective practice in teaching, nursing, and social work remain unstandardized because various roles and relationships provide wide-ranging professional learning, reflection, and practice. Each has different professional involvement and reasons for using reflective practice.

To summarize, researchers have adapted and integrated reflective practice across various domains and learning environments. However, while the common thread remains, improving one's professional practice, reflection varies significantly based on the context and domain intervention. This highlights a core issue that generalizability is not possible, further underscoring that in the case of HE there is limited clarity on the components and a lack of practical scaffolding to support educators to engage in reflection. So even when educators are

committed to improving their pedagogy using reflection, there is a general lack of clarity and limited resources.

General Discussion

Higher education establishments have welcomed the idea and set up departments dedicated to supporting educators in improving their pedagogical practice to provide the necessary pedagogical support. Reflection is considered as a critical component in improving pedagogical practice (Clarà, 2015; Korthagen, 2017; Landis et al., 2015; Leigh, 2016; McAlpine et al., 1999; Saroyan et al., 1997; Schön 1995) and thus support to staff and students is considered important to improve reflection and reflective practice. For example, McGill University in Canada has supported faculty through their Teaching and Learning Services (TLS) where Van Walraven (2017) highlighted the benefits of reflective journaling in education, specifically for HEE.

Winchester and Winchester (2014) purported engaging in reflection benefits the practitioner while enhancing student performance. Their study investigated the impact of reported reflective practice using formative student evaluations of teaching (SETs) on modifications to summative SETs, usually conducted at the end of a teaching period. Findings indicated, SET scores improved more each year on average for all reflective practitioners and faculty members who indicated high levels of reflection. Furthermore, this improvement resulting from pedagogical reflection was also noted in the higher grades students achieved over the year. As well, in the student feedback, they mentioned improvements in the teaching quality over the year.

The reflective process does not just improve pedagogical practice. It can also help educators become lifelong learners. Once they have acquired the skills to engage in

reflection, they can apply them to new, challenging tasks they encounter. In doing so, they can enhance their understanding and knowledge (Butler, 1996). Professional growth and continued professional development also exemplify factors where engaging in reflective practice enhances learning. Reflection can create and support a peer network facilitating interactions, dialogue, and collaboration (Epler et al., 2013; Sellheim & Weddle, 2015).

As reflection is both complex and multifaceted, its success depends on the practitioner's commitment and the support of the environment. Even though issues with the terminology and the subsequent application significantly hamper constructive reflection, many scholars have attested to the benefits of reflection and reflective practice in education. Reflection remains key to education since most educators strive to improve their pedagogy. To achieve this, they need to acquire new perspectives, objectively view their actions, and attempt to understand, appreciate, and modify their behavior (Osterman, 1990).

Challenges and Issues

In brief, this overview indicates that reflective practice expands a practitioner's pedagogical technique, decision making processes and self-awareness. However, some limitations come forth regarding the overarching understanding and inclusion of reflection within the teaching practice. Studies have established that there is no clear meaning of reflection and its perfect method of execution still remains unidentified. Rogers (2001) found that "no fewer than 15 different terms were used to describe the reflective process [and that] the term reflection is used as a noun, a verb, an adjective, a process and/or an outcome" (p. 40). The vagueness surrounding this topic hinders its usability in training, professional development and its overall efficacy. Additionally, HE educators are not required to have formal training in

teaching methods thus, so there is no streamlined mode of instruction, which can lead to an absence of reflective practice. This absence of training deters educators from engaging in reflective practice. Furthermore, without training, individuals may not be able to recognize and inspect appropriate cues and causes that lead to poor execution of planned decisions which hinders their ultimate engagement in reflective practice (McAlpine & Weston, 2000). Correspondingly, an educator's behavior does not entirely transform due to reflection; several overt and covert factors may hinder change. In summary, while studies have tried to explain reflection, there is no unanimous reflective approach that exists, in fact it is understood as a complex concept covering numerous domains (Wass & Harrison, 2014). Although a model can potentially streamline the reflective process, there are over 34 models identified. Some are over-simplified and are incapable of addressing all aspects that come under reflection and others are over-complicated to the extent of making the process more arduous and difficult to comprehend, preventing them from being fully utilized.

Directions for Future Research

Bearing in mind our findings of and above-mentioned limitations to reflective practice, future research regarding the following concerns could benefit the practice of reflection. To begin with, it has been established through previous studies that reflective practice improves teaching, but its utilization in HE is inchoate. Newer research exploring this arena would greatly benefit its practice. Secondly, the ambiguity surrounding the process of engaging in reflective practice needs to be tackled. Consequently, a crucial future research avenue would be to address this gap and design some sort of scaffold to support educator engagement. Finally, as mentioned earlier there are differences between schoolteachers and HE educators, thus a vast amount of research may not be applicable to the latter (see Huang et al., 2016; Kember, 1997); however,

there are clear similarities in terms of the educational goals to be achieved. Furthermore, given that research has drawn connections between various fields engaging in reflection, it would be fruitful for future research to triangulate these lines of research to address this gap in the literature and provide insights. A crucial takeaway from our analysis is that, despite the contributions of existing studies, the discrepancy in scholarship gives enormous opportunity for new theoretical and empirical research to assist and advance our knowledge and positively contribute to the field.

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Bridging Text

In Chapter 2, I provided an overview of the literature on reflection and reflective practices in higher education. The overview highlighted that although reflective practice positively influences pedagogy, its utilization in HE is inchoate and that the ambiguity surrounding the process of engaging in reflective practice needs to be tackled, highlighting the need for future research to address this gap.

As mentioned in the introduction, the general aim of this dissertation is to examine reflection and reflective practices in higher education to help improve HE educator pedagogy by developing a framework to scaffold reflection. With paucity of empirical research in HE educator reflection, the aim of Chapter 3 was to investigate reflection in Higher Education medical educators. Specifically, this qualitative study aimed to address empirically the themes emerging from HE educator self-reflection by giving educators an opportunity to freely reflect on their video recorded pedagogy. Additionally, the study also wanted to address a key issue of educator teaching experience and its relationship with reflection and reflective practice. Finally, to test our conjecture that a framework to guide reflection would benefit educator engagement with reflection, we developed and proposed a conceptual framework to scaffold HE pedagogical reflection based on existing literature. Our participant educators reviewed the framework and expressed their opinions, based on their understanding and experience with reflection on their pedagogy.

Chapter 3: Study 1

Deciphering Reflection and Reflective Practice in Medical Educators

Abstract

Medical professionals learn how to engage in self-reflection during their medical education but do not learn how to self-reflect on their pedagogy. Since most medical professionals eventually teach, self-reflective strategies remain paramount to their instructional development. In this study, we categorized self-reflection and investigated its functionality within our innovative theoretical framework. Based on our theoretical review and review of research in higher education, we identified six dimensions highlighting the teaching-learning interdependency: self-knowledge, teaching, students (learner), learning, content, and context. Seven medical educators taught a ten-minute microlesson on a single topic of their choice. Then they watched the video of that lesson and self-reflected using retrospective think-aloud. We found that medical educators' self-reflections aligned fully with the theoretically identified teaching-learning interdependency dimensions. Further, we identified over a dozen self-reflective comment types that medical educators made. Many comments were focused on surface-level characteristics (physical appearance or speech patterns), indicating medical educators did not comprehensively self-reflect on their teaching process. We also found that teaching experience did not seem to affect self-reflection. In this exploratory study, the participants claimed a framework would have helped structure self-reflection, unveiling theoretical and methodological insights and potential research opportunities.

Keywords: medical educators; reflection; video-based; think-aloud protocol; reflective framework

Introduction

Reflection involves scrutinizing a memory to garner experiential insight to inform one's future actions (Johns, 2017; Ng et al., 2015; Rolfe, 2014). Various professions, particularly medical professionals, revisit situations to develop their learning (Hargreaves, 2016; Steinert, 2019), boost scientific competence, and support in-depth practice, proficiency, and self-appraisal (Regmi & Naidoo, 2013; Steinert, 2019). Generally, self-reflection develops the skills required to learn and analyze one's cognitive, emotional, and behavioral responses to confounding medical experiences (General Medical Council, UK, 2021).

Similarly, teachers and educators self-reflect to assess their pedagogy and teaching practices. Experts agree self-reflection offers pedagogical advantages in higher education (HE). However, few have indicated how this happens in the field (Kreber, 2005). Beneficial reflection requires support and a framework to direct practitioners (Carrington & Selva, 2010). However, its improper use in the medical field and heavy outcome focus have resulted in poor reflection, lack of engagement, low confidence, and apathy (Ng et al., 2015; Rolfe, 2014). Furthermore, there is minimal guidance for pedagogical self-reflection among medical educators specifically and in higher education more generally (Kreber, 2005). This research aims to spark a discussion recognizing the medical educator as an educationalist, not just a medical practitioner.

According to Carrington and Selva (2010), appropriate scaffolding can enhance reflection and learning. Schön (1987) argued externalities could foster appropriate reflection in any profession. Correspondingly, Ash and Clayton (2004, 2009) recognized scaffolding elevates learning and reflection. Organizing reflection through questions and guides streamlines it, advancing learning and pedagogy (Johns, 2017; Moon, 2015; Steinert, 2019; Vong, 2016). However, HE lacks structures to help medical educators (MEs) engage in deep self-reflection,

unmasking a problem because it aims to foment purposeful pedagogical practice. A lack of framework impedes proper reflection (Ash & Clayton, 2004). Vague reflective strategies hinder professional application (McAlpine et al., 2004). Educators' lack of knowledge about teaching and reflection prevents them from meaningfully employing this practice.

We plan to explore medical educators' reflection and to identify the most helpful ways to provide scaffolding. Researchers attest the fact that scaffolding is beneficial in the educational context. Scaffolded reflection empowers "the practitioner to touch the breadth and depth of reflection" (Johns, 2017, p. 81), enhancing understanding and positively influencing pedagogy. Ash and Clayton (2004) and Duffy (2009) asserted scaffolded reflection unmasked teaching issues and promoted educator advancement. While reflection embodies a personal practice (Boud et al., 1985), "the learning process can be considerably accelerated by appropriate support" (p. 36). Johns (2017) contended a guide must continually steer educators to navigate pedagogy, and facilitator guidance helps the practitioner reflect on multiple viewpoints, preparing for various circumstances (also see Steinert, 2019).

Retrospective Think-Aloud Protocol and Video Self-Reflection

Thinking-aloud is the simultaneous articulation of a participants' thoughts while engaging in a task (Ericsson & Simon, 1993). Researchers record these verbalizations to unmask participants' cognition without interrupting or influencing their thoughts (Bannert & Mengelkamp, 2008; Ericsson & Moxley, 2019; Ericsson & Simon, 1993; McIntyre et al., 2022). The data is recorded, transcribed, and encoded for future scrutiny. Furthermore, Retrospective think-aloud (RTA) requires that participants recollect and articulate their thoughts after they perform a task (McIntyre et al., 2022; Seidel et al., 2011). Additionally, in video-stimulated RTA, participants concurrently review a video recording of their session to scaffold their

recollection of events acquiring additional access to participants cognition accessing relevant memories and knowledge (McIntyre et al., 2022; Seidel et al., 2011). The videos serve to stimulate educators' thought processes throughout the reflection session.

Video-mediated reflection provides educators with detailed information about themselves, promoting reflection (Gelfuso, 2016; Lakshmi, 2014). Video-based reflection transcends relying on memory to narrow gaps that can cause discrepancies in a systematic reflection (Baecher et al., 2014; Gelfuso, 2016). Golombek (2011) used video-based teacher reflection, purporting "memories may be muddled when reconstructing a teaching event" (p.129). Trip and Rich (2012) noted educators could benchmark their pedagogy against best practices and identify issues unknowingly emerging while instructing. When using video-based reflection, educators identified intervals they could not have recalled without the video. Research has revealed that instructional improvement was consistently influenced favourably by video-based educator training approaches (e.g., Chang et. al., 2018; Gaudin & Chaliès, 2015; Gröschner et. al., 2015; Marsh & Mitchell, 2014).

Developing the Framework, Dimensions of Reflection, and Potential Coding Themes

Engaging a deductive approach (based on a theoretical review of existing literature) and an inductive approach (analysis of qualitative data from our participants), our goal is to help scaffold HE educator reflection by defining and developing a framework that HE educators can use to guide their self-reflections. Teaching and learning in higher education are complex and understudied, meaning we lack a clear conceptual framework for pedagogical self-reflection. Moving forward, we aim to begin collecting a list of potential categories that we have gleaned from the literature. Colton and Sparks-Langer (1993) defined seven dimensions of teaching focused on reflective teaching and identified the educator, pedagogy, students and their

attributes, learning, content, and environment. According to Low et al. (2009), multi-skilled and well-rounded educators must combine teaching and thinking with administrative and managerial tasks. Educators must also remain self-aware and possess in-depth knowledge of students, community, and pedagogy. Their design emphasized educators' "dispositions (being), practice (doing), and professional knowledge (knowing)" (p. 72) interaction. Self-knowledge, teaching and learning, students, school and society, and context affect educator beliefs. Furthermore, Korthagen & Vasalos (2005) studied six characteristics that impact educators' perceptions to illustrate how both contextual circumstances and unique personality features affect behaviour. The environment, behaviour, competencies, beliefs, identity, and mission are some of these variables. These six factors—are arranged in the Onion Model as six layers that resemble a sliced onion. Korthagen & Nuijten (2018) further highlighted "core reflection" as a way to get the educator to reflect more deeply. They proposed that in order to further their professional growth, educators must first critically reflect on their personal characteristics and ideals.

From the three paradigms mentioned above (Colton & Sparks-Langer, 1993; Korthagen & Vasalos, 2005; Low et al., 2009), we extracted six teaching-learning interdependency elements: self-knowledge, teaching, students (learners), learning, content, and context. We also used the Teaching Behaviour Inventory (TBI) developed by Murray (1983), to extract specific behaviors that are known to be part of teaching. See Table 1 and Table 3 outlining the coding themes. This research aimed not to neglect categories. So, although we describe themes, we gathered any comment we perceived as self-reflective, even if it does not seem to fit into the framework (see Appendix A - Other). The eventual aim was to develop a robust framework based on theoretical foundations and empirical research.

Table 1

Framework Presented to Participants in Phase 3 of the Study

Dimension	Potential Categories
Educator	Personal philosophy Physical attributes Emotion regulation
Teaching	Activating prior student knowledge Presentation abilities Quality of Presentation Teaching plans Instructional technique Management skills
Learner	Learner characteristics
Learning	New knowledge consolidation Experiential learning
Content	Subject matter expertise
Context	Physical, social, and personal learning environment

Theme 1: The Self as an Educator

Focusing on the self as an educator can activate pedagogical self-knowledge, emphasizing the educator's epistemology and ontology (Bracken, 2010; Schraw et al., 2012). However, humans are a visual species, where pleasing aesthetics dissuade adverse appraisal (Nemko, 2020). Psychologists have agreed people remember overall appearance and demeanor after an encounter (Simončić, 2016). HE researchers have demonstrated physical appearance biased student opinion and educator evaluation (Simončić, 2016). Taken together, such evidence suggests that educators might focus too closely on their physical attributes when reflecting. Potentially without a framework to draw their attention to pedagogical performance, this self-conscious self-reflection (physical attributes) might likely distract participants (see Table 3, a middle column for our initial coding categories). We will also search for self-reflective commentary about emotional regulation and personal pedagogical beliefs.

Theme 2: The Act of Teaching

The verb accompanying the noun “educator” is “teaching”. The teaching-learning relationship rests on the educator's instruction. Although educators implement numerous activities to aid learning, their teaching approach develops through field knowledge and personal philosophies, including efforts employed inside and outside the classroom. Based on field experts, we predict educator participants will self-reflect on formulating adequate knowledge comprehension and discussion, creating effective presentations, implementing supportive teaching procedures, directing the session, and devising evaluation methods (Avalos, 2011; Grossman, 2021). Knowledge that is in agreement with past information strengthens existing networks (van Kesteren et al., 2018), so we might expect the learner's existing knowledge to play a large role in reflection.

Theme 3: The Learner and the Process of Learning

According to Darling-Hammond (2012), learners help educators grow, advancing educator learning. Scholars have established links between student learning, educator growth, and subsequent teaching strategies (Darling-Hammond et al., 2020). We predict limited commentary about the learner, since although our students were enrolled in university and had a basic understanding of the topics taught, the educator and students did not know one another given our experimental setting.

When educators self-reflect on their students’ learning processes, they concentrate on learner knowledge acquisition and selecting, organizing, and integrating the new knowledge into the student's cognition (Weinstein & Mayer, 1986). We will look for commentary about acquiring new knowledge within the learning dimension. Practical, experience-based learning can link academic experiences to the real world (Kolb, 2014). Its notable use within medical

education and training helps health professionals (Ferro Allodola, 2014). Role-playing, games, case studies, simulations, presentations, and group activities foster experiential learning to improve interactive learning (Kurthakoti & Good, 2019).

Theme 4: Content and Context

Shulman (1986) claimed the educator must prioritize classroom content. An effective educator understands and differentiates the principal field tenets, appropriately distinguishing methodologies for learning. Diezmann and Watters (2015) professed well-versed educators emphasize core concepts rather than content and promote analytical and inquiry-based learning. We included commentary about content area and task knowledge for these educators to train students to practice medicine.

Of course, teaching and learning do not happen in a vacuum but rather in a complex set of circumstances. Kinnunen (2009) attempted to capture this complexity in the didactic triangle representing the intersection of student, teacher, and content, all surrounded by the context of learning. A conducive learning environment builds a rewarding rapport between the educator and learners; thus, the classroom must impart a cohesive learning experience. Given its experimental context, we may not expect much commentary about this concept, given the fact that it is an experimental context.

The Role of Teaching Experience in Self-reflection

Erickson (2011) generally asserted prior teaching affected educators' ability to recognize patterns, differentiating novice and experienced educators. Mature educators realize a broader classroom dynamic, concurrently monitoring and learner actions and their impact on student comprehension (see Stahnke & Blömeke, 2021). In contrast, novice educators directed their classroom attention superficially, concentrating on routines and neglecting to scan student

habits (see Stahnke & Blömeke, 2021). Given this difference in classroom practice, we might expect similar differences in self-reflection.

As medical educators regularly reflect as medical professionals, we might predict they would port those practices into their pedagogy. If so, such findings would contradict Mamede and Schmidt (2005), who contended reflection decreased as proficiency and experience increased and also suggested that when not supported, practitioner reflection tends to decline. As HE medical educators, participants had the opportunity to reflect regularly as medical professionals, so this practice may permeate into their reflective pedagogy.

Study Aims

This exploratory study attempted to understand medical educators' pedagogical self-reflections. Given the paucity of research, the practical goal is to describe their thoughts and map their comments along the teaching-learning reflection dimensions (see Table 1). We wanted to gather educators' feedback (see Appendix D) regarding our conceptual framework guiding educator reflection (see Appendix A) to improve HE educator pedagogy. This initial attempt to engage our framework with live data will enable us to report the process as well as results of the thematic analysis. We designed this study around these three research questions: (1) What themes emerge from medical educators' self-reflection; (2) do self-reflection themes vary with teaching experience; and (3) what do medical educators think of the utility of our self-reflection framework?

Method

Participants

On obtaining ethics approval from the McGill University Research Ethics Board, we recruited our convenience sample via a general invitation sent to medical department faculty

using a snowball method. As a result, seven medical educators from a research-intensive institution in Eastern Canada volunteered to participate in the study. Of those professors, four had teaching experience of five or fewer years (low experience), and three had teaching experience of 15 or more years (high experience; see Table 2).

Table 2

Participant Characteristics and Microlesson Information

Participant	Teaching experience	Gender	Microlesson title	Lesson length (minutes)	Reflection length (minutes)
PA	Low	F	Herpes	15.67	18.67
PB	Low	F	Chlamydia	12.75	13.67
PC	Low	M	Headaches	10.58	20.00
PD	Low	F	Leprosy	12.75	13.50
PE	High	F	E-Health	12.83	19.50
PF	High	F	Infectious diseases	16.00	36.75
PG	High	F	Diagnosis of diseases	9.67	16.00

Note. Seven medical educators participated in this study. Participants with low experience have five or fewer years of teaching experience (4). Participants with high experience have 15 or more years of teaching experience (3). high-experience Educators in the group reported an approximation. Length is reported in fractions of a minute; for example, one minute and thirty seconds would equal 1.50.

The seven medical educators in this study when recruited were requested to prepare a ten-minute micro-lesson of their choice about a disease, prior to the session (Appendix B & C). On the day of the session, we adequately explained the research and obtained informed consent, after which they taught a class using their earlier prepared micro-lesson. This microteaching[4] session was videotaped (Phase 1). Participants watched their microlesson and provided verbal

[4] As defined by Allen (1966) "Microteaching is a teacher education technique [that is]... essentially constructed, but real teaching, the technique allows teachers to apply clearly defined teaching skills to carefully prepared lessons in a planned series of five to ten-minute encounters with a small group of real students, often with an opportunity to observe the results on videotape" (p. 1).

self-reflection during a video-stimulated RTA session (Phase 2). Finally, each participant was given a copy of the conceptual framework for reflection and asked their opinion (see Appendix D) about the presented framework (Appendix A) and provide feedback about our structure specifically (Phase 3). Acknowledging their time and effort, each educator received a gift card for participating.

Materials

The materials for this study include the materials that were pre-prepared by the participant for the microlesson in Phase 1, the recording and playback equipment used during the RTA video-stimulated self-reflection in Phase 2, and the framework depiction shown to participants in Phase 3.

Microlesson Materials

During recruitment, participants were asked to plan and prepare to deliver a ten-minute microteaching session introducing a disease to students, comprising a mix of undergraduate students agreeing to be audience members and lab confederates pretending to be students. This microteaching session was then presented to five to eight people and was videotaped by the researchers.

Recording and Playback Equipment

During Phase 2, each participant watched a video of their micro-lesson and provided self-reflective commentary simultaneously. The hardware setup for this phase consisted of a laptop, two video-recording cameras, and a participant bluetooth headset. We played the video on a VLC media player, and audio was recorded separately with the free, open-source digital audio software, Audacity.

Printout of Self-Reflection Framework

As this study was part of a series of studies where we tested variable coding categories, we mocked up our basic framework (see Table 1 above). Participants were given the framework after they had completed their self-reflections (Appendix A).

Procedure

A minimum of two researchers with video-stimulated RTA experience remained present at all sessions. The entire study session lasted between 70 and 100 minutes and consisted of three phases:

Phase One: Teaching a Microlesson

In the first phase, participants micro-taught for ten minutes. After microteaching, participants sometimes assessed the students on the topic. They taught five to ten students who had volunteered to be audience members or lab members acting as students. Table 2 displays the participant topic and presentation length. Research assistants videotaped the session with the participants' knowledge. Participants were told when they approached ten minutes, allowing them to finish their presentation naturally. Presentation length ranged from 9.67 to 16.00 minutes, with a mean of 12.89 minutes (SD = 2.35, Mdn = 12.75). The microlesson goal was to generate the videotape for participant self-reflection about their teaching in Phase 2.

Phase Two: Doing Self-Reflection

In the second stage, participants thought aloud and verbalized as they viewed their Phase 1 recorded microteaching and reflected on their pedagogy. They watched themselves teaching and paused the video to comment. Participants verbalized reflectively as they viewed their video-recorded teaching at their own pace. This phase was also videotaped by the researchers.

The sessions lasted from 13.67 to 36.75 minutes. The average self-reflection session lasted 19.73 minutes (*SD* = 7.96; *Mdn* = 18.67).

Phase Three: Feedback about Framework

Upon completion, we introduced participants to the six dimensions (Table 1) and potential categories (Appendix A) and explained teaching-learning interdependency dimensions, noting their opinions on guided reflection (Appendix D). They also commented on the scaffold reflection content and effectiveness, which was videotaped.

Data and Coding

We coded the RTA video recordings and ensuing conversation, yielding 457 video and audio minutes in total. We transcribed the verbal data and thematically categorized it to address the research questions probing pedagogy reflection.

We used van Es et al.'s (2014) structure for teacher video analysis. First, we sorted videotape transcripts to denote reflective conversations. Next, we used Colton and Sparks-Langer's (1993) and Low et al.'s (2009) models to identify six primary teaching-learning interdependency dimensions: self-knowledge, teaching, students (learner), learning, content, and context, and their characteristics. Then, using McAlpine et al.'s (1999) coding, we delineated and validated the elements while looking for additional elements. The computer-aided, qualitative data analysis software Nvivo 12 facilitated the data coding. Periodically we cross-checked the coded transcripts against the code list to adjust iteratively (Creswell & Creswell, 2018), allowing us to experiment with adding and refining coding themes. To ensure reliability, two independent coders examined 35% of the data. The inter-rater reliability was 86%. We gathered and processed data anonymously. We deleted and destroyed data input and identifiers linking participants to the findings.

Table 3 displays our framework, listing each reflective dimension and the potential coding categories. The right-most column presents the themes after the initial review. We counted and presented the final themes in the results.

Table 3

Reflection Dimensions, Potential Coding Categories, and Final Coding Categories

Reflection dimension	Potential coding categories	Final coding categories
(Self as) Educator	• Physical Attributes • Personal Philosophy • Emotion Regulation	• Physical Attributes • Pedagogical Self-Knowledge • Metacognitive Awareness
Teaching	• Activating Prior Knowledge • Presentation Abilities • Quality of Presentation • Teaching Plans • Instructional Technique • Management Skills	• Activating Prior Knowledge • Presentation Abilities • Quality of Presentation • Teaching Plans • Instructional Technique • Management Skills • Philosophy of Teaching • Assessment • Time
Learner	• Learner Characteristics	• Learner Characteristics • Needs, Motivation & Goals • Support & Mentorship
Learning	• New Knowledge Consolidation • Experiential Learning	• New Knowledge Consolidation • Experiential Learning
Content	• Subject Matter Expertise	• Subject Matter Expertise • Task Knowledge
Context	• Physical, Social, and Personal Environment	• Personal Learning Environment

Note. Potential coding categories were initially expected based on our theoretical and literature review. Final coding categories emerged from review of the data. Some categories were not found (emotion regulation), and some new categories emerged (assessment).

Results

In this study, we have three research questions. The first regarded the themes emerging from participant self-reflection, the second involved teaching experience, and the third entailed participant framework opinions.

Themes Emerging from Medical Educators' Self-Reflective Comments

Our primary research goal was to investigate the medical educators' self-reflective comments according to the framework. First, we looked at all self-reflective comments. Then we filed the codes within each dimension. Table 4 summarizes all self-reflective comments for each participant within each reflection dimension, while Table 4 portrays the number and percentage of each coding category.

Table 4

Reflection Dimensions Mentioned by Each Participant During Self-Reflection

Participant	Teaching	Self as educator	Learner	Learning	Content	Context	*Total*
PA	19	9	3	4	0	2	*37*
PB	9	6	4	4	3	2	*28*
PC	16	4	8	2	1	0	*31*
PD	12	8	1	0	1	1	*23*
PE	16	15	1	1	0	0	*33*
PF	11	4	8	1	0	0	*24*
PG	14	4	6	6	2	0	*32*
Total	*97*	*50*	*31*	*18*	*7*	*5*	***208***

Note. PA, PB, PC, and PD had five or fewer years of teaching experience, while PE, PF, and PG had 15 or more years. Counts are tokens (instances participant said something fitting within the reflection dimension). See manuscript text for examples.

Table 5

Reflection Dimensions, Final Coding Categories, and Frequency of Each Code

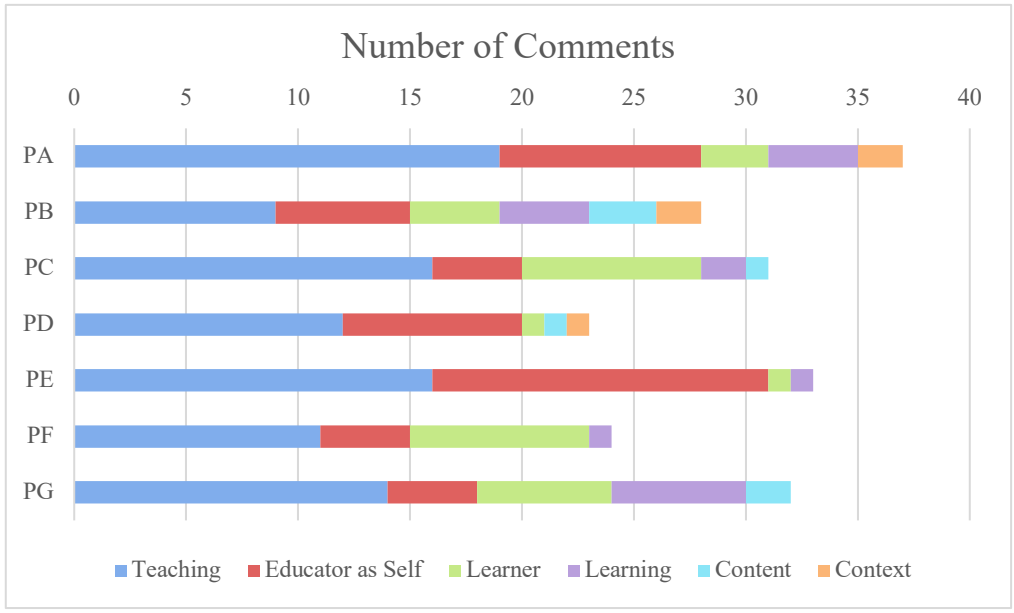
Reflection dimension	Final coding categories	Number of comments	Percent of total	Percent of dimension
Self as Educator (*n* = 50)	Physical Attributes	39	18.75%	78.00%
	Pedagogical Self-Knowledge	2	0.96%	4.00%
	Metacognitive Awareness	9	4.33%	18.00%
Teaching (*n* = 97)	Activating Prior Knowledge	2	0.96%	2.06%
	Presentation Abilities	28	13.46%	28.87%
	Quality of Presentation	15	7.21%	15.46%
	Teaching Plans	18	8.65%	18.56%
	Instructional Technique	13	6.25%	13.40%
	Management Skills	12	5.77%	12.37%
	Philosophy of Teaching	1	0.48%	1.03%
	Assessment	3	1.44%	3.09%
	Time	5	2.40%	5.15%
Learner (*n* = 31)	Learner Characteristics	17	8.17%	54.84%
	Needs, Motivation & Goals	13	6.25%	41.94%
	Support & Mentorship	1	0.48%	3.23%
Learning (*n* = 18)	New Knowledge Consolidation	9	4.33%	50.00%
	Experiential Learning	9	4.33%	50.00%
Content (*n* = 7)	Subject Matter Expertise	3	1.44%	42.86%
	Task Knowledge	4	1.92%	57.14%
Context (*n* = 5)	Personal Learning Environment	5	2.40%	100.00%

Note. Percent of total is the number of comments in that coding category as a percentage of all coded comments (208). Percent of dimension is the number of comments in that coding category as a percentage of the comments that fall under the same reflection dimension (listed in the first column). So, for example, for the first row, the coding category is Physical Attributes, it was commented on 39 times, which is 18.75% of the total number of comments, and 78.00% of the comments within the reflection dimension Self as Educator (50).

We counted the instances of self-reflective comments (208). The comments fit well within the reflection dimensions (see Table 4). We found all participants engaged with four or more elements and one with all six (see Figure 1 for individual participant data).

Figure 1

Use of Each Reflection Dimension by Participant



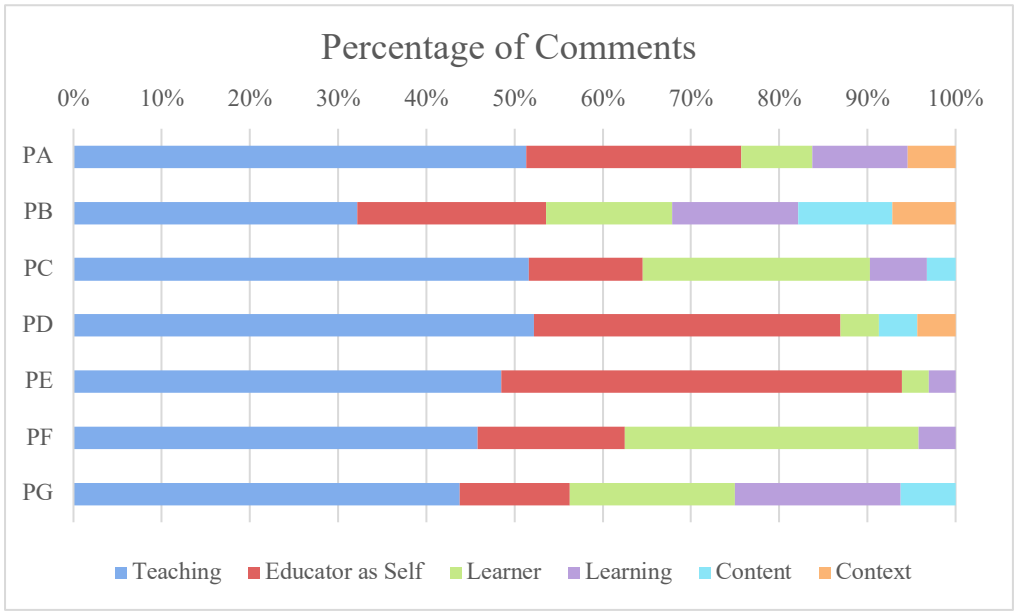
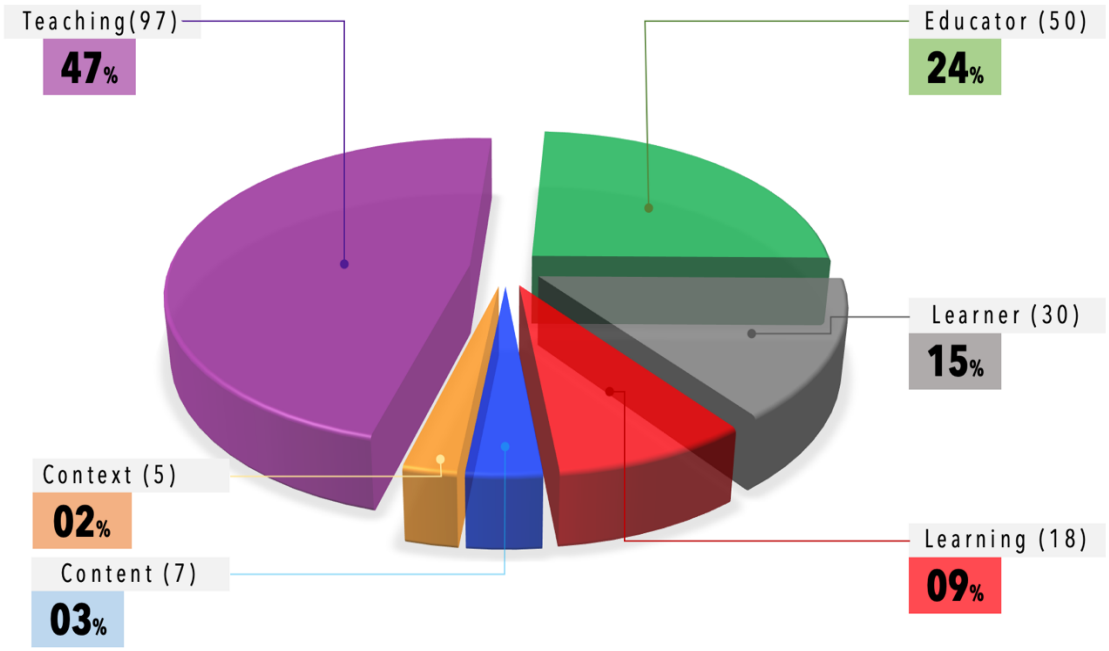


Figure 2 shows the percentage of comments falling into each reflection facet; Figure 3 illustrates a similar breakdown but includes participants and the coding categories.

Figure 2

Percent of Self-Reflective Comments for Each Reflection Dimension



Regarding the comment makeup, participants reflected on the teaching dimension the most (97, 47%). Physical reflection on teaching got salient attention (44%) compared to other incorporeal aspects. The self as an educator (50) made up about 24% of reflections, of which 78% concentrated on physical attributes (39). The learner yielded about 15% of reflections (31), of which 57% were learner characteristics. Self-reflection focused on the learning process, reflecting on learning in 9% of their comments (18). Participants rarely reflected on content (7, 3.4%) or context (5, 2.4%). Although educators cannot reflect on all teaching-learning components, these reflection dimensions capture participants' spontaneous self-reflective comments.

Educator: Reflective Comments about the Self as Educator

As we had predicted, every participant frequently pointed out their physical appearance (39, 19%; see Table 5). PD commented on her physical movements: “I’m making too many nervous movements, and I might be reading too much.” Later she declared, “My body language is a little bit quirky.” Similarly, PA remarked: “I'm using my hand gestures a lot …I'm showing a lot of facial expressions…I can see that a lot of non-verbal communication happening.” We had predicted this because people tend to emphasize these aspects when they self-reflect via video.

We also observed high-level commentary about the self as an educator. Participant educators discussed their pedagogical planning, organizing, and knowledge delivery, concentrating on best practices, knowledge, and understanding. PB voiced, “I thought that the assessment was going to be too simple for the content, but it was the way I could emphasize the most important part of the talk and also to stimulate recall in the students.” We had originally tried to capture this commentary in a personal philosophy theme, but we expanded and refined the category to pedagogical self-knowledge. Though only two instances emerged, we modified the coding to encompass people who have training in or have a descriptive or aspirational framework.

A new code emerged from our data, metacognition. PG engaged in metacognition about teaching:

> What I have been trying to do here is develop a little bit of an algorithm. If I were to teach something like this, I might end up with 10-15 things on the list - I try and get it down to something memorable like three things under which there may be two or three other things.

Metacognition yielded nine comments (4%). We dropped a code emotion regulation; since our HE sample did not engage with it. Table 3 represents the initial and final codes.

Teaching: Reflective Comments about the Act of Teaching

About half of self-reflective comments fell under the umbrella of teaching (97), making it the most common dimension. All participants commented on their presentation abilities during self-reflection (28, 13%). PE remarked: “I go to my slides but keep contact with my audience…I'm repeating a lot… I say 'Ya' a lot… I don’t go over all the items. I only focus on a few, which I think are the most important.” Teaching plan references were also common (18), as were comments about presentation quality (15) and instructional techniques (13). PB highlighting teaching plans, noted,

> I decided to use this teaching-learning technique since I thought it was easy in a smaller group. I was expecting 6-8 people and was about sharing info. And woman-to-woman would be easier to ask these questions and to share this content. I thought it would work well. I got some important questions as well from the people.

While discussing their presentation quality, PE remarked, “I like to put a lot of pictures in my slides and presentations.” Similarly, PF addressing the instructional technique, voiced,

> I'm watching my students all the time. I'm maintaining eye contact, look on their faces, so I'm trying to monitor all the time if they are following what I'm saying if they are understanding if they are responding to it. It’s a very interactive thing.

Session management also elicited multiple comments (12). PC described his session management skills. “This table is a very important part of the presentation. But due to lack of time, I didn’t give them enough time to go over it. I need to manage my time better.”

Finally, participants minimally reflected on time (5), assessment (3), activating prior knowledge (2), and teaching philosophy (1). PF reflecting on time, articulated, "If I had a little more time, I could have said some interesting things on influenza."

Only one educator reflected on activating prior knowledge. This sparsity might result from ecological validity. Teaching an introductory topic may have elicited an assumption regarding prior knowledge. We also might see time mentioned less often in self-reflections not associated with micro lessons.

Learner: Reflective Comments about Learner Types

According to Felder and Brent (2005), educators who fully comprehend their learner and their objectives can address learner goals. Coming into the situation, our coding had only one code under the learner facet. Learner traits garnered 17 comments. PF voiced,

> I had 10 minutes. I was able to figure out my audience at the initial stage…Lots of students are visual learners, so I make it a point to have illustrations that make the point. People grasp the concept immediately. If it's clear, they get it! . . . You also need to be able to explain the material and be articulate to put the point across since not everybody is a visual learner. The auditory learners need support as well.

We added a category regarding needs, motivations, and goals coded in 13 comments. While PC reflected on learner needs, motivations and goals, she shared,

> As they are preparing for (neurological) patient care, here I am trying to get from the students, if they started to think about the answers, they could get from the patients using this difference (multiple questions) why they need to know this information so that they can connect the dots and get a good idea of the topic. They don't need to remember

> everything, but they need to remember the important points red flags so that they don't miss any serious problems.

We added one category, even though it had one reference, a comment about support and mentorship, aligning with findings, an educator must establish a rapport with their protégé to provide support and mentorship (Santiesteban et al., 2021). The ecological validity of the experimental setting might not elicit this reaction, as they did not know each other. However, one instance led us to add it to the framework.

Learning: Reflective Comments about the Act of Learning

While almost all educators (6) reflected on new knowledge consolidation, only a few (3) mentioned experiential learning. New knowledge consolidation (9) and experiential learning (9) encompassed about half of the comments in this dimension. PG detailed, "So the three major categories I want to ask them to repeat back in their own words. It tells me that (gives me an assurance) they have got it. Interestingly, they did, but they needed a little prompting on it." Similarly, PA voiced,

> I am bringing it back to her (the student). Taking what she said back to the conversation and then making it personal to her . . . I am trying to relate more to the audience by giving them examples outside the classroom where they would have seen it.

Content: Reflective Comments about Subject Matter and Task Knowledge

Participants rarely emphasized the content during their self-reflections, examining task knowledge (4) and subject matter knowledge (3). "Task knowledge" refers to understanding how to teach a specific set of students, a specific content, while subject matter knowledge refers to the knowledge about the domain in general. PB declared, "I felt at that moment that people understood the content, and I left them with an important message for them to take home." PD

reflected on subject matter knowledge “Someone who doesn’t have a baseline concept of leprosy then they are kind of lost, it's ok to list the signs and symptoms but really to have a picture … is more impactful.”

Context: Reflective Comments about the Learning Environment

The learning environment, or context, was rarely mentioned by our participants. Three participants referenced the personal learning environment, yielding five comments. PB commented on the personal learning venue, asserting, “I like the fact that there were some questions from the audience and some questions that I didn’t expect, but was able to answer…it made me think.” Our experimental setting may have limited commentary about the learning setting. In more ecologically valid settings, we would expect to see more context comments.

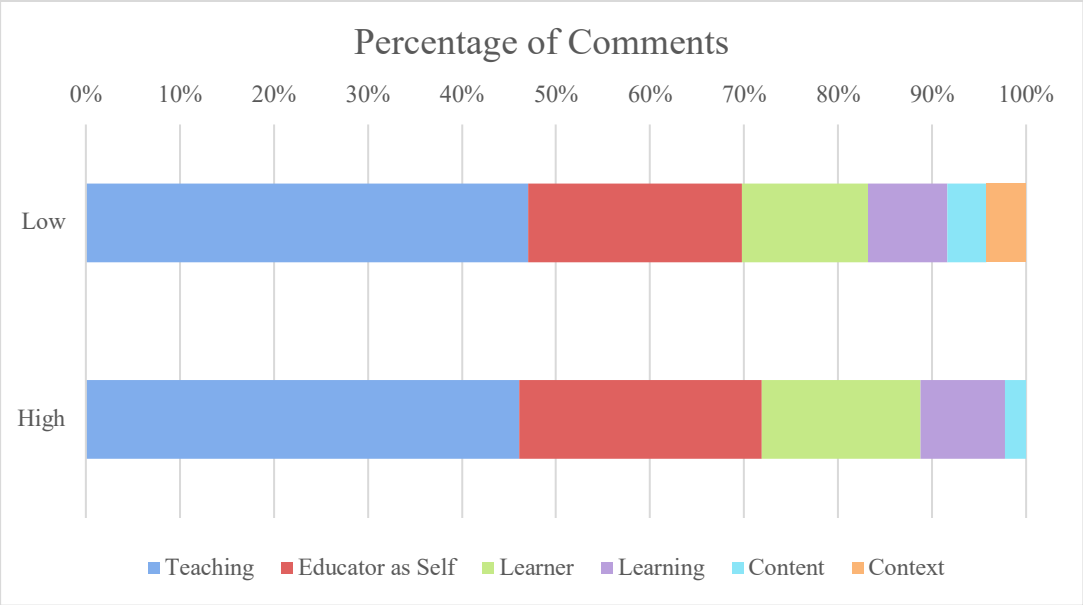
Influence of Teaching Experience on Self-Reflection Themes

No noteworthy differences emerged in the number of self-reflective comments between high and low-experienced educators (see Table 2). On average, the high experience educators (n = 3) produced an average of 29.67 (SD = 4.93) self-reflective comments, compared to an average of 29.75 for low experience educators (n = 4; SD = 5.85).

Figure 3 shows the percentage of comments in each reflection dimension for educators with high versus low. No noteworthy differences stood out, suggesting the element educators reflect on might not change with experience. Maybe, all context comments (5) came from low-experience participants. The veteran educators may talk more about the learner (5) on average than lower experience counterparts (4).

Figure 3

Use of Each Reflection Dimension According to Teaching Experience

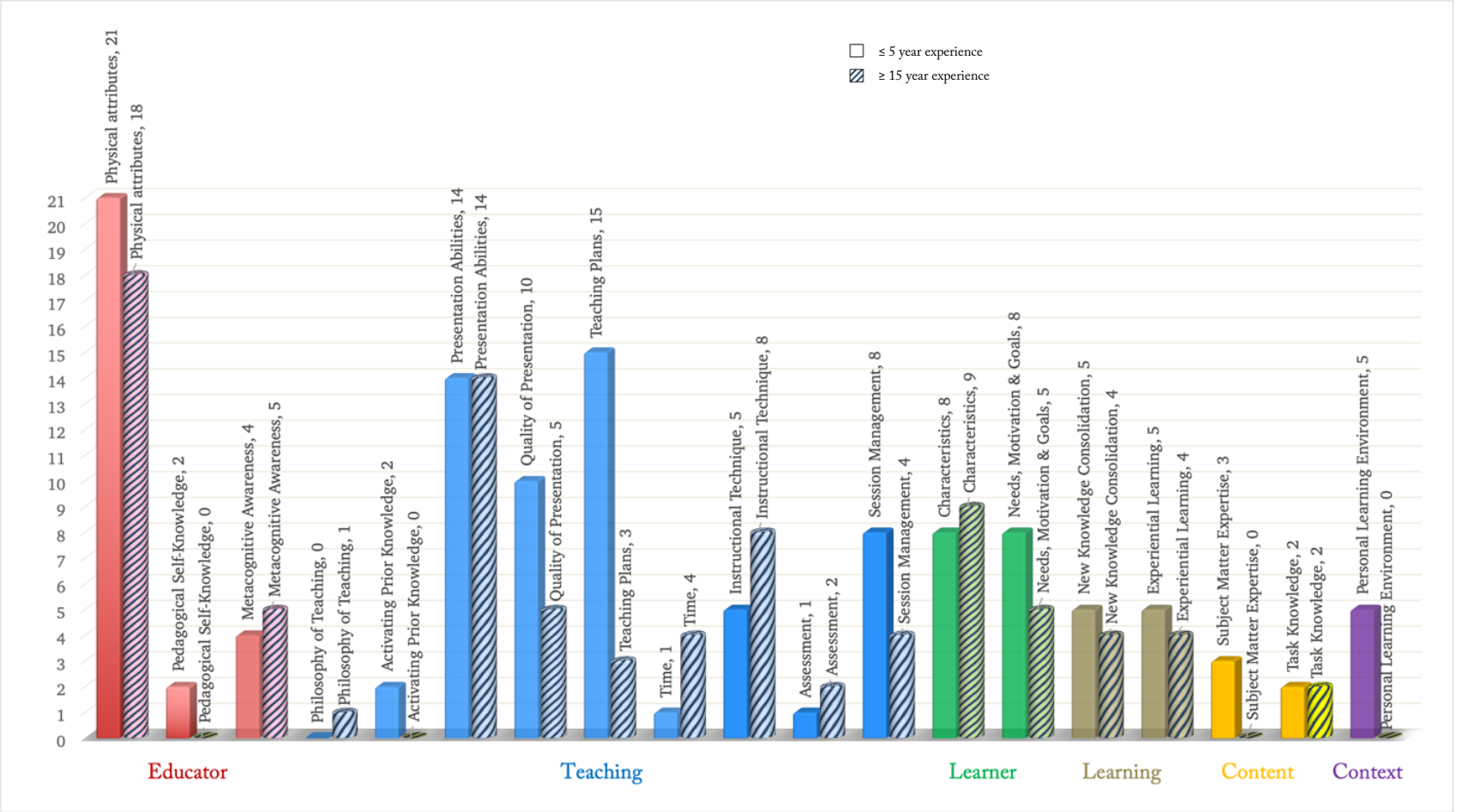


Note. Teaching experience is high for those with fifteen or more years of education. Those in the "low experience" group have five or fewer years of experience teaching.

Figure 4 details the number of each coding category. Not enough data was collected to perform a formal statistical analysis. However, a qualitative examination suggested perhaps the low experienced were more likely to comment than highlight experience: teaching plan (15:3), presentation quality (10:5), session management (8:4), the learners' needs, motivation and goals (8:5), the personal learning environment (5:0), subject matter expertise (3:0), pedagogical self-knowledge (2:0), and activating prior knowledge (2:0). Veteran teachers emphasized instructional technique (8:5) and time (4:1) more than low experienced teachers.

Figure 4

Use of Each Coding Category by Teaching Experience



Note. Shaded bars are more experienced educators (15 or more years), and clear bars are less experienced educators (5 or fewer years). Each coding category is labeled, and the hue represents the reflection dimension.

Medical Educators' Insights on Our Theoretical Self-Reflection Framework

After they completed their self-reflection, we presented the participant with vital teaching-learning interdependencies (see Table 1) and also provided them with our theoretically developed Higher education reflection framework (see Appendix A) based on existing literature, and significantly based on Colton and Sparks-Langer's (1993) and Low et al.'s (2009) reflective teacher-researcher models. Participants served as a focus group regarding opinions about the structure. All participants were asked their opinion on the self-reflection framework (see Appendix D, Q7) and were encouraged to freely elaborate and provide suggestions. Participants unanimously endorsed its utility in supporting reflection. PF claimed, "Although I have done this before and have a very good grasp of pedagogy, I would have looked at it more comprehensively." PE said, "It would help me go broader. It's a good tool and covers the components."

According to Sandars (2009), individuals may inadequately understand the primary reflection purpose, where self-reflection can distract them. PA articulated, "There are a lot of things that I was not aware of, but want to be… I am seeking those strategies." Similarly, PA noted, "I was focused on one thing… also I was stuck on the non-verbals for a long time."

Educators' scaffolding for self-reflection helps them refine their teaching and hone their content-specific knowledge (Hayden et al., 2013). PA said, "If I had this during the reflection, I would have been more systematic… I would have been looking at different levels as well." Giving educators self-response prompts helps them to concentrate on self-reflection (Ash & Clayton, 2009). PB claimed, "If I had had the framework, I would have been able to address more specific points."

The educators engaged in a variety of self-reflection comments, but, generally, most reflective attention (71%) generally centered on teaching and the educator self. PE pointed out, “I didn't look at the learner, content, and context since I focused just on myself and my teaching.” Participants unanimously agreed that the framework is a potentially useful tool.

General Discussion

This first exploratory study identifying and categorizing the commentary of MEs during pedagogical self-reflection helped us get a sense of whether our envisioned framework fits with the comments. We found it did, and we refined the codes and the framework (see Table 3, right-most column). We also discovered when MEs do not have structured self-reflection, they tend to focus on surface-level characteristics like their physical attributes or speech patterns. Self-reflections in high versus low-experience teachers were comparable, leaving our findings about teaching experience as inconclusive. A qualitative review revealed that the participants unanimously endorsed the need for a framework to guide pedagogical self-reflections.

A vacuum in HE educator reflection elucidated a need for support should educators want to reflect to improve their pedagogy. This study found the MEs unanimously endorsed having guided pedagogical self-reflection. Participants highlighted assistance could have enhanced their engagement and the scope of their reflections. Even though many educators had reflection experience, a scaffold could have positively influenced it. Finally, scaffolding instigates reflective exploration, identifying and honing teaching-learning, and comprehensively influencing pedagogy.

This descriptive, qualitative research offers medical educators and potentially all HEs a starting point to advance pedagogy. As HE medical educators, participants had a distinct advantage of regularly reflecting as medical professionals, and this practice permeated into their

pedagogy, demonstrating increasing teaching experience did not negatively impact reflection. This exploratory research aimed to discuss the current state of HE reflection, where practitioners can practice it to realize rewarding outcomes while addressing the gap between realistic reflection and its actual scope.

Implications

In terms of implications for practice, the end goal of this research is to scaffold educator reflection and thereby create a framework HE educators can use to structure reflective practices. This first iteration helped us perform bottom-up work along with top-down empirical research. Sharing the iterative process results will facilitate replication in other fields. This research revealed that metacognition is essential to self-reflection. Metacognitive awareness requires reflecting on action goals and clarifying how they intend to achieve pedagogical objectives. According to Siqueira et al. (2020), as a medical professional, patient care can improve metacognitive applications, scientific analysis, clinical decision-making, and unceasing lifetime learning to improve practice. Planning, regulating, and monitoring metacognitive awareness produces pedagogy supporting learning (Hughes, 2017).

Limitations and Future Research

One study limitation entailed a small sample size from a limited geographical area; consequently, further research is needed to corroborate our results in other environments. Conversely, this exploratory qualitative study found it difficult to recruit medical educators, probably one reason scholars may not have undertaken this exercise.

The research addressed some limitations regarding ecological validity important for future work. This study took place under experimental conditions; the educators did not know the students, and this was not an actual class. We believe this contributed to the lack of content

and context commentary. Development of such an instrument remains iterative, beginning with seeing what emerges from real data. Another potential limitation is that our study only had medical educators. So, the next step would engender employing this coding to structure something or code behaviour in a new group.

Conclusion

Overall, this research helped us to design and test coding to guide medical educators' pedagogical self-reflection. By engaging in a top-down, bottom-up approach, we were able to identify key categories that influence the teaching-learning dynamic. Starting from 13 categories, we added an additional six categories based on our empirical analysis, thereby augmenting the theoretically developed framework with empirical data. Furthermore, this research provided us with the first set of codes to identify and categorise HE reflection data, paving the way for additional research in this domain. The research unmasked multiple reflection research avenues and revealed the development of a potential framework to support higher education pedagogy. Future work will continue field research to explore higher education self-reflection to determine which tools would be effective in scaffolding medical educators. Overall, we hope this work will allow medical and other higher educators to advance, extend, and enhance their pedagogy.

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Appendix A

Higher Education Reflection Framework

1.1 Teacher

How was my posture, my appearance, my tone of voice, my eye contact?
How was my motivation to teach?
Could I effectively regulate my emotions?
Was I comfortable letting go of control of my class?
Did I look competent in my teaching?
Did the way I teach capture my philosophy about teaching?
Did I feel good at the end?

1.2 Teaching

What was my teaching style? How were my presentation skills?
Was I comfortable with the way I taught?
How was my collaboration with the class? Could I activate a two-way communication?
Did I provide an overview and/or a summary?
How was my fluency and competence in delivering material?
Did I successfully break down complex structures?
Did I provide an authentic application of the content? Could I demonstrate examples of theory to application?
Was I comfortable in answering students' questions?
Did I dominate? How were my class management skills? Did I manage time well.

2.1 Learner

Was my expectation of students realistic?
Could I activate my students' prior knowledge?
Did I pay attention to my students' feedback?
Was I able to cover content based on my students' understanding? Did I meet my students at their level?
Was I able to scaffold students that were falling behind?
Did I motivate/lose my students my students?
Will I need to support my students outside my formal class?

2.2 Learning

Did I have a plan (specific learning outcomes and strategies for teaching and assessment)?
Did I reach my session objectives? Did I teach to the learning outcomes I had in my mind?
Did I assess my students' learning? Were my assessments formative and frequent?
How effective was I in providing feedback to and receiving from my students?

3. Content

Was I comfortable with the assigned content?
Did I have sufficient content knowledge?
Did I provide a structured presentation of the materials to be taught?

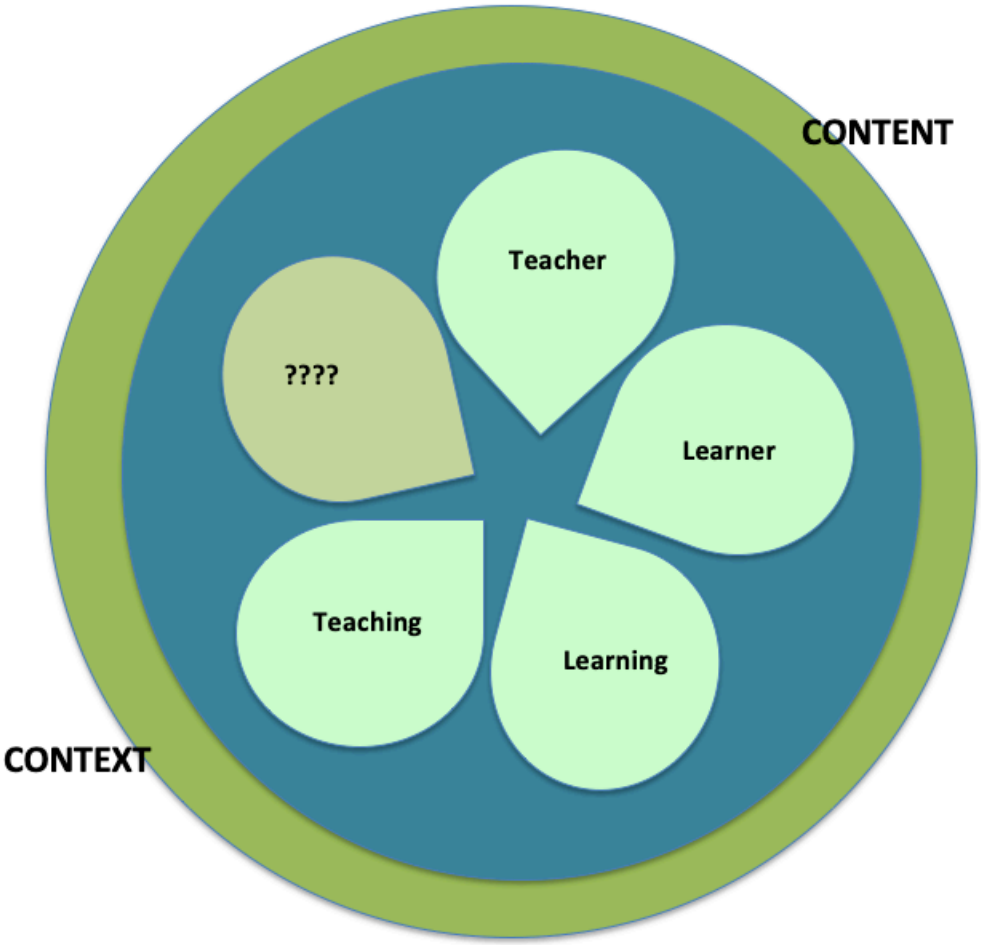
How effective was I in the selection of materials?
Did I effectively use instructional tools?
How smooth was the flow of my organization?

4. Context

Did the physical set up of the class support my teaching approach?
What was my classroom environment like?
Were audio/visual material, board, charts, etc. available and did I use them effectively?
Did I explain any ground rules which I expected to be followed in my class?
Was I able to create the dynamics that I wanted among students / between students and myself?
Was there energy in my class? Was there a sense of humour?

5. Other

Is there anything you can think of that we can add to this framework?



Appendix B

Dear (***Educator***),

Thank you for agreeing to participate in our research.

I am confirming the data collection session for ***Month Date @ Time***. This session should last about an hour.

The location will be room **519 in the Education Building**.

Please come to the session prepared to do a **10-minute micro teaching** to a group of 5-8 students. Specifics of the task are described in the attached document.

There will be a board as well as a laptop with connections to a data projector in the room. If you need anything else, please advise us in advance.

We will collect your consent before data collection. At the end of the session, we will also collect any notes or material that you have used to prepare for your session or for use during your micro-teaching.

With respect to your $100 honorarium, you have the option to receive it in cash, or as a gift certificate from the McGill bookstore or the Apple Store. **Please let me know what your preference is**.

If you have any queries concerning the nature of the research or are unclear about an aspect, please let me know.

Thank you again ***(Educator)*** for taking the time to help us with our research. It really is much appreciated.

(Researcher/Professor)

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Appendix C

Specifics of the Micro-teaching Session

Choose a Communicable or Non-communicable disease and then in 10 minutes present the

- Fundamental principles relating to etiology/nature/prevention/control of the disease

or

- Psychological/cultural/societal/environmental factors that result from the disease

Please feel free to prepare your presentation to the class using any material/technique you find suitable (or use in your usual teaching practice).

Appendix D

Script of Questions to be asked after Video-Reflection

Q1.
How many years of teaching experience do you have?

Q2.
Have you participated in teaching development?

Q3.
Can teaching be learned or is it an art?

Q4.
Given a teaching assignment what are the steps you take Before, During & After

Q5.
Can you state the emotions you felt during video reflection?

Q6.
If you did this again, after you have video reflected - what would you do different?

Q7.
Would you be more systematic in reflection with a Framework?

Q8.
What form of prompting would work best for you?

Q9.
Would a computer-based reflective environment appeal to you?

Bridging Text

The findings in Chapter 3 (Study 1) revealed that on classifying the commentary of MEs during pedagogical self-reflection we discovered that our proposed framework corresponds with the commentary in our study. Medical educators when freely reflecting on their pedagogy using video reflection engaged in the earlier established six dimensions (self-knowledge, teaching, students (learners), learning, content, and context) of the teaching-learning dynamic. Furthermore, the study further added new categories (self-knowledge – pedagogical self-knowledge, metacognitive awareness; teaching – philosophy of teaching, assessment, time; students (learners) – needs, motivations & goals, support & mentorship; content – task knowledge) to our earlier developed list of categories. Our findings on teaching experience were equivocal since self-reflections in teachers with high and low experience were comparable. The requirement for a framework to scaffold educational self-reflections was universally acknowledged by the participants, according to a qualitative analysis.

This second study (Chapter 4) further delves into pedagogical reflection in HE medical educators. Taking into account the feedback given by our participants, and having found a unanimous endorsement of the utility of having a framework to scaffold reflection in Study 1, in Study 2 (Chapter 4), we extended our investigative lens and wanted to see if having a framework during reflection really did provide the assumed scaffolding, and as a result if that scaffolding positively influenced educator reflection. Hence, conversely to Study 1, in Study 2, we recruited eight additional Medical Educators who reviewed our framework prior to reflecting on their pedagogy (scaffolded reflection). Furthermore, to examine the relative effects of the various forms of guidance, we combined the two cohorts (our seven participants in Study 1, with an additional eight participants in Study 2). To explore reflection in detail, and after

qualitatively coding and analysing our data, in Study 2 we categorised our qualitative codes quantitatively for a comprehensive qualitative analysis.

Chapter 4: Study 2

Does Scaffolding Influence Medical Educator Pedagogical Reflection?

Abstract

This paper examines the effectiveness of scaffolding on medical educators' reflection on teaching, using an innovative framework. A sample of eight medical educators micro-taught a class on a single topic. Next, we provided the participants with a conceptual framework of 20 pedagogical reflection themes, spread over six key teaching-learning interdependency dimensions (teacher, teaching, learner, learning, content, context). Participants viewed their microteaching reflectively, thinking aloud. Educators richly reflected on pedagogical sessions which we analyzed according to these coding categories. Comparing our work to earlier research in the field (Study 1), we noted that in this study educators who received scaffolding indicated broader coding categories than previous research in this topic in which participants had freely self-reflected with no guide, buttressing the previous results. The scaffolding instigated the educators to transcend superficial thoughts (physical attributes) to incorporate more on teaching. Medical educators considered multiple pedagogical reflection dimensions when provided a framework to guide reflection, widening the lens of our educators' self-reflection. Our future research aims to diversify the framework with more higher education educators.

Keywords: Medical educators; Reflection; Video-based; Reflective framework

Introduction

Self-reflection within the medical field leads to enhanced technical proficiency, as it supports comprehensive analysis of one's subject matter expertise (Regmi & Naidoo, 2013). Reflection, essential in the medical field, boosts comprehension, medical capability, and continual professional development (Kaufman, 2019; Steinert, 2019). Medical sciences, social service, and teacher education have endorsed reflection collectively (Boud 2010; GMC, 2021; Hargreaves, 2016).

Pedagogical reflection, a valuable practice in higher education (HE), allows educators to evaluate their teaching behaviors critically regarding classroom and organizational skills. Reflection evaluates the educator values, thereby enriching the learning environment, and pedagogy (LaBoskey, 1997; Lefebvre et. al., 2022; Osterman & Kottkamp, 2004; York-Barr et al., 2005). However, experts have understudied teaching and research reflection in medical education. Scholars have focused on student outcomes, perhaps minimizing medical educators' pedagogical reflection. This paper further delves into pedagogical reflection in medical educators.

Researchers have argued guidance enhances self-reflection. Al Riyami (2015) asserted reflection varies, and vagueness compromises outcomes. Carrington and Selva (2010) proposed appropriate assistance with prompts and scaffolding promotes meaningful reflection, bolstering performance. According to Schön (1987), a guide remains integral to reflection in all professions. Further, reflection facilitators have emerged in HE.

Ash and Clayton (2004, 2009) established structuring reflection using a framework optimizes learning and aids constructive reflection. Reflection outcomes are qualitatively fruitful, significant, and beneficial when structured through questions. The guides impact the

process positively, improving both pedagogical practice and student learning (Johns, 2017; Moon, 2015; Vong, 2016). Johns (2017) professed a guide directs the educator reflection experience. Duffy (2009) comprehensively probed educator pedagogical concerns, concluding that scaffolded reflection fostered meaning, support, and focus on professional development.

Addressing teaching experience in education but specifically teacher reflection, McIntyre (1993) argued reflection garners more powerful learning for experienced teachers than their less experienced counterparts. He argued that veteran teachers learned through reflection because they had extensive repertoires on which to draw on to address problems. Novices, on the other hand, depended on external knowledge outside of their proficiency. Conversely, in the field of medicine, Mamede and Schmidt (2005) unveiled two correlates of reflective practice: reflection appeared to decrease with increasing years in practice and decreased with unreinforced reflective thinking. In order to engage with the influence of reflection on educator experience in higher education, we addressed the issue in this study. Our previously conducted research (Study 1) had explored educator experience qualitatively. In this paper, we quantitatively combined educator experience data from the earlier conducted study (Study 1) with data collected in the current study. Re-engaging with our research question focusing on HE educator experience.

Study Aims

Our goal is to help scaffold HE educators by crafting a framework they can use to guide their self-reflections thereby potentially improving their pedagogical practice. Our theoretically conceptualized framework design is based in Colton and Sparks-Langer (1993)'s dimensions of self-reflection in education. Each dimension focuses on one part of the learning interaction: the teacher (self as educator), the act of teaching, the learner, the act of learning, the content that is

being learned, and the context in which teaching and learning transpires. In our earlier conducted research (Study 1) we outlined how seven medical educators performed a microteaching and freely reflected on their teaching by doing a think aloud while reviewing a video of their teaching.

In this study, eight participant educators, after performing their microteaching, examined our framework prior to reflecting on the video recording of their instruction (scaffolded reflection). We combined both cohorts to analyze the differing guidance's relative effects. We also aim to qualitatively categorize various codes and analyse them. Taken together study 1 and 2 represent the first two rounds that are used to iteratively develop a beneficial and illustrative framework for promoting pedagogical reflection in HE. We hope to uncover how it reflects the educators' self-reflective commentary and how the framework influences reflective knowledge.

This study was designed in parallel to Study 1, but goes further. Specifically, following our earlier study where participants reflected freely on their pedagogy, we designed this study around these three research questions: (1) Did any noticeable differences in pedagogical reflection dimensions emerge between the non-scaffolded reflection of medical educators (Study 1) and the scaffolded reflection of medical educators (Study 2)? (2) Did any differences emerge in the content and amount of reflection by medical educators with a low number versus a high number of years of teaching experience? (3) How do medical educators perceive the effectiveness of a scaffolded reflective framework?

Method

After receiving ethics permission from the McGill University Research Ethics Board, we used the snowball approach to recruit our convenience sample by sending an open invitation to all medical department professors. In this study, medical educators performed a brief videotaped microlesson (Phase 1). Then, we briefed each participant on our framework (Table 1 & Appendix B) and told them they could refer to it during reflection. In Phase 2, they watched their microlesson and verbally self-reflected retrospectively, thinking aloud (RTA). Finally, participants shared their opinions about the framework (Phase 3).

Participants

Eight medical educators from various research-intensive institutions in Eastern Canada volunteered to participate. Of those educators, four had teaching experience of seven or fewer years (low experienced), and four had teaching experience of 12 or more years (high experienced) (see Table 2). Before arriving for the study, each participant prepared a ten-minute microlesson of their choice about an infectious disease. Upon arrival for the session, we explained the study and obtained informed consent from each participant. Each participant received a gift card to acknowledge their time and effort.

Materials

As this study followed a series where we tested variable coding categories, we mocked up the basic framework (see Table 1 and Appendix B). Participants could refer to this design freely during self-reflection.

Recording and Playback Equipment

The hardware consisted of a laptop, two video cameras, and a Bluetooth headset. We played the video on a VLC media player and recorded audio separately with free, open-source digital audio software, Audacity.

Table 1

Framework Presented to Participants in Phase 3 of the Study

Dimension	**Potential categories**
Educator	Personal philosophy Physical attributes Emotion regulation
Teaching	Activating prior student knowledge Presentation abilities Quality of Presentation Teaching plans Instructional technique Management skills
Learner	Learner characteristics
Learning	New knowledge consolidation Experiential learning
Content	Subject matter expertise
Context	Physical, social, and personal learning environment

Procedure

The three-phase sessions identical to Study 1 lasted 70 to 100 minutes. Participants micro taught a group of five to nine for around ten minutes (ranging from 9.83 to 15.25 minutes). The mean length equaled 12.23 minutes ($\sigma = 2.05$, *Mdn* = 11.71 minutes). These data did not statistically differ from Study 1, (*M* = 12.89 minutes), t (12.07) = 0.58, p = 0.57*, 95% CI* = (-1.83, 3.16). Table 2 displays microlesson data.

Table 2

Participant Characteristics and Microlesson Information

Participant	Teaching experience	Gender	Microlesson title	Lesson length (minutes)	Reflection length (minutes)
PH	Low	M	Asthma	10.33	16.50
PI	Low	F	Hepatitis	10.92	28.42
PJ	Low	M	Chickenpox	9.83	17.33
PK	Low	M	Delirium	12.50	18.25
PL	High	F	Shingles (Herpes Zoster)	13.67	25.50
PM	High	F	HIV/AIDS	10.83	22.00
PN	High	F	Sexually Transmitted Infections	14.50	15.00
PQ	High	F	STD/HPV	15.25	20.33

***Note*:** Eight medical educators participated in this study. Low experienced (four) educators had seven or fewer years of teaching experience. Highly experienced (four) educators had 12 or more years of teaching experience. Length reported in fractions of a minute, where one minute and 30 seconds was denoted as 1.50, analogous to Table 2 in Study 1.

In the second stage, participants thought aloud and verbalized as they viewed their Phase 1 recorded microteaching and reflected on their pedagogy. Varying from Study 1, participants had a reflection framework to guide their teaching reflection video before reviewing their instruction. The sessions lasted from 15.00 minutes to 28.42 minutes. The average self-reflection session lasted 20.42 minutes in length (σ = 4.65 minutes; *Mdn* = 19.29 minutes). These results did not statistically differ from Study 1 (*M* = 19.73 minutes), $t(9.40) = 0.201$, $p = 0.85$, *95% CI* = (-8.40, 7.02). In the final phase, participants commented on the content and effectiveness of a framework prompting reflection. We videoed these discussions and gave a gift certificate to each participant.

Data Collection and Sources

We coded the video-stimulated RTA, yielding 496 video and audio minutes. We transcribed and thematically categorized the verbal data to address the research questions probing pedagogical reflection. To establish reliability, 30% of the data was evaluated by two separate coders. The inter-rater reliability was 89%. Our framework in Table 3 lists the reflective dimensions in the first column and the analyzed potential coding in the center. The right-most column portrays the coding categories after the initial data review. We combined these themes with those from Study 1 to develop the final coding categories.

Table 3

Reflection Dimensions, Potential Coding Categories, and Final Coding Categories

Reflection dimension	Potential coding categories	Final coding categories
(Self as) Educator	Physical Attributes Personal Philosophy Emotion Regulation	Physical Attributes Pedagogical Self-Knowledge Emotion Regulation Metacognition Motivation
Teaching	Activating Prior Knowledge Presentation Abilities Quality of Presentation Teaching Plans Instructional Technique Management Skills	Activating Prior Knowledge Presentation Abilities Quality of Presentation Teaching Plans Instructional Technique Management Skills Philosophy of Teaching Assessment Time
Learner	Learner Characteristics	Learner Characteristics Needs, Motivation & Goals
Learning	New Knowledge Consolidation Experiential Learning	New Knowledge Consolidation Experiential Learning Student Feedback
Content	Subject Matter Expertise	Subject Matter Expertise Task Knowledge Choice of Content
Context	Physical, Social, and Personal Environment	Physical Learning Environment Social Learning Environment Personal Learning Environment

Note. We entered the study thinking of potential coding categories we thought we might find based on our theoretical and literature review. Final coding categories emerged from the data review. This table is analogous to Table 2 in Study 1, but it only includes the codes seen in this study participants specifically.

Results

This study explores three research questions. The first compares scaffolded and free reflection (Study 1), the second examines teaching experience, and the third regards participants' professional opinions of our framework.

Statistical Analysis and Comparing across Studies

This paper is meant to be a companion to the first exploratory study, Study 1. Study 1 qualitatively explored how medical educators reflected and potential coding categories. In that paper, we discussed the facets and theoretical justification for inclusion. Here we quantitatively reported the design's utility, comparing self-reflective comments from this analysis and the free response procedure in Study 1. Statistical caveats surface when comparing data across studies, as the discussion covers. However, the procedure was identical across studies, except the participants in this study reviewed the framework in Table 1 before self-reflection.

When counting category instances in verbal data, we used two dependent variables (DVs). One DV involves a binary response where the participant receives a score of 1 if they said something encompassed in a particular coding category and 0 if they did not. This measure ignores the categorical instances. For example, if participants commented on their presentation ability, they received a 1 for Presentation Abilities. If they later mention their presentation abilities, the score does not increase. The second DV engenders a continuous count or sum of the comments falling under the facet. This DV is often called tokens, while the other is termed types. If the participant makes four allusions to physical attributes, we count each reference, yielding four tokens and one type for Physical Attributes. We will use this terminology sparingly, but we included it for clarity.

We scrutinized each DV using the appropriate statistical methodology. For analyses where we report the instances (tokens), we used mixed effects general linear modeling with the participant as a random effect and scaffolding (2 levels: free reflection from Study 1 versus scaffolded from the current study) and teaching experience (2 levels: highly experienced versus low experience) as fixed effects. When we reported the number of participants who produced a given category (types), we used mixed effects logistic regression modeling with the same predictors: the participant as a random effect and scaffolding and teaching experience as fixed effects. We reported the statistics necessary for determining model significance and results (see Table 4, Table 5, and Appendix A). These mixed model investigations remain robust to data at the dimensional level - one analysis of each type for the seven dimensions (self, teaching, learner, learning, content, context, and all dimensions combined).

Although the statistical power did not exist to dissect the data within each dimension, to zoom into the coding categorically, we performed and report the nonparametric and parametric inferential statistical tests for each coding category. We used *t*-tests (corrected for normality) to compare each coding theme instance in the token analysis. For type analysis, we employed Fisher's exact test for group independence to determine the participants who mentioned that coding category.

Themes Emerging from Medical Educators' Scaffolded Self-Reflection

Our first research question asked whether medical educators' self-reflection varied when they used a scaffolding framework. First, we will look at all self-reflective comments. Then we will turn to each individual self-reflection dimension.

Comments Across all Reflection Dimensions

With 335 reflections, our medical educator participants ($N = 8$) appeared to reflect on their teaching the most (190, 56.72%), followed by the Self as Educator (53, 15.82%), Learner (40, 11.94%), Learning (28, 8.36%), Content (13, 3.88%) and Context (11, 3.28%). Figures 1-3 delineate participant comments. Overall, these data replicate the pattern of Figure 2 in Study 1. Like Study 1, the comments fit well within the reflection dimensions (see Table 4).

Table 4

Reflection Dimensions Participants Mentioned During Self-Reflection

Participant	Self as educator	Teaching	Learner	Learning	Content	Context	*Total*
PH	6	21	2	0	0	1	*30*
PI	14	35	10	8	1	0	*68*
PJ	3	27	9	6	1	1	*47*
PK	2	10	3	3	3	0	*21*
PL	4	9	5	2	0	0	*20*
PM	6	37	3	4	3	3	*56*
PN	12	32	2	3	1	6	*56*
PQ	6	19	6	2	4	0	*37*
Total	*53*	*190*	*40*	*28*	*13*	*11*	***335***

Note. PH, PI, PJ, and PK had seven or fewer years of teaching experience. PL, PM, PN, and PQ had 12 or more years of teaching experience. Counts denote tokens (instance the participant said something fitting within the reflection dimension). See Study 1 for qualitative examples.

Replicating Study 1, participant comments fell under all reflection components and added several coding categories. Table 5 displays the number and percentage of each coding category.

Table 5

Reflection Dimensions, Final Coding Categories, and Code Frequency

Reflection dimension	Final coding categories	Number of instances	Percent of total	Percent of dimension
Self as Educator (*n* = 53)	Physical Attributes	32	9.55%	60.38%
	Pedagogical Self-Knowledge	8	2.39%	15.09%
	Metacognitive Awareness	7	2.09%	13.21%
	Emotion Regulation	4	1.19%	7.55%
	Motivation	2	0.60%	3.77%
Teaching (*n* = 190)	Activating Prior Knowledge	3	0.90%	1.58%
	Presentation Abilities	38	11.34%	20.00%
	Quality of Presentation	29	8.66%	15.26%
	Teaching Plans	37	11.04%	19.47%
	Instructional Technique	20	5.97%	10.53%
	Management Skills	34	10.15%	17.89%
	Philosophy of Teaching	7	2.09%	3.68%
	Assessment	7	2.09%	3.68%
	Time	15	4.48%	7.89%
Learner (*n* = 40)	Learner Characteristics	27	8.06%	67.50%
	Needs, Motivation & Goals	13	3.88%	32.50%
Learning (*n* = 28)	New Knowledge Consolidation	15	4.48%	53.57%
	Experiential Learning	12	3.58%	42.86%
	Student Feedback	1	0.30%	3.57%
Content (*n* = 13)	Subject Matter Expertise	6	1.79%	46.15%
	Task Knowledge	6	1.79%	46.15%
	Choice of Content	1	0.30%	7.69%
Context (*n* = 11)	Physical Learning Environment	9	2.69%	81.82%
	Social Learning Environment	1	0.30%	9.09%
	Personal Learning Environment	1	0.30%	9.09%

Note. Percent of total represents the comments in a coding category as a percentage of all coded comments (335). Percent of dimension depicts the comments in that coding category as a percentage of the comments in the same reflection dimension (first column). The first-row coding category Physical Attributes was mentioned 32 times, representing 9.55% of the comments and 53 times (60.38%) of the comments within the reflection dimension Self as Educator.

Table A9 displays the comments for free and scaffolded reflection. The bottom row compares the total tokens. Study 1 free reflection revealed 208 self-reflective comments. No statistically significant difference existed between self-reflective comments (tokens) free reflective from Study 1 participants produced ($\overline{x}$ = 29.71 and σ = 5.02) versus the scaffolded reflection participants in the current study ($\overline{x}$ = 41.88 and σ = 17.68) and (β = 0.47, SE = 0.28, t (12) = 1.68, p = 0.12). Markedly, these results denote a relatively low p-value, though not meeting the significance criteria (see Appendix A).

Table A8 displays the participants' comments in a category (type) at least once. Since 26 categories emerged in our coding, each participant could score 26 points, for they received a score of 1 or 0 for each category in the type analysis. The bottom row of Table A8 displays the outcomes. In the free reflection, 182 points were available (seven participants times 26 categories); for the scaffolded reflection, 208 points were available (eight participants times 26 categories). Free reflection participants produced a total of 77 coding categories (types), or 42.31% of all categories (77 / 182 = 0.4231), while scaffolded reflection participants produced 117 coding categories (types), or 56.25% of the categories (117 / 208 = 0.5625). This was a statistically significant difference, (β = 0.57, SE = 0.22, z = 2.58, p = 0.01**). Chi-squared analysis for the total is also reported in the bottom row of Table A8, replicating the statistically significant effect, $X^2(1) = 7.548$, p = 0.0060**. These analyses are conceptually similar but logit modeling accounts for the fact that the data for the various coding categories are coming from the same participants.

Figure 1

Use of Each Reflection Dimension by Participant

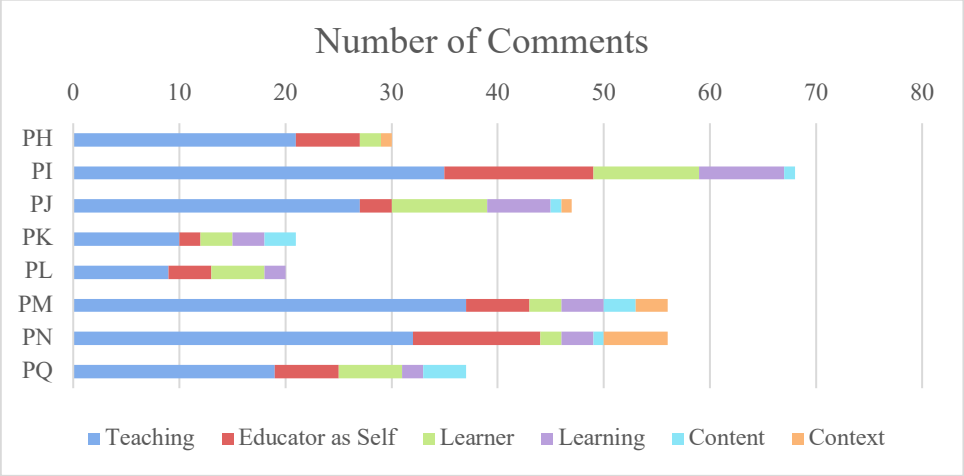
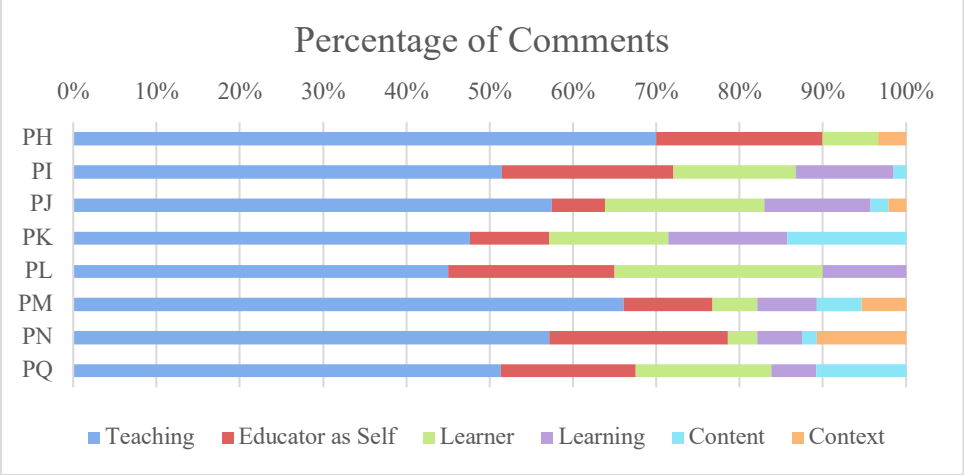


Figure 2

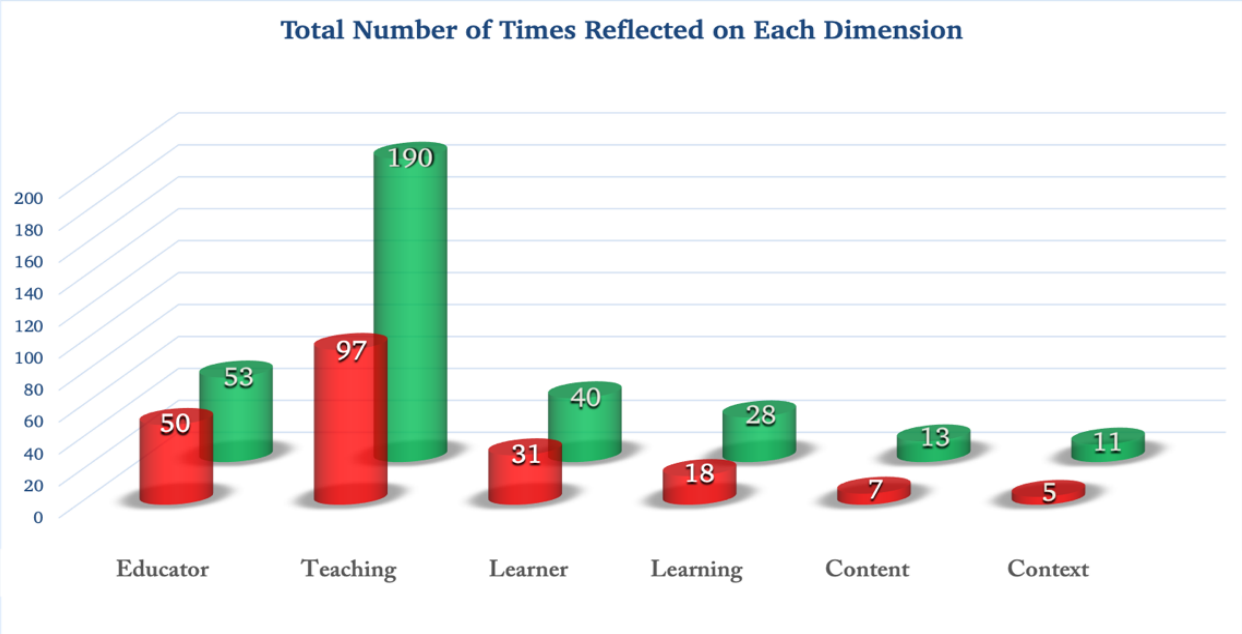
Percentage Self-Reflective Comments for Each Reflection Dimension



Taken together, this set of results suggests that having the framework available for them increased the variety of the themes (or codes) that medical educators expressed during their self-reflection, but it did not statistically significantly increase the overall *quantity* of self-reflective comments they expressed.

Figure 3

Self-Reflective Comments for Each Reflection Dimension



Note: Front bar is this study (Study 2, scaffolding). The back bar is Study 1 (no scaffolding), illustrating the count of tokens or the number of instances. For example, if someone used the same coding category more than once, they get counted for each use.

Self as Educator Comments

The coding categories referring to the Self as Educator include comments about one's physical attributes, emotion regulation, metacognition, motivation, and pedagogical self-knowledge. The first six rows of Table A8 refer to types that count how many participants used a given coding category compared to the highest possible score. The participants with scaffolded reflections produced self-as educator at least 24 of 40 possible types (60.00%), while those freely reflecting had 13 of 35 potential types (37.14%), unveiling a statistically significant difference X^2 (1) = 7.548, p = 0.006, β = 0.96, SE = 0.48, z = 2.01, p = 0.04. Regarding quantity, these data reported in the top six rows of Table A9 indicated each instance of each code (tokens). This equaled 50 for free reflection ($\bar{x}$ = 7.14 AND σ = 4.02) and 53 for scaffolded

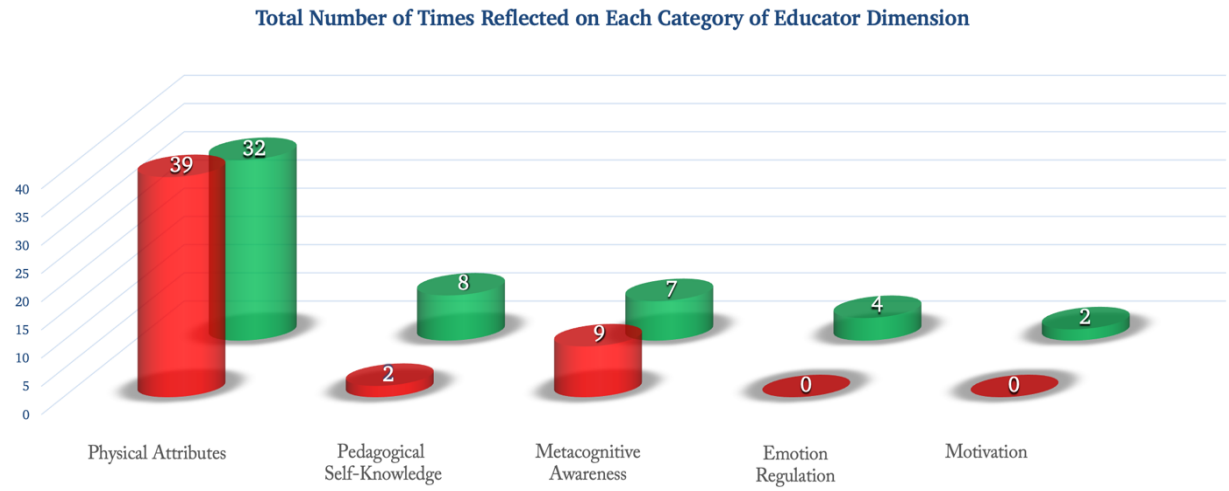
reflection ($\bar{x}$ = 6.63 AND σ = 4.24). These results did not reveal a statistically significant difference, β = -0.12, SE = 0.59, $t(72)$ = -0.20, p = 0.85. In other words, having the scaffolding led to greater use of coding category variety in self educator dimension, but it did not lead to a general increase in the number of comments within this area. These findings mirror the total dataset.

Analysis of the educator as a self of the RTA showed 100% of participants (8 of 8) commented on issues related to their physical attributes. While video reflecting, participants focused highly on their physical attributes (32). References to pedagogical self-knowledge ranked second (8 allusions across 5 participants), followed by references to metacognition (7 allusions across 6 participants; see Figure 4). For example, PH commented on his physical attributes. “I feel I'm mumbling” later, he also said, “I'm making gestures during describing terms, but it’s actually not deliberate!” Similarly, PN voiced, “I'm looking at myself, and it is very monotonous - me talking, with no change . . . I am using a lot of hand gestures! . . . I am using my hand movements to explain!” While PQ reflected on her pedagogical self-knowledge, articulating “I have a certain style, and I see it.” PN claimed “Normally I engage and see what the reactions are if they sleep on me if they are taking notes if they are distracted. Those are the things I am looking at.” None statistically or significantly differed from the free reflection data in Study 1. However, the data are reported in Table A8 (types) and Table A9 (tokens).

Participants also reflected on two categories not in our original list (see Table 3): emotion regulation (4 across 3 participants) and motivation (2 across 2 participants). For example, PH commented on his emotional regulation. “I enjoyed it, get nervous before presentations, but (I was able to) move ahead and get going.” While PM mentioned motivation, expressing, “We need to talk about these issues, about Aboriginal women, substance abuse and at-risk behaviour.”

Figure 4

Educator Dimension Reflections



Teaching: Act of Teaching Comments

Nine coding categories focused on the teaching act. Looking at all Teaching dimension self-comments collectively, the sum of the instances equaled 97 ($\overline{x}$ = 13.86 and σ = 3.44) for free reflection and 190 ($\overline{x}$ = 23.75 and σ = 10.81) for scaffolded reflection. A statistically significant difference emerged in tokens, where the scaffolded reflection participants made more comments about the teaching dimension than the free reflection participants, β = 1.10, *SE* = 0.50, $t(12) = 2.21$, $p = 0.05$, see Table A9. The analysis from Table A8 showed the same effect. In the free reflection condition, 63 possible types (9 coding categories times 7 participants) existed. Free reflection participants used 33 / 63 (52.38%) of the coding categories. The scaffolded reflection participants used the categories 55 of 72 (76.39%) potential types, β = 1.08, *SE* = 0.38, $z = 2.86$, $p < 0.01$; $X^2(1) = 8.534$, $p = 0.0035$. In other words, our scaffolding framework engaged participants with a wider variety of coding categories (types) and a greater quantity of them overall (tokens).

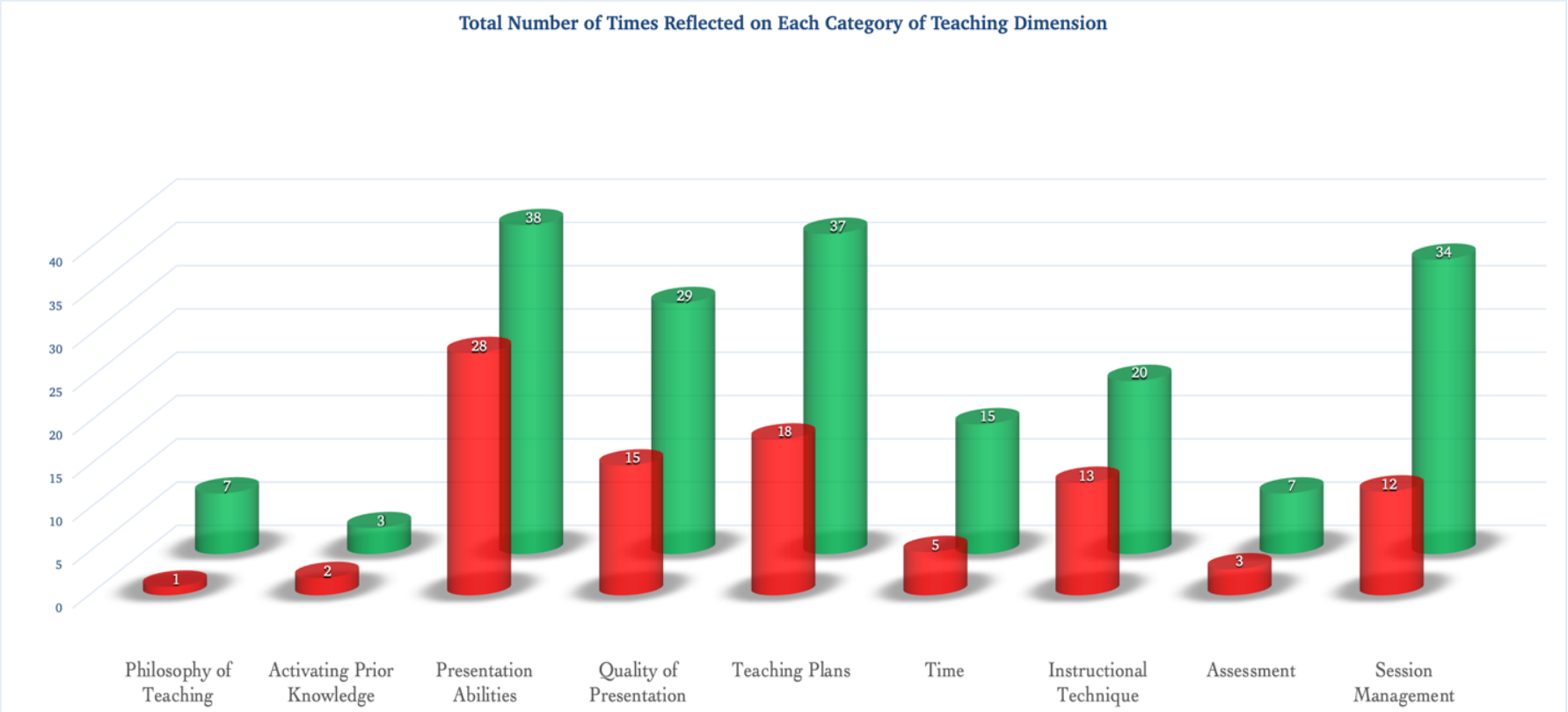
Analysis of the RTA Teaching dimension showed all participants commented on issues related to their presentation abilities, and they emphasized their presentation abilities (38 across all eight participants), while references to teaching plans rated second (37 all eight participants), followed by references to session management (34 across seven participants) (see Figure 5). For example, PI described her presentation abilities: “I think I am having a problem with the language. It could be because earlier, when I used to teach, it was in two languages— English and Arabic.” On the other hand, PL depicted a teaching plan. “So, my goal is for them to remember in the future, when faced with the problems, what we talked about.”

Furthermore, participants reflected on their presentation quality (29 allusions across all 8 participants) and their instructional technique (20 allusions across 6 participants). PK on the quality of presentation asserted, “I'm trying to use the video to visualize what we were talking about, the features. Visualizing the content/material.” While PQ addressing instructional technique commented, “I'm doing this in a smaller group that's why I did it as a show of hands. In a large group I would be using clickers.”

Finally, participants reflectively mentioned issues relating to time (15 across ven participants), assessment (seven across five participants), teaching philosophy (seven across three participants), and activating prior knowledge (three across three participants). For example, PJ commenting on time reflected, “It is important for me to have a track of time. Asking the question ...It gives off the sense that I am not in control of time.”

Figure 5

Teaching Dimension Reflection



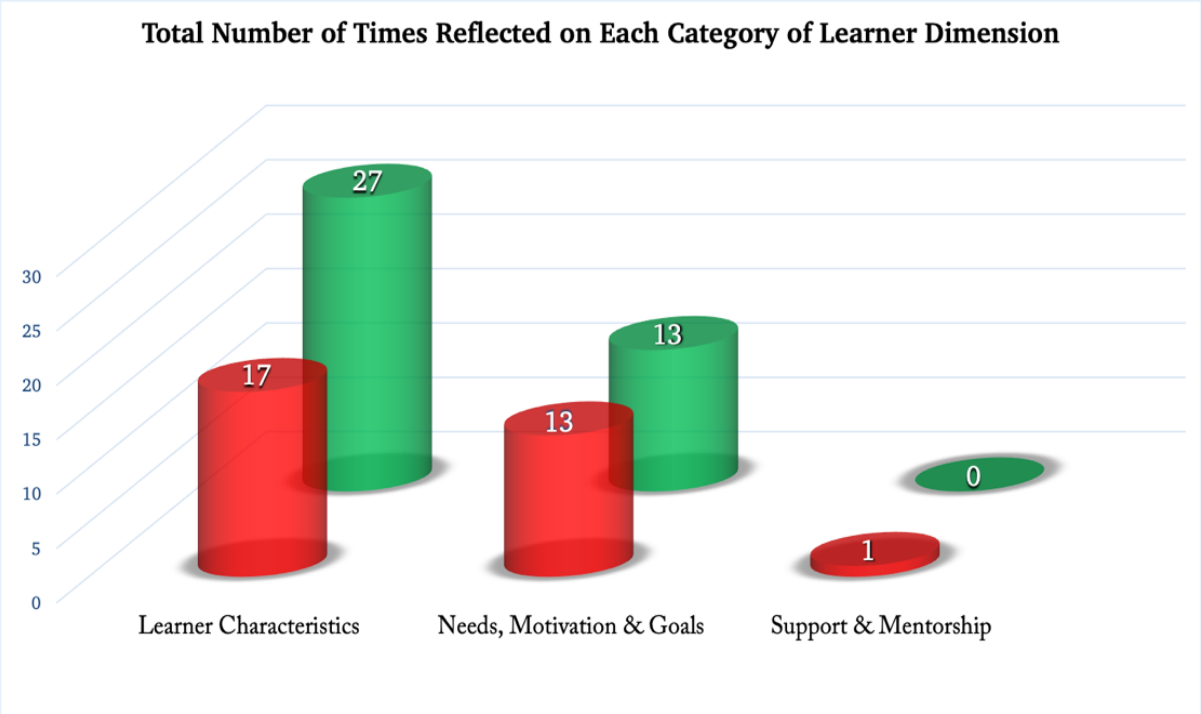
Given we did find a statistically significant difference in both the types and tokens of self-reflective comments in the teaching dimension, we scrutinized the differences in each coding category. According to the statistical analyses in Tables A8 and A9, no statistically significant differences in types or tokens emerged when we zoomed into the coding category. However, the scaffolded educators revealed higher types and tokens for all nine coding categories. The p-values indicate the likely robustness of each comparison. We found p-values under 0.20 for session management (Study 1 $\bar{x}$ = 1.71 vs current study $\bar{x}$ = 4.25), $t(9.8)$ = 1.8844, p = 0.0895 and time (Study 1 $\bar{x}$ = 0.71 vs current study $\bar{x}$ =1.88), $t(11.8)$ = 1.5171, p = 0.1556. The p-values were above 0.20 for all other categories; see Table A9 for tokens analysis and Table A8 for types analysis.

Learner: Reflective Comments about Learner Types

RTA analysis of the Learner dimension showed participants frequently reflected on issues relating to learner characteristics. Delving deeper, we noted that participants concentrated on their learner characteristics (27 across seven participants), while references to learners' needs, motivations, and goals ranked second (13 across six participants; see Figure 6). For example, PM referred to engaging with learner characteristics and support reflectively, professing, “I wanted to specify - although young adults know better, they still refer to HIV as a ‘gay’ disease.” While PJ reflected on the learners' needs, motivations, and goals, “I think it was important for me here to take the time and respond to whatever was being asked, even though it was not related to the session.” One category in Study 1 was not produced by any participants in this study: Support and Mentorship.

Figure 6

Learner Dimension Reflections



No statistically significant differences surfaced in the number of self-reflective instances ($\overline{x}$ = 4.43 AND σ = 2.99) in free reflection vs in scaffolded reflection ($\overline{x}$ = 5 AND σ = 3.12), β = 0.21, SE = 0.59, $t(42)$ = 0.35, p = 0.60, nor any evidence for a difference in the coding category types: free (13 / 21 = 61.90%) versus scaffolded reflection (13 / 24 = 54.17%), β = -0.32, SE = 0.61, z = -0.52, p = 0.60 (see Tables A8 and A9).

Learning: Act of Learning Comments

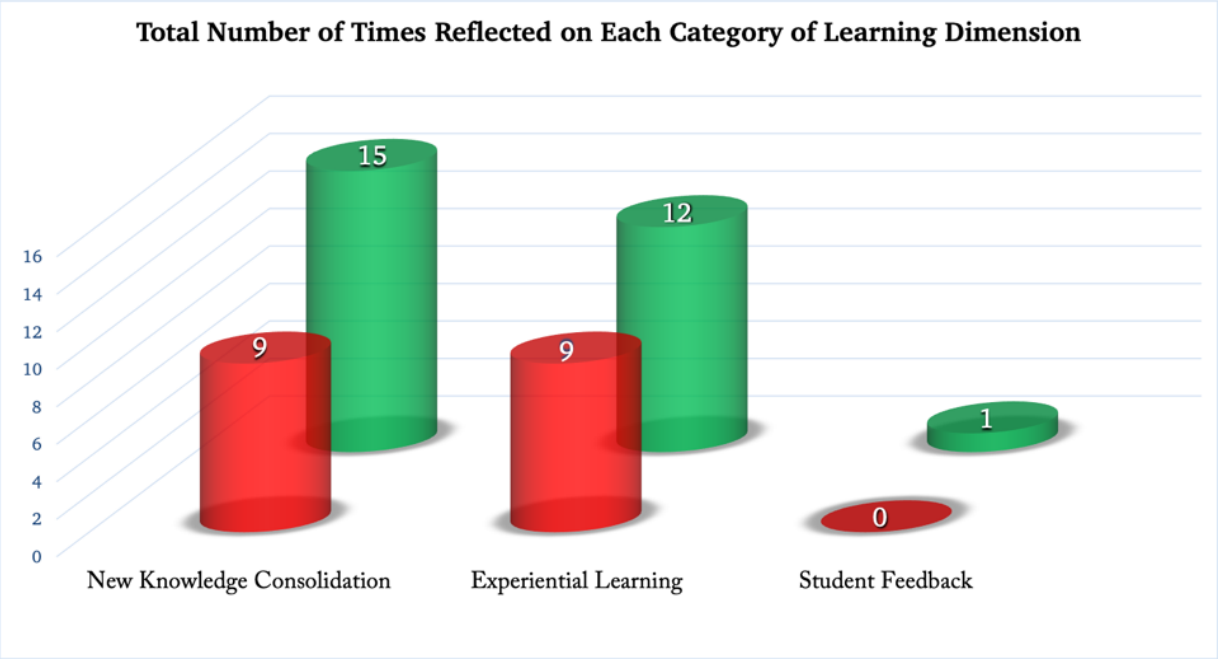
The Learning dimension highlights key aspects an educator can reflect on regarding the act of learning. We addressed the three categories suggested in the Learning dimension: New knowledge consolidation, Experiential Learning, and Student Feedback (a category added to this dimension because a participant engaged with it in this study).

The RTA Learning dimension revealed participants frequently reflected on new knowledge consolidation issues. While video reflecting, participants focused on their learner's new knowledge consolidation (15 across six participants), followed by experiential learning (12 across five participants) and student feedback (one; see Figure 7). PM reflecting on new knowledge consolidation, commented, “Here I was returning back to the global issue that I had discussed earlier and wanted them to mention their understanding.” and “Here I am linking it back to (earlier discussed) body fluids at birth.” PI noting student feedback expressed,

> In the end, a student asked me a question 'what do you mean by prophylaxis?’ and I was shocked since I was explaining the whole thing and he didn’t even understand the definition of what I was talking about …I think I am having a problem with the language since earlier I used to teach in Arabic.

Figure 7

Learning Dimension Reflections



Content: Subject Matter and Task Knowledge Comments

Participants engaged in three categories in the content dimension: Subject matter Expertise, Task Knowledge, and Choice of Content. RTA analysis of the content dimension revealed participants reflected on issues relating to task knowledge and subject matter expertise. While video reflecting, participants focused equally on their task knowledge (six across three participants) and subject matter expertise (six across four participants), and a category we did not see in Study 1: choice of content (1) (see Figure 8). PQ, reflecting on task knowledge, commented,

> I made the PowerPoint easy to understand and with an understanding of who the learner might be . . . While doing the presentation, I was not too sure how much I needed to explain. I tried to do it in a way so that everyone understood and explained terms that were not common.

In a comment regarding subject matter expertise, PJ voiced,

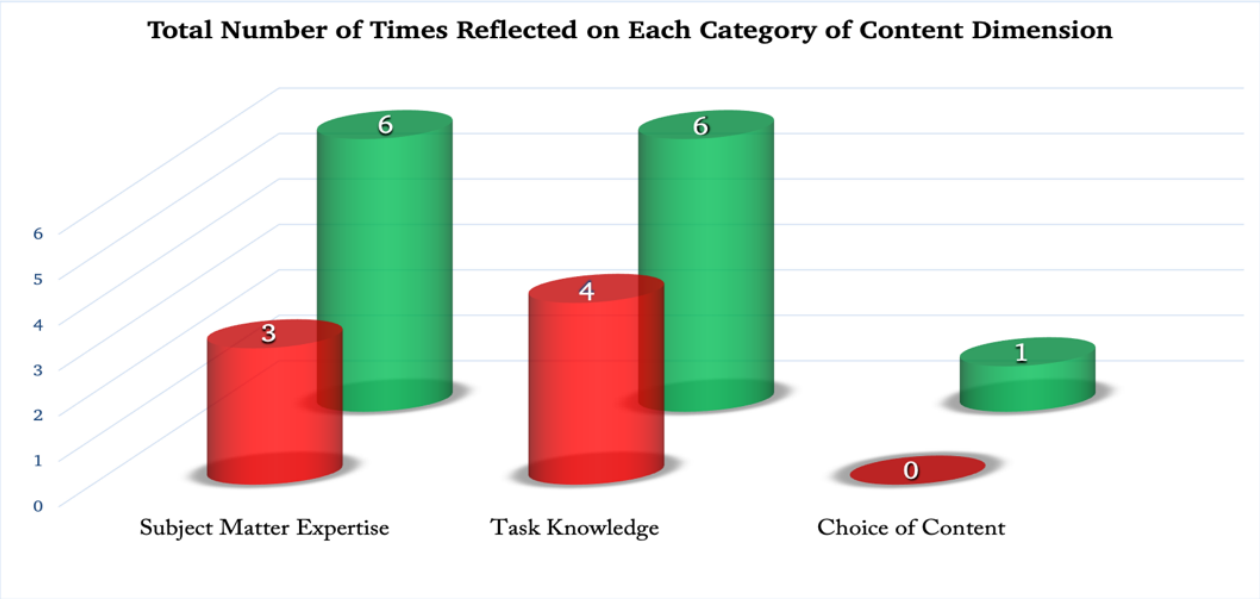
> Starting with a picture/some experience not having people know what we were going to be talking about getting them to kind of deduct it, construct it and then going with the title slide. I think it worked well. It was more engaging than if, right off the bat, everyone knew that we were talking about chickenpox and the vaccine. I think it would have dampened the discussion a bit. It got people curious about what was going on.

No statistically significant differences existed regarding the content dimension, neither in the number of instances the number of self-reflective instances ($\overline{x}$ = 1 AND σ = 1.15) in free reflection vs in scaffolded reflection ($\overline{x}$ = 1.63 AND σ = 1.51), β = 0.21, *SE* = 0.24, $t(12) = 0.84$,

$p = 0.42$, nor in the types analysis (Table A8; free reflection: 5 / 21 = 23.81% vs scaffolded reflection: 8 / 24 = 50.00%), $\beta = 0.47$, $SE = 0.67$, $z = 0.71$, $p = 0.48$.

Figure 8

Content Dimension Reflections



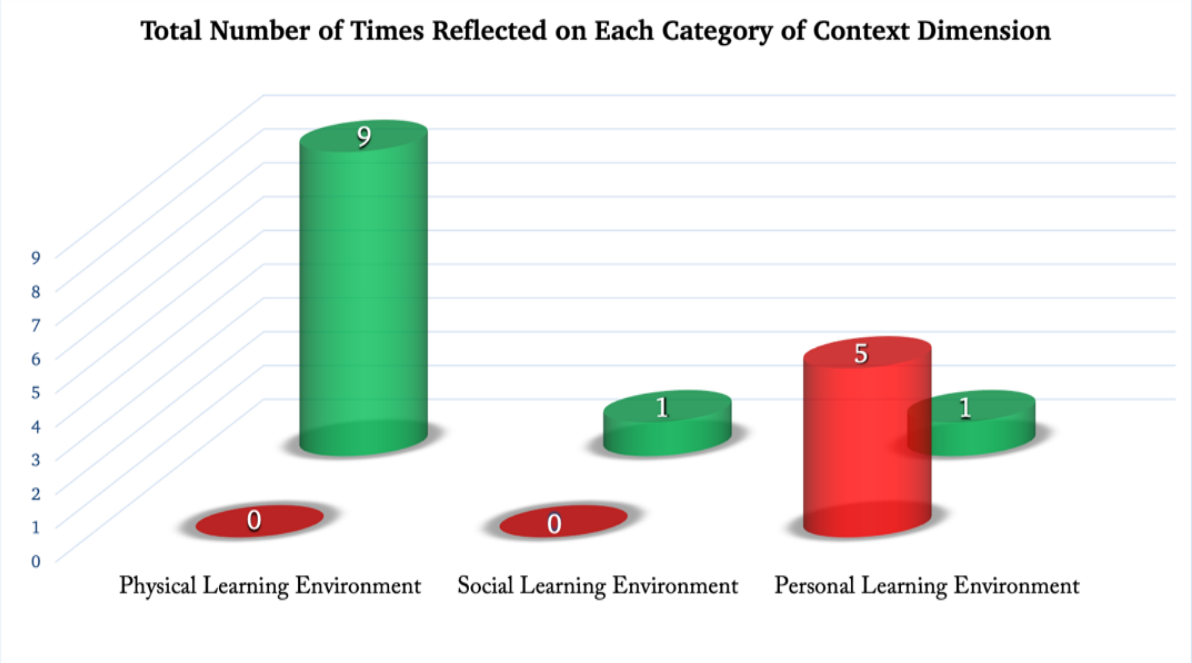
Context: Learning Environment Comments

The context dimension in the framework highlights critical aspects on which an educator can reflect. Participants reflected on all three categories attributed to the context dimension: physical, social, and personal learning environments. RTA analysis of the context dimension showed participants mostly mentioned issues related to the physical learning environment. While video reflecting, many participants focused on physical (nine across three participants), while few emphasized personal (one) or social learning environments (one; see Figure 9). For example, PM while highlighting the physical learning environment expressed, “I was uncomfortable since I had a light directly in my eyes.” Similarly, PN claimed, “I am unable to see my audience, and I have no clue what is going on. Are they really listening? I would have set up the class differently so that I could see what’s going on!”

No statistically significant differences regarding the context dimension emerged, neither in the number of self-reflective instances ($\bar{x}$ = 0.71 AND σ = 0.95) in free versus scaffolded reflection ($\bar{x}$ = 1.38 AND σ = 2.13), β = 0.21, *SE* = 0.31, $t(42) = 0.68$, $p = 0.50$, nor in the types analysis (Table A8; free: 3 / 21 = 14.29% versus scaffolded reflection: 5 / 24 = 20.83%), β = 0.50, *SE* = 0.81, $z = 0.61$, $p = 0.54$.

Figure 9

Context Dimension Reflection



Teaching Experience Influence on Self-Reflection Themes

In Study 1, we performed a descriptive analysis of any apparent differences in reflection due to teaching experience. A visual analysis of any apparent differences from the current study are presented from Figure 10-12. In this study, we quantitatively combined the dataset with Study 1, including teaching experience as a fixed effect in every Research Question 1 model

about the effect of scaffolding. Appendix Tables A1-A7 present teaching experience in the bottom row of each model table.

Figure 10

Reflection Dimension Use According to Teaching Experience – Scaffolded

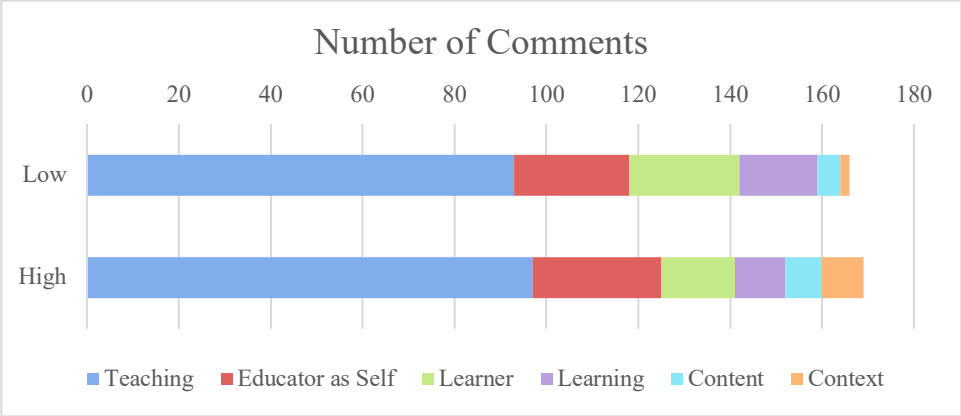
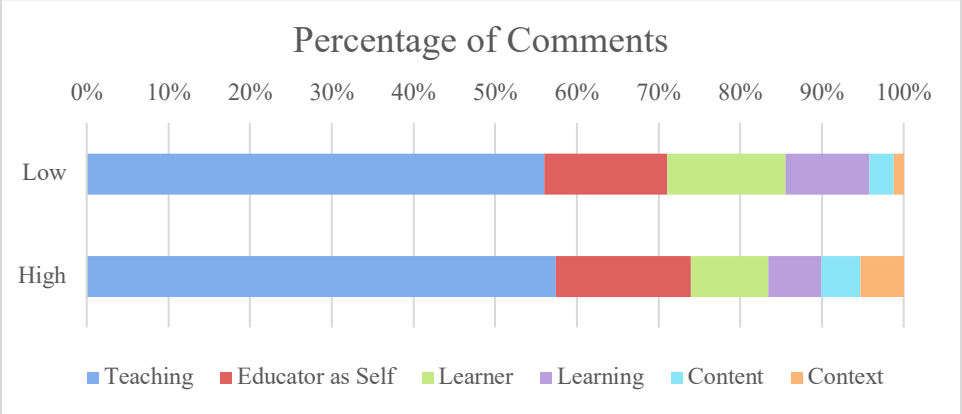


Figure 11

Percentage of Reflection Dimension Use According to Teaching Experience - Scaffolded

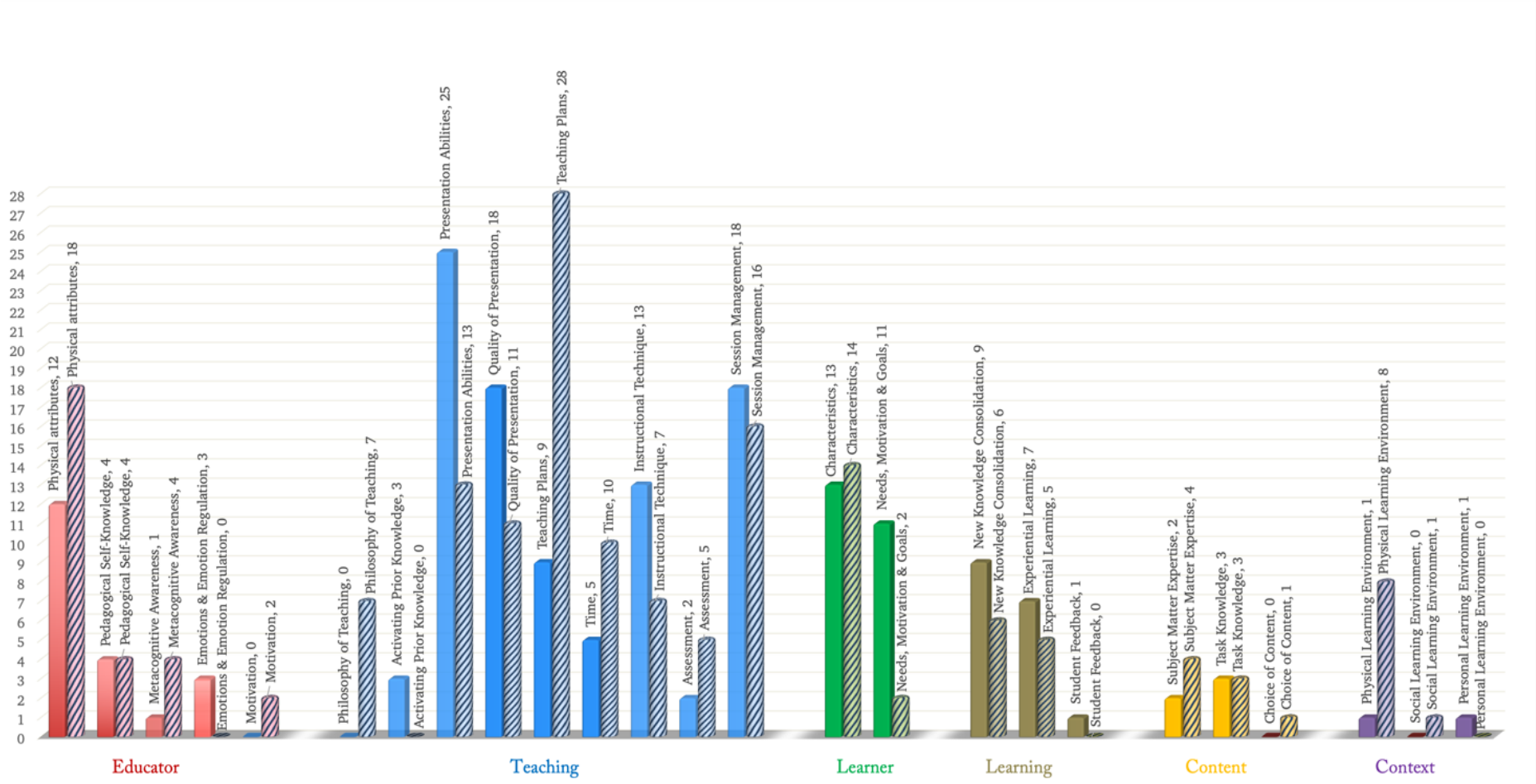


Note. Teaching experience is defined as "high" for those with 12 or greater years of education. Those in the "low experience" group have 7 or fewer years of experience teaching.

No significant effect of teaching experience on any DVs surfaced (types and tokens of all dimensions, and types and tokens of each dimension independently), with all *p*-values > 0.40. Appendix Figures portray figures for these analyses. We concluded that teaching experience did not affect the variety or quantity of self-reflective comments.

Figure 12

Coding Category by Teaching Experience



Note. Shaded bars are more experienced educators (12 or more years), and clear bars are less experienced educators (7 or fewer years). Each coding category is labeled, and the hue represents the reflection dimension.

Medical Educators' Insights on Our Theoretical Self-Reflection Framework

After they completed their self-reflection, each participant evaluated the framework. All participants were asked what they thought of the framework for self-reflection (see, Appendix D, Q7) and were requested for suggestions while being allowed to freely elaborate. As in Study 1, all participants unanimously endorsed the framework utility to support reflection. While reflection embodies a personal practice (Boud et al., 1985), "the learning process can be considerably accelerated by appropriate support" (p. 36). Concurring with researchers, participants highlighted scaffolding increased the category breadth they covered in their self-reflection (Johns, 2017). PK seemed to note:

> Having the framework was helpful. Even though I didn't go through each item, it helped me get the picture, helping me to think about how I performed, how I can communicate ideas clearly or effectively … If I hadn't had the framework beforehand, I think I would probably have just focused on myself, rather than the whole teaching process, including the students and the environment.

Hayden et al. (2013) illustrated scaffolded reflection epitomizes educators identifying crucial events from their practice to refine their teaching and content-specific knowledge. PQ exclaimed, "I like the framework, but it's a lot to think about when you're reflecting. But overall, it's helpful because it's good to look at all the different aspects. It gave me more ideas and topics for reflection than if I had not had the framework." PJ felt it benefited by drawing focus away from surface characteristics:

> All the questions and how it is structured (teacher, learner, etc.) helped me shape how I was watching and evaluating what I was doing. It brought my reflection to a deeper level. Otherwise, I would have focused more on trivial details like hand movements. But

> the framework helped me to think about the bigger picture and its impact my teaching had on me and my learners.

Prompting educators to concentrate improves learning reflection (Ash & Clayton, 2009). PN pointed out,

> When I looked at the framework, there were a lot of things that teachers don't really look at, like ‘did I look competent in my teaching?' and 'was I comfortable letting go of the class?' we don’t really think about these things!... If I hadn't had the framework, I wouldn't have thought of all of this. It was beneficial in the comments that I made during the reflection.

PM suggested the framework could help lesson planning, “I have an understanding of the concepts, but I would appreciate having the framework before I prepare the class. For me, it would have helped me prepare a better presentation or class.”

General Discussion

This paper reports the second of two exploratory studies aimed at designing a framework that guides medical educators’ pedagogical self-reflective practices. Educators in Study 1 freely reflected on their teaching – specifically, they were not scaffolded and were not given any instructions on reflection. Educators in the current study received scaffolding where they had our basic framework during the reflection phase. These papers pertain to our first two rounds of iterative coding refinement. Study 1 qualitatively reviewed the data generated from the 7 participants that were part of the study. Additionally, this study initially qualitatively analysed the data generated from the 8 participants of this study, following which the two datasets generated from the total of 15 participants (Study 1 & 2) were quantitatively analyzed.

We replicated a few critical findings from Study 1. First, the coding categories and the dimensions used to structure our framework adequately captured the variety of participants' self-reflective comments. Study 2 expanded our coding categories to 26 across six reflective dimensions. The data pattern across dimensions also stayed relatively stable across the two samples: participants reflected most often on the teaching, then the self as educator, learner, learning, content, and context dimensions. Second, no relationship existed between teaching experience and self-reflection. Teaching experience represented a potential predictor in every analysis and did not approach significance. In other words, it did not appear teaching will necessarily change one's self-reflective practices over time. It also suggested skills from self-reflection in medical practice did not automatically transfer to pedagogical self-reflection. Third, in both studies, all the participants unanimously agreed the framework helped structure their self-reflection. Participants who did not see the framework until after self-reflection agreed "this would have been useful," and participants who saw the framework before their self-reflection agreed "this was useful."

We have a few discoveries from comparing data across studies. Scaffolding medical educators did seem to positively influence their self-reflection. Participants engaged in scaffolded self-reflection explored a greater variety of coding categories than participants who freely reflected and were not scaffolded, indicating a guide can prompt medical educators to expand their pedagogical self-reflection repertoire. Second, we found that there were significant differences in engagement with the "teaching" dimension, with participants from the scaffolded reflection doing a greater amount of self-reflection that falls under this dimension (i.e., tokens). Scaffolded reflection also leads to a greater number of participants delving into a greater variety of coding categories. It enriched self-reflection regarding the act of teaching. Third, scaffolded

reflection leads to more people interacting with the "self as an educator" dimension. Collectively, these three findings indicate medical educators benefit from a self-reflective framework on which to base their pedagogical self-reflection.

Study Implications

The primary implication engenders our framework seems to embody a reasonable way to structure pedagogical self-reflection, making it an effective exercise for medical educators. Overall, it appears to promote engagement with a greater variety of self-reflective comments. Specifically, it seemed to make individuals less likely to focus on the surface (one's physical attributes), offering alternatives. Although everyone did emphasize their physical traits when using the framework, it helped them focus on active teaching in their microlesson. Providing this prompt without verbal feedback, training, or prodding, impacted medical educators' pedagogical self-reflection, uncovering that the framework scaffolded pedagogical self-reflection. Direct feedback to our question regarding the framework's utility also revealed educators preferred earlier access while designing the lesson, indicating pedagogical self-reflective training could also enhance medical self-reflection training.

No disadvantages emerged from scaffolding. The design did not confuse or mislead anyone. They viewed it as intuitive. They did not find any difficulties using the framework, even without training. It did not take an exceptionally long time to use. It did not extend overall self-reflections or theme repetition. Instead, the differences were primarily categorical, increasing participants' themes or categories.

Our goal for the contribution to the literature is to present in great detail how we completed two rounds of bottom-up data-driven research, iteratively developing a coding system. Notably, we qualitatively probed self-reflection. Outlining the process can inform future

work in other domains and generate feedback from others engaging in the practice. Both qualitative and quantitative data deepened the investigation, employing mixed methods, and self-reflection research in medical education.

Limitations and Future Research

There are some potential threats to validity regarding our coding categories. Forthcoming publications about future iterations and solidification of our self-reflection framework for higher educators will triangulate data sources to justify the themes. In this round, member checking helped determine the finding accuracy. Some participants reviewed specific descriptions for accuracy (Creswell, 2009). Qualitative validity was determined by checking result accuracy, captured through trustworthiness, authenticity, and credibility (Creswell & Miller, 2000). In this study, as in Study 1, threats to ecological validity existed, as we did not have an actual classroom. This and other methodological limitations were covered in Study 1.

Statistical limitations involved comparing data across studies. For example, cohort effects could emerge. Also, we cannot make explicitly causal arguments, as we did not randomly assign participants. We collected all free reflection in the first investigation and the scaffolded reflection in the second iteration. Another limitation constituted our sample lacks statistical power to find differences within coding categories. We wanted to evaluate if it does anything, and the answer is yes. We simply did not have access to enough educators to conduct a randomized control trial, and so our future work will expand our participant group to other HE educators. The statistical methodologies we used (linear and mixed effects logistic modeling) do not presuppose random assignment and are often used for quasi-experimental data.

Future directions include broadening the educators we study to other HE educators and increasing the framework's external validity. Along with this, we will combine these data-

driven studies with the top-down theory driven work. Future studies might provide actual training, feedback, or prompting to use the framework because it can be taught quickly, and individuals can be trained to use it.

Conclusion

This study found a pedagogical self-reflection framework can affect medical educators, and it can possibly lead to increases in the variety of information in those self-reflections, even without specific training. This suggests our framework and the data in this study, and Study 1 unveiled a practical framework for organizing medical educators' self-reflections. We did not find a relationship between teaching experience and the content of self-reflections, suggesting that medical practice self-reflection does not automatically result in pedagogical self-reflection. Along with its companion study (Study 1), we present the initial iterations in building a data-driven self-reflection framework. Future research will investigate the degree to which the framework generalizes to the broader higher education field.

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Appendix A

Dimensions Data

Table A1

All Dimensions (Statistical Analysis)

	Estimate	*SE*	*df*	*t* value	Pr(>|t|)
Instances Sum (Tokens)					
(Intercept)	1.15	0.26	12	4.46	0.00
Scaffolding	0.47	0.28	12	1.68	0.12
Experience	-0.01	0.28	12	-0.05	0.96
Coding Categories or Themes Count (Types)					
	Estimate	*SE*		*z* value	Pr(>|z|)
(Intercept)	-0.37	0.21		1.81	0.00
Scaffolding	**0.57**	**0.22**		**2.58**	**0.01**
Experience	0.11	0.22		0.48	0.63

Table A2

Educator Dimension (Statistical Analysis)

	Estimate	*SE*	*df*	*t* value	Pr(>|t|)
Instances Sum (Tokens)					
(Intercept)	1.52	0.55	72	2.78	0.01
Scaffolding	-0.12	0.59	72	-0.20	0.85
Experience	-0.17	0.59	72	-0.28	0.78
Coding Categories or Themes Count (Types)					
	Estimate	*SE*		*z* value	Pr(>|z|)
(Intercept)	-0.74	0.45		1.62	0.10
Scaffolding	**0.96**	**0.48**		**2.01**	**0.04**
Experience	0.36	0.48		0.75	0.45

Table A3

Teaching Dimension (Statistical Analysis)

	Estimate	*SE*	*df*	*t* value	Pr(>|t|)
Instances Sum (Tokens)					
(Intercept)	1.56	0.46	2	3.41	0.01
Scaffolding	1.10	0.50	2	2.21	0.05
Experience	-0.04	0.50	2	-0.09	0.93
Coding Categories or Themes Count (Types)					
	Estimate	*SE*		*z* value	Pr(>|z|)
(Intercept)	0.12	0.33		0.37	0.71
Scaffolding	**1.08**	**0.38**		**2.86**	**0.00**
Experience	-0.05	0.38		-0.13	0.89

Table A4

Learner Dimension

	Estimate	*SE*	*df*	*t* value	Pr(>|t|)
Instances Sum (Tokens)					
(Intercept)	1.36	0.55	2	2.48	0.02
Scaffolding	0.21	0.59	2	0.35	0.73
Experience	0.21	0.59	2	0.35	0.73
Coding Categories or Themes Count (Types)					
	Estimate	*SE*		*z* value	Pr(>|z|)
(Intercept)	0.47	0.57		0.83	0.41
Scaffolding	-0.32	0.61		-0.52	0.60
Experience	0.03	0.61		0.04	0.97

Table A5

Learning Dimension

	Estimate	*SE*	*df*	*t* value	Pr(>|t|)
Instances Sum (Tokens)					
(Intercept)	0.72	0.42	2	1.07	0.10
Scaffolding	0.33	0.46	2	0.72	0.48
Experience	0.24	0.46	2	0.53	0.60
Coding Categories or Themes Count (Types)					
	Estimate	*SE*		*z* value	Pr(>|z|)
(Intercept)	-0.15	0.56		-0.28	0.78
Scaffolding	0.10	0.60		0.17	0.86
Experience	0.10	0.60		0.17	0.86

Table A6

Content Dimension

	Estimate	*SE*	*df*	*t* value	Pr(>|t|)
Instances Sum (Tokens)					
(Intercept)	0.36	0.23	2	1.59	0.14
Scaffolding	0.21	0.24	2	0.84	0.42
Experience	-0.04	0.24	2	-0.18	0.86
Coding Categories or Themes Count (Types)					
	Estimate	*SE*		*z* value	Pr(>|z|)
(Intercept)	-1.20	0.64		-1.87	0.06
Scaffolding	0.47	0.67		0.71	0.48
Experience	0.06	0.67		0.09	0.92

Table A7

Context Dimension

	Estimate	*SE*	*df*	*t* value	Pr(>|t|)
Instances Sum (Tokens)					
(Intercept)	0.31	0.29	2	1.06	0.29
Scaffolding	0.21	0.31	2	0.68	0.50
Experience	-0.12	0.31	2	-0.39	0.70
Coding Categories or Themes Count (Types)					
	Estimate	*SE*		*z* value	Pr(>|z|)
(Intercept)	-2.10	0.82		-2.56	0.01
Scaffolding	0.50	0.81		0.61	0.54
Experience	0.50	0.81		0.61	0.54

Table A8

Participants Expressing Coding Category in Scaffolding Condition with Statistical Tests (Types)

Reflection dimension	Final coding categories	Free reflection (n = 7 participants)	Scaffolded reflection (n = 8 participants)	Inferential statistics
Self as Educator (n = 5 categories)	Physical Attributes	6	8	Fisher's exact, p = 0.4667
	Pedagogical Self-Knowledge	2	5	Fisher's exact, p = 0.3147
	Metacognitive Awareness	5	6	Fisher's exact, p = 1.000
	Emotion Regulation	0	3	Fisher's exact, p = 0.2000
	Motivation	0	2	Fisher's exact, p = 0.4667
	Total in Self as Educator Dimension	13 / 35 (37.14%)	24 / 40 (60.00%)	β = 0.96, SE = 0.48, z = 2.01, p = 0.04* ($X^2(1)$ = 3.902, p = 0.0482*)
Teaching (n = 9 categories)	Activating Prior Knowledge	1	3	Fisher's exact, p = 0.5962
	Presentation Abilities	6	8	Fisher's exact, p = 0.4667
	Quality of Presentation	5	8	Fisher's exact, p = 0.2000
	Teaching Plans	6	8	Fisher's exact, p = 0.4667
	Instructional Technique	4	6	Fisher's exact, p = 0.6084
	Session Management	5	7	Fisher's exact, p = 0.5692
	Philosophy of Teaching	1	3	Fisher's exact, p = 0.5692
	Assessment	2	5	Fisher's exact, p = 0.3147
	Time	3	7	Fisher's exact, p = 0.1189
	Total in Teaching Dimension	33 / 63 (52.38%)	55 / 72 (76.39%)	β = 1.08, SE = 0.38, z = 2.86, p < 0.01** ($X^2(1)$ = 8.534, p = 0.0035**)
Learner (n = 3 categories)	Learner Characteristics	6	7	Fisher's exact, p = 1.0000
	Needs, Motivation & Goals	6	6	Fisher's exact, p = 1.0000
	Support & Mentorship	1	0	Fisher's exact, p = 1.0000
	Total in Learner Dimension	13 / 21 (61.90%)	13 / 24 (54.17%)	β = -0.32, SE = 0.61, z = -0.52, p = 0.60 ($X^2(1)$ = 0.275, p = 0.6001)
Learning (n = 3 categories)	New Knowledge Consolidation	6	6	Fisher's exact, p = 1.0000
	Experiential Learning	4	5	Fisher's exact, p = 1.0000
	Student Feedback	0	1	Fisher's exact, p = 1.0000
	Total in Learning Dimension	10 / 21 (47.62%)	12 / 24 (50.00%)	β = 0.10, SE = 0.60, z = 0.17, p = 0.86 ($X^2(1)$ = 0.025, p = 0.8734)

Content (n = 3 categories)	Subject Matter Expertise	2	4	Fisher's exact, p = 0.5291
	Task Knowledge	3	3	Fisher's exact, p = 1.0000
	Choice of Content	0	1	Fisher's exact, p = 1.0000
	Total in Content Dimension	5 / 21 (23.81%)	8 / 24 (33.33%)	β = 0.47, SE = 0.67, z = 0.71, p = 0.48 ($X^2(1)$ = 0.495, p = 0.4819)
Context (n = 3 categories)	Physical Learning Environment	0	3	Fisher's exact, p = 0.2000
	Social Learning Environment	0	1	Fisher's exact, p = 1.0000
	Personal Learning Environment	3	1	Fisher's exact, p = 0.2821
	Total in Context Dimension	3 / 21 (14.29%)	5 / 24 (20.83%)	β = 0.50, SE = 0.81, z = 0.61, p = 0.54 ($X^2(1)$ = 0.328, p = 0.5666)
All Dimensions (N = 26 categories)	Total Across All Dimensions	77 / 182 (42.31%)	117 / 208 (56.25%)	β = 0.57, SE = 0.22, z = 2.58, p = 0.01** ($X^2(1)$ = 7.548, p = 0.0060**)

Note. * $p < 0.05$, ** $p < 0.01$. For the DV, the denominator denotes the total possible categories produced if every individual produced every category. The numerator equals the categories actually produced. Each participant received a score of 0 if they did not mention the category in their self-reflection and a score of 1 if they did.

Table A9

Instances of Coding Category by Scaffolding Condition with Statistical Tests (Tokens)

Reflection dimension	Final Coding categories	Free reflection	Scaffolded reflection	Inferential statistics
Self as Educator	Physical Attributes	39	32	$t(9.8) = 0.7394$, $p = 0.477$
	Pedagogical Self-Knowledge	2	8	$t(10.1) = 1.6984$, $p = 0.1201$
	Metacognitive Awareness	9	7	$t(8.2) = 0.7222$, $p = 0.4902$
	Emotion Regulation	0	4	$t(7) = 1.8708$, $p = 0.1036$
	Motivation	0	2	$t(7) = 1.5275$, $p = 0.1705$
	Total-Self as Educator Dimension	50	53	$\beta = -0.12$, $SE = 0.59$, $t(72) = -0.20$, $p = 0.85$
Teaching	Activating Prior Knowledge	2	3	$t(10.4) = 0.2632$, $p = 0.7976$
	Presentation Abilities	28	38	$t(12.9) = 0.3511$, $p = 0.7312$
	Quality of Presentation	15	29	$t(12.9) = 1.3482$, $p = 0.2009$
	Teaching Plans	18	37	$t(9.9) = 1.1667$, $p = 0.2707$
	Instructional Technique	13	20	$t(12.1) = 0.5991$, $p = 0.5601$
	Session Management	12	34	$t(9.8) = 1.8844$, $p = 0.0895$
	Philosophy of Teaching	1	7	$t(8) = 1.369$, $p = 0.2079$
	Assessment	3	7	$t(12.9) = 0.9714$, $p = 0.3492$
	Time	5	15	$t(11.8) = 1.5171$, $p = 0.1556$
	Total-Teaching Dimension	97	190	$\beta = 1.10$, $SE = 0.50$, $t(12) = 2.21$, $p = 0.05$*

Learner	Learner Characteristics	17	27	$t(13) = 0.8455$, $p = 0.4131$
	Needs, Motivation & Goals	13	13	$t(12.5) = 0.2735$, $p = 0.7890$
	Support and Mentorship	1	0	$t(7) = 1.0000$, $p = 0.3506$
	Total - Learner Dimension	31	40	$\beta = 0.21$, $SE = 0.59$, $t(42) = 0.35$, $p = 0.73$
Learning	New Knowledge Consolidation	9	15	$t(9.7) = 0.6795$, $p = 0.5127$
	Experiential Learning	9	12	$t(12.9) = 0.2518$, $p = 0.8052$
	Student Feedback	0	1	$t(7) = 1.0000$, $p = 0.3056$
	Total-Learning Dimension	18	28	$\beta = 0.33$, $SE = 0.46$, $t(42) = 0.72$, $p = 0.48$
Content	Subject Matter Expertise	3	6	$t(13) = 0.7440$, $p = 0.4701$
	Task Knowledge	4	6	$t(12.3) = 0.3515$, $p = 0.7312$
	Choice of Content	0	1	$t(7) = 1.0000$, $p = 0.3506$
	Total - Content Dimension	7	13	$\beta = 0.21$, $SE = 0.24$, $t(12) = 0.84$, $p = 0.42$
Context	Physical Learning Environment	0	9	$t(7) = 1.5151$, $p = 0.1735$
	Social Learning Environment	0	1	$t(7) = 1.0000$, $p = 0.3506$
	Personal Learning Environment	5	1	$t(7.4) = 1.5482$, $p = 0.1630$
	Total - Context Dimension	5	11	$\beta = 0.21$, $SE = 0.31$, $t(42) = 0.68$, $p = 0.50$
	Total Across All Dimensions	208	335	$\beta = 0.47$, $SE = 0.28$, $t(12) = 1.68$, $p = 0.12$

Note. * $p < 0.05$, ** $p < 0.01$. For the DV, the measure is the total number of instances of that coding category (tokens).

Appendix B

Higher Education Reflection Framework

1.1 Teacher
How was my posture, my appearance, my tone of voice, my eye contact?
How was my motivation to teach?
Could I effectively regulate my emotions?
Was I comfortable letting go of control of my class?
Did I look competent in my teaching?
Did the way I teach capture my philosophy about teaching?
Did I feel good at the end?

1.2 Teaching
What was my teaching style? How were my presentation skills?
Was I comfortable with the way I taught?
How was my collaboration with the class? Could I activate a two-way communication?
Did I provide an overview and/or a summary?
How was my fluency and competence in delivering material?
Did I successfully break down complex structures?
Did I provide an authentic application of the content? Could I demonstrate examples of theory to application?
Was I comfortable in answering students' questions?
Did I dominate? How were my class management skills? Did I manage time well.

2.1 Learner
Was my expectation of students realistic?
Could I activate my students' prior knowledge?
Did I pay attention to my students' feedback?
Was I able to cover content based on my students' understanding? Did I meet my students at their level?
Was I able to scaffold students that were falling behind?
Did I motivate/lose my students my students?
Will I need to support my students outside my formal class?

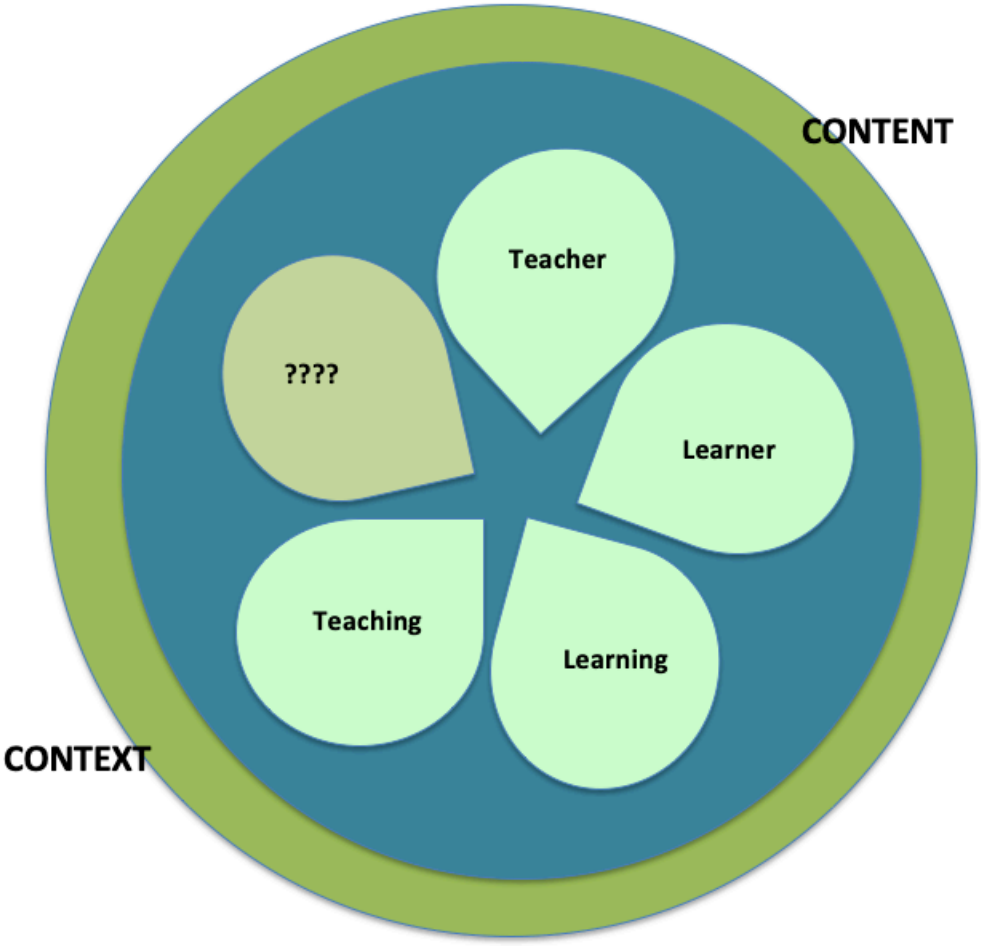
2.2 Learning
Did I have a plan (specific learning outcomes and strategies for teaching and assessment)?
Did I reach my session objectives? Did I teach to the learning outcomes I had in my mind?
Did I assess my students' learning? Were my assessments formative and frequent?
How effective was I in providing feedback to and receiving from my students?

3. Content
Was I comfortable with the assigned content?
Did I have sufficient content knowledge?
Did I provide a structured presentation of the materials to be taught?
How effective was I in the selection of materials?

Did I effectively use instructional tools?
How smooth was the flow of my organization?

4. Context
Did the physical set up of the class support my teaching approach?
What was my classroom environment like?
Were audio/visual material, board, charts, etc. available and did I use them effectively?
Did I explain any ground rules which I expected to be followed in my class?
Was I able to create the dynamics that I wanted among students / between students and myself?
Was there energy in my class? Was there a sense of humour?

5. Other
Is there anything you can think of that we can add to this framework?



Bridging Text

The findings in Study 1 and 2 (Chapter 3 and 4) revealed that medical educators engaged in the earlier established six dimensions of the teaching-learning dynamic and added the new categories to our earlier developed list of categories. From an initial list of 20 categories, the two empirical studies, expanded our coding categories to 26 across six reflective dimensions. Furthermore, no relationship existed between teaching experience and self-reflection. Teaching experience represented a potential predictor in every analysis and did not approach significance. In other words, it did not appear teaching experience will necessarily change one's self-reflective practices over time. It also suggested skills from self-reflection in medical practice did not automatically transfer to pedagogical self-reflection. Third, in both studies, all the participants unanimously agreed the framework helped structure their self-reflection.

Combining the results of the studies on the topic, I re-engaged with the literature on this topic to gain new insights and expand the theoretical understanding of the teaching-learning dynamic. Consequently, this study (Chapter 5) first discusses the theoretical and conceptual foundations of the newly constructed framework before outlining and detailing its six major components. The mappings created by the experts show the categories and subcategories and elucidating potential questions to support reflective practice.

Chapter 5: HERF: The Higher Education Reflection Framework

Abstract

Strategic reflection on one's teaching can transcend simply retelling events, promoting post-situational self-awareness. However, higher education educators (HEEs) reflecting on their teaching encounter murkiness due to the limited practical advice on how to reflect. The prevailing self-reflection models tend to embrace K-12. Further, inter-silo issues have caused term reflection to vary across inquiry domains, resulting in confusion and frustration. The lack of a practical HEE reflection framework has led us to synthesize the literature and empirical studies to build the Higher Education Reflection Framework (HERF). The HERF, a tool guiding HEE pedagogical self-reflection, is based on Colton and Sparks-Langer (1993), Low et al.'s Reflective Teacher (2009), Korthagen's Onion models (2004) and Val and Murray's (1983, 2007) Teacher Behavior Inventory. The HERF focuses on six learning experience dimensions: the teacher, teaching, the learner, learning, the content, and the surrounding context. Within those facets, we identified self-reflective strategies or topics and wrote prompts to encourage effective self-reflection. We found educators' spontaneous self-reflective commentary emphasized personal appearance, but when we listed potential categories on which to comment, responses varied and engagement increased more than their non-scaffolded counterparts. This HERF framework presents a tool for practical use, uncovering implications for HE pedagogy.

Keywords: reflection, framework, higher education, educator, guided reflection

Introduction

Reflection has drawn the attention of multiple field experts, including education, for almost a century. Educator pedagogy resides on reflection (Loughran, 2006). However, barriers may impede educator reflection, affecting development (Collin et al., 2013). No precise, effective reflection strategy encompasses professional growth. Moreover, ambiguity obstructs efficient practice (McAlpine & Weston, 2000). A lack of knowledge (teaching and reflection) or educator's inability to select and monitor appropriate cues influence its advantages. “There seems to be more rhetoric about the value of reflective practice than there is detail about how professional educators can help beginning professionals develop the skills of reflective practice and acquire initial experiences” (Russell, 2005, p. 199).

While reflection and reflective practice have matured in K-12 education, scholars cannot directly apply the outcomes to Higher Education (HE) because significant distinctions between teachers in elementary and secondary education (school instructors) and HE educators prevail (Jensen, 2014; Kember, 1997; Parsons, 2015; Saxena, 2017). Compared to HE, elementary and secondary school educators' tasks, demands, and expectations differ (Parsons, 2015; Saxena, 2017). According to Schwartz et al. (2008), a school teacher disseminates knowledge to students, encouraging learners to acquire facts and skills. HEs, however, serve as subject matter experts (SMEs), and the student bears the primary responsibility for acquiring knowledge.

Specifically, in HE, teaching skills and pedagogical knowledge hold a low priority when recruiting an educator (Lefebvre, 2022). According to Pekkarinen and Hirsto (2017) and the University of California Berkeley Career Center Job Center, hiring managers at HE institutions emphasize subject matter knowledge, requiring a PhD in the area and many academic publications to draw research funding. As a result, many academics see university teaching as an

employment pursuit not requiring formal education. Hence, universities have shifted from the teaching and learning archetype to research and funding, making teaching secondary to publications and grant money. With dynamic realignment, the pedagogical imbalance surfaced, and an official United Kingdom (UK) review, the Browne Review (2010), elucidated this issue, purporting university faculty require teacher training. Multiple metrics reflecting university prestige and rankings rarely encompass faculty pedagogy. Focusing on other traits, most professors do not even know if they excel at teaching. However, many educators want to improve their pedagogy. Thus, universities have started scaffolding reflection to improve pedagogy.

Researchers have developed multiple models to foster educational reflection, but they tend to lack the clarity to implement in the real world (Al Riyami, 2015; Clarà, 2015). Furthermore, reflection as a term and concept varies across domains, bringing field-specific meaning and perspective to the concept, process, and practical techniques. Often HEEs tend to genuinely understand self-reflection and its scope but cannot put that knowledge into practice. Scaffolding must facilitate systematic reflection for educators to benefit (Ash & Clayton, 2004; Carrington & Selva, 2010; Johns, 2017; Moon, 2015; Vong, 2016).

Maggs and Biley (2000), Ash and Clayton (2004), and Duffy (2009) described the advantages of guided reflection, deepening instructional issue awareness, and stimulating educators to improve. Ash and Clayton (2004) argued ineffective structures guide reflection, creating a directive question sequence known as DEAL (Describe, Examine, and Articulate Learning). Johns (2017) emphasized guided reflection as a roadmap, supporting, assisting, and helping educators to avoid obstacles. Generally, meaningful reflection can assist, prompt, and scaffold, promoting performance (Carrington & Selva, 2010). According to Schön (1987), a

guide could enhance reflection in-and-on action in all professional practices, and reflection facilitators have become increasingly vital in HE. Structured questions heighten qualitative reflection, promoting its advantages. Hence, guides impact reflection positively, improving practice and consequently student learning (Johns, 2017; Moon, 2015; Vong, 2016).

Despite multiple reflection models, HEE reflection remains ineffective. This dissonance hinders professional development, warranting investigation. Based on a literature review, no framework exists structuring HEE reflection. Using scholarly literature and empirically established reflective scaffolding, we designed a conceptual framework to improve educator reflective practice. The critical dimensions encapsulating reflection led to the design. The visual model presents the five educator elements occurring in a specific context, their teaching, the learner, learning, and content engagement. We postulated when engaging with a reflective model, these six dimensions comprise a model to advance specific prompts.

The present study proposes a theoretical framework illustrating HE teaching and learning, scaffolding reflection to improve pedagogy. Considering the areas impacting pedagogical reflection, we divided this six-dimensional conceptual framework into 26 subcategories to schematize educator reflection prompting (see Tables 3-8 for details on each dimension and its associated categories and prompts). The following outlines the framework development and elaborates the primary facets supporting it.

Higher Education Pedagogical Self-Reflection Framework Development

We used a converging methodology to develop the HERF. The top-down literature and ideas to framework and bottom-up data to framework, met in the middle with the HERF. Our empirical studies detail statistical analysis and qualitative exemplars and discuss their

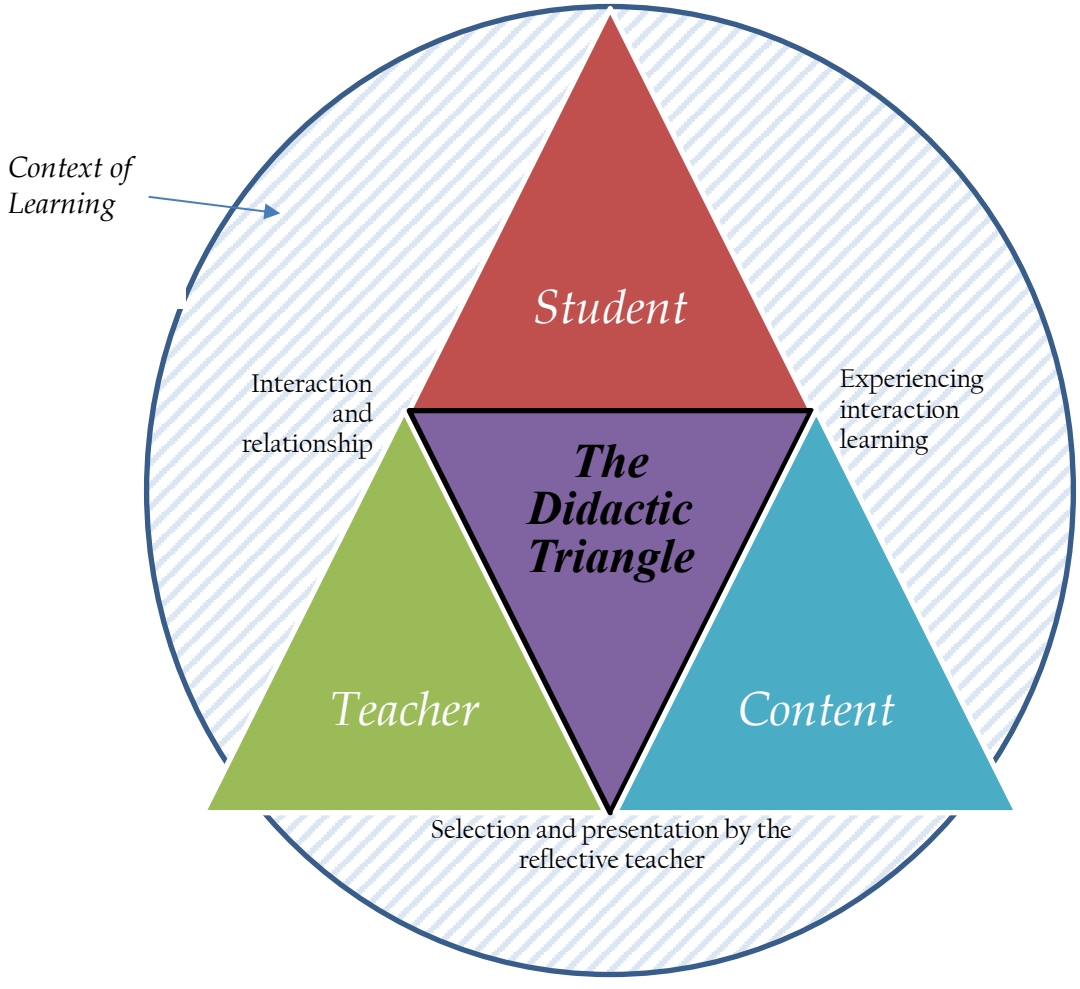
development (Chapters 3 and 4). We will quickly review the methodologies of the top-down work stemming from the literature review. Then, we will overview our HERF empirical research.

Top Down: HERF Theoretical Framework

The complex, intricate knowledge acquisition and transmission issues in teaching, learning, and pedagogy have hindered conceptual framework construction (Guerriero, 2017). This section presents the top-down HERF formation, compiled from various teaching and learning paradigms. The HERF runs along six dimensions of pedagogical context: teacher/teaching, learner/learning, and content/context. Figure 1 represents Kansanen's (1999) triangulation theory, examining the pedagogical context, probing the teacher, student, and content.

Figure 1

Kinnunen's (2009) Didactic Triangle



Kinnunen (2009) adapted this model, arguing the pedagogical context entails a crucial element, for teaching does not happen in a vacuum (Berglund & Lister, 2010; Hillen & Landis, 2014; Jank & Meyer, 2019; Kansanen, 1999; Kron et al., 2022; Sheridan, 2020). From these attempts to capture this complexity, we gleaned learning and teaching transpire in a didactic triangle (student, teacher, and content) enveloped within the learning context.

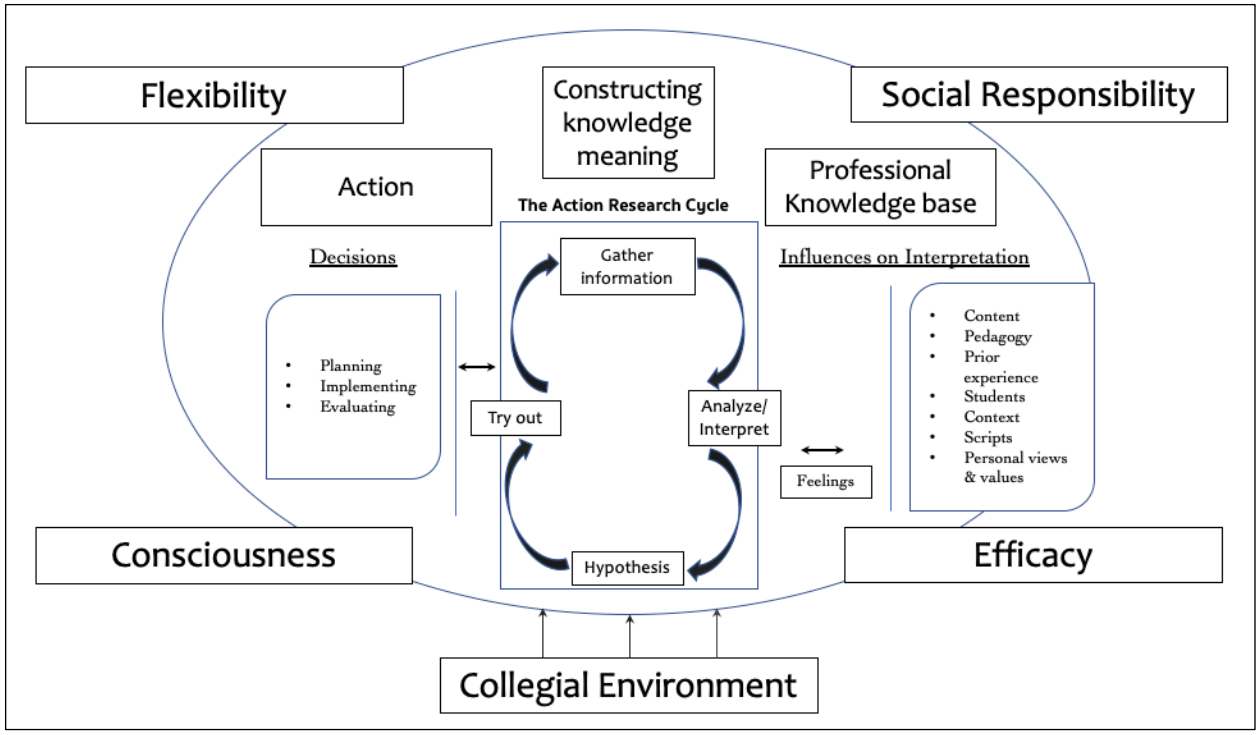
We used Colton and Sparks-Langer (1993), Low et al.'s Reflective Teacher (2009), Korthagen's (2004) Onion Model, and Murray's (1983, 2007) 60-item Teaching Behaviour Inventory (TBI) to develop the HERF. Literature and theoretical and empirical models support teaching and instruction (Bowers, 2015; Entwistle, 1987, 2009; McAlpine et al., 1999; Menges & Austin, 2001; Saroyan & Amundsen, 2004; Shepard, 2001), providing the foundation for comprehending the field and assembling reflective components. Building on research, we investigated Colton and Sparks-Langer's (1993) reflective teaching promoting professional development. Figure 2 displays three primary factors: action, knowledge, and personal attributes (Crookes, 2003). Action embodies meaning during pedagogy. Educators must reflect on their knowledge, including the content they want to impart, context, student approach, previous teaching, epistemological understanding, pedagogical experiences, and individual values.

Additionally, personal attributes emerge, like teacher flexibility and the will to explore various teaching methods to enhance student outcomes. Colton and Sparks-Langer (1993) empowered teachers to implement and evaluate their approach, understanding the mutual relationship between teaching and learning, transcending efficiency to incorporate collaboration and self-awareness. Murray (1983) developed the TBI to inform teaching and instructional quality (Boman, 2013; Hadie et al., 2019; Keller et al., 2016; Rosas et al., 2016). Experts have also used the TBI's 60 low-inference items to measure educator effectiveness (Hadie et al.,

2019). Each element represents eight global abstract behaviors: clarity, enthusiasm, interaction, organization, pacing, disclosure, speech, and rapport (Hadie et al., 2019; Murray, 1983, 1987, 2007).

Figure 2

Colton and Sparks-Langer's (1993) Conceptual Framework



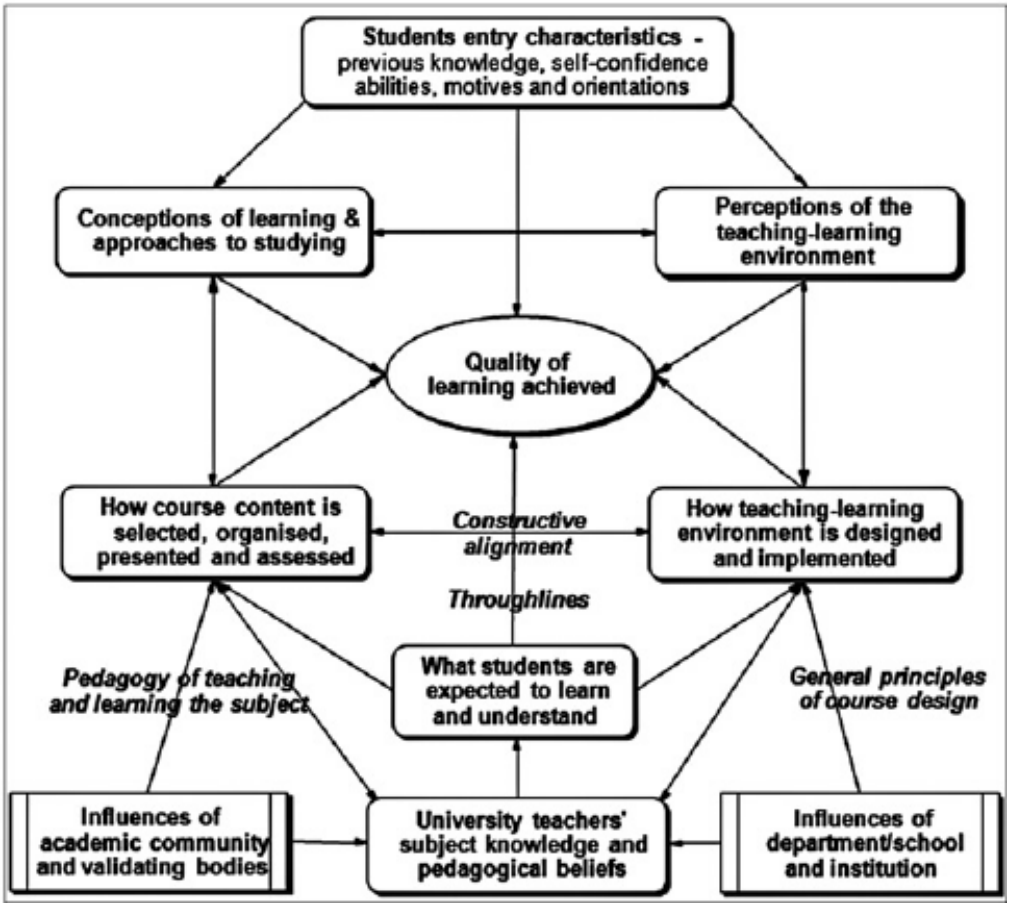
According to Low et al. (2009), multiskilled, well-rounded educators must combine teaching and thinking with administration and management; educators must remain self-aware with deep knowledge of students, community, and pedagogy. We expanded the educator dimension using Low et al.'s (2009) Reflective Teacher Researcher model, highlighting the interaction between the educator's "dispositions (being), practice (doing), and professional knowledge (knowing)" (p. 72). Guerriero (2017) broadened this concept in her OECD report, demonstrating the teaching and learning complexities not incorporated in the design. She

professed teacher knowledge engenders a teaching and learning approach product, affecting the educators' classroom action and knowledge perception differentiating the educator (the individual) from the teaching act (knowledge transmission).

McIlrath and Huitt (1995) discussed five teaching and learning structures regarding the learner and learning, highlighting teacher and student, characteristics, attitudes, efficacy, behavior, prior knowledge, expectations, and achievements. Entwistle (1987) introduced the teaching and learning variables to reveal two learner HERF dimensions: characteristics and learning (see Figure 3).

Figure 3

Entwistle's (1987) Higher Education Teaching and Learning Model

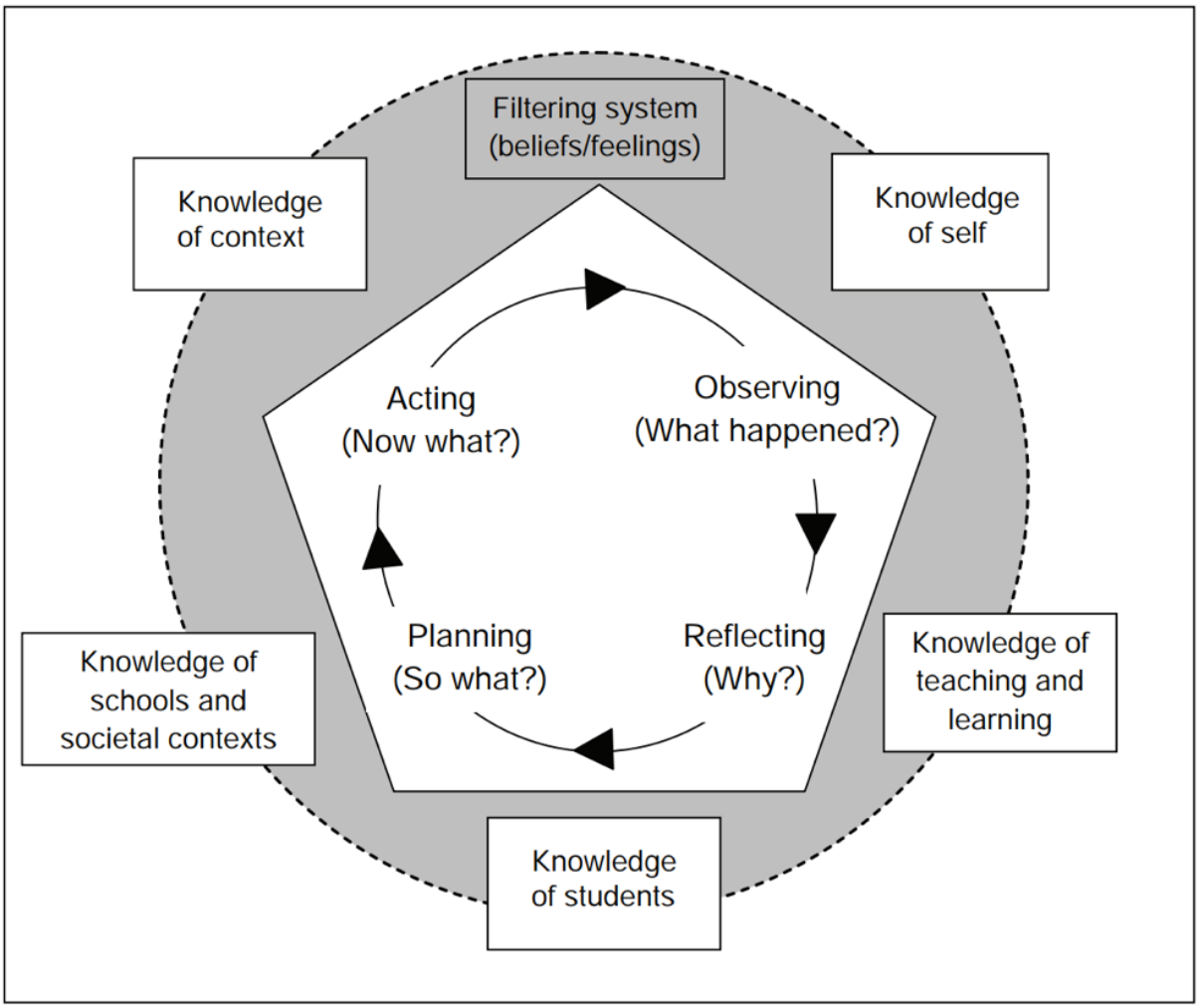


In Korthagen's (2004) Onion Model, internal factors like identity reside as the core, while external factors like environment encompass the outer layers. The outer layers affect the inner ones and vice versa. In core reflection, Korthagen & Nuijten (2022) proposed reflectors must incorporate the inner layers to understand the outer layers' deep significance in teaching. Our self-reflection system includes internal (educators) and external (context) factors.

Capturing the external and marginal layers, we reviewed Schwab (1971), who discovered four curriculum-making components: teacher, students, subject, and milieu. Furthermore, Kron (2008) proposed four pedagogical discussion and viewpoint dimensions: societal, institutional, interactional, and individual. At this juncture, other than the identified educator and student elements, we considered factors such as subject, milieu, society, and institution. Low et al. (2009) developed reflective teaching in Figure 4 for the National Institute of Education, Singapore (NIE). These facets, such as educator self-knowledge, teaching, learning, students, school, and societal and knowledge contexts, emerged as principal to pedagogical reflection. Beliefs and feelings filter these outer circle concepts. Figure 4 illustrates the two pedagogical reflection dimensions guiding content and context. Therefore, teaching and learning transpire with content, situating this trilogy (educator, student, and content) in the learning environment context as displayed in Figure 4.

Figure 4

Low et al.'s (2009) Reflective Teaching Model



Bottom Up: HERF's Empirical Roots

First, we used theory and literature summarized in Table 1 to create a framework. Then, we recruited 15 HE medical educator participants to engage in reflection. An educator prepared a microlesson in these two studies before arriving at our lab.

Table 1

Framework Used in Empirical Research Supporting the HERF

Dimension	Potential Categories
Educator	Personal philosophy Physical attributes Emotion regulation
Teaching	Activating prior student knowledge Presentation abilities Quality of Presentation Teaching plans Instructional technique Management skills
Learner	Learner characteristics
Learning	New knowledge consolidation Experiential learning
Content	Subject matter expertise
Context	Physical, social, and personal learning environment

On arrival for the session, first, the educator presented the microlesson (about 10-20 minutes) to five to ten student volunteers and research confederates. Second, immediately after, the educator watched a video of the microlesson and self-reflected in a video-stimulated retrospective think-aloud (RTA) while controlling the video in whatever way they wanted. However, in Study 1, the participants did not receive direct instruction on how to reflect or what to reflect, while in Study 2, educators received a conceptual framework before they started reflecting. Third, the educator gave their opinion about the design. Afterward, the experimenters

transcribed and coded the educators' comments during the second and third phase while they engaged in self-reflection and discussed the framework, respectively.

The primary goal was to complement and expand the theory and literature. We did find self-reflective comments fit nicely into the six HERF dimensions displayed in Figure 5 and Figure 6. Moreover, when we could not code educators' comments into existing categories in the conceptual framework, we updated the framework accordingly, resulting in the HERF. We based the model on theoretical literature, research, and real life.

Meeting in the Middle: HERF

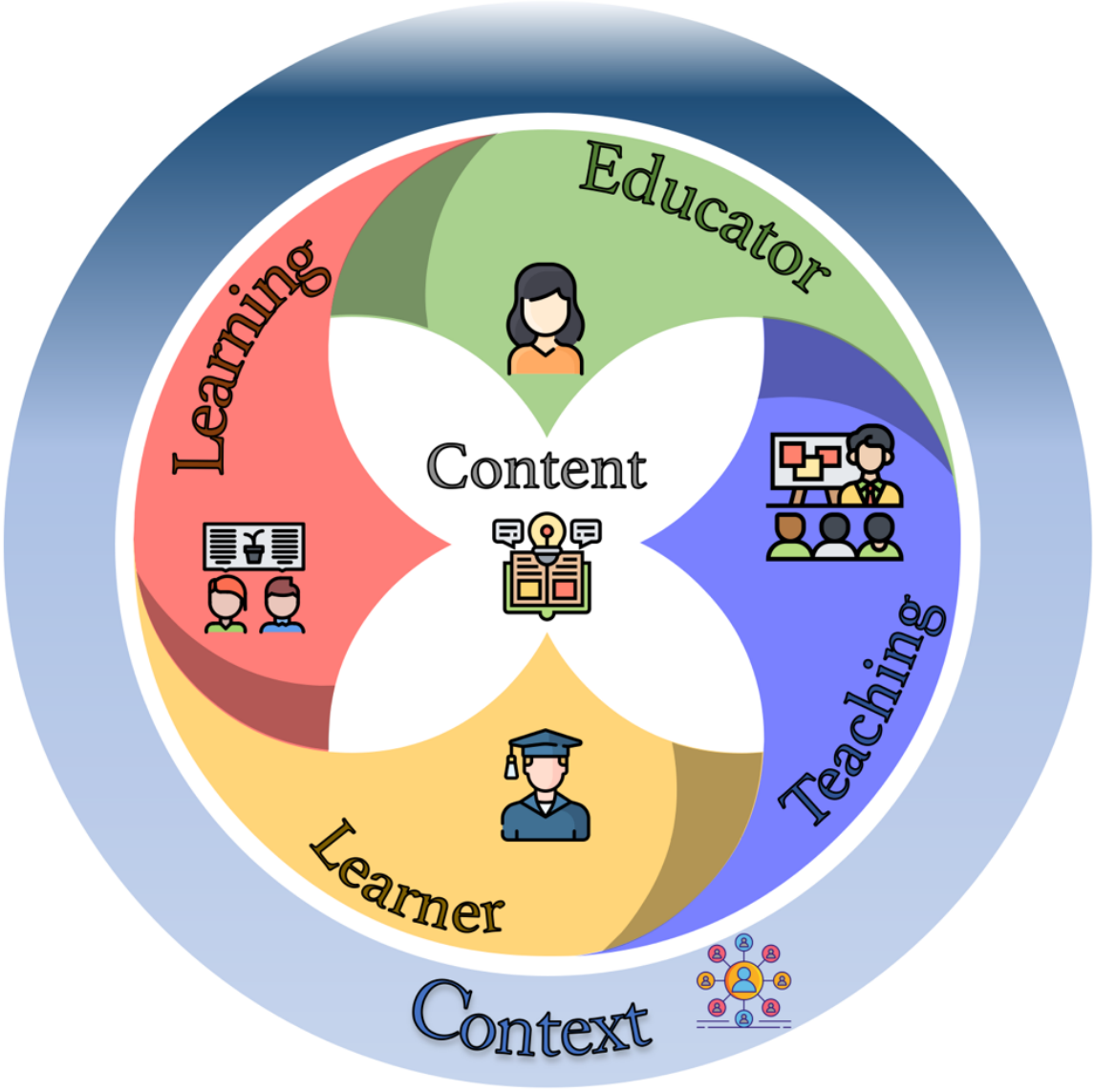
The top-down theory and bottom-up empiricism culminated in the HERF, as displayed in Appendix A. This educator tool entails six reflection dimensions from our conceptual framework and 26 commentary categories after adding elements and specific prompts to instigate relevant information (. Our work with educators demonstrated they found the HERF helpful, desiring a tool for HE pedagogical reflection. We encountered preliminary evidence that access to our framework without guidance, prompt, or training increased the comment variety and decreased the time educators spent talking about their physical attributes – only one of 26 potential categories on which to comment. In the next section, we will describe this framework and explicate the 26 comment categories.

Higher Education Reflection Framework

The HERF covers the six dimensions of the educator and their teaching, the learner and learning, engaged with the content transpiring in a specific educational environment context (see Figure 5). We will discuss how each facet and its associated sub-categories promote comprehensive reflection.

Figure 5

Higher Education Reflection Framework (HERF)



We will go through these systematically, highlighting the reflective comment categories identified through the literature review and empirical studies. Table 2 displays the six dimensions and the 26 categories. Additionally, each dimension has a table displaying the corresponding prompt questions.

Table 2

Reflection Dimensions and Categories for Prompting Educators

Reflection Dimension	Categories
Educator	Physical attributes
	Pedagogical self-knowledge
	Metacognitive awareness
	Emotions & emotion regulation
	Motivation
Teaching	Philosophy of teaching and learning
	Activating students' prior knowledge
	Presentation abilities
	Presentation quality
	Teaching plans
	Time
	Instructional technique
	Assessment
	Session management
Learner	Learner characteristics
	Learner needs, motivation & goals
	Support and mentorship
Learning	New knowledge consolidation
	Experiential learning
	Student feedback
Content	Subject matter knowledge
	Task knowledge
	Choice of content
Context	Physical learning environment
	Social learning environment
	Personal learning environment

Educator

Understanding the self epitomizes reflection (Mälkki et al., 2022; McIntosh, 2020; Väyrynen et al., 2022), as captured in the educator, or self as educator, dimension. Educators must reflect upon their assumptions, attitudes, thoughts, actions, style, and mannerisms to improve teaching practice. A deep self-understanding instigates change to impact pedagogy and student learning significantly. We established five categories in the educator component of this HE reflection framework covering physical appearance, metacognition, personal beliefs, and emotions.

Colton and Sparks-Langer (1993) discussed prior experiences and personal and social beliefs molded from social interactions, acquired knowledge, lived experience, and learning or education. They emphasized personal ethics and empathy as playing a crucial role in teaching. Moreover, they argued metacognitive scripts direct thoughts whereby a reflective educator plans to assess the situation and ask pertinent questions during reflection. In the Teaching Behavior Inventory (TBI), the educator dimension encompasses enthusiasm, speech, and rapport. McIntosh's Seeking Educational Equity and Diversity (SEED) Project (2020) focused on educators' inner questions on self-scholarship, concentrating on inner philosophy, experience, thought system, and vision.

Our empirical findings indicated educators were highly likely to comment on themselves, specifically physical attributes, not surprising to anyone who has tried to watch a video of themselves or listened to a taped recording. However, this is not necessarily a valuable strategy for self-reflection, as it tends to focus on superficial characteristics, like physical clothing or speech patterns. When educators were scaffolded with the conceptual framework, they could

transcend this pattern, broadening their categories. The next section will go over the commenting types and queries under this dimension (see Table 3).

Table 3

Prompts for Scaffolding Self-Reflection in the Educator HERF Dimension

Comment Category	Prompt Questions
Physical Attributes	• Did I speak clearly, at the right pace, and at an appropriate volume? • Did I look competent in my teaching?
Motivation	• How was my motivation to teach? • Was I comfortable letting go of control of my class?
Emotions & Emotion Regulation	• Did I engage in effective emotion regulation? • How did I feel at the end?
Metacognitive Awareness	• Did I understand which strengths and weaknesses affected my teaching? • Was I aware of the teaching techniques I use?
Pedagogical Self-Knowledge	• How did I respond, both inwardly and outwardly, when challenged? • Which resources and strategies did I favor, and which did I ignore? • What can I do to make myself more aware of my thinking and emotions?

Note. Self-reflective comments falling under categories in the "Educator" Dimension relate to the teacher, who will be using the tool to engage in self-reflection.

We surmised the HERF could suggest other items— it seemed to have pulled participants away from distracting self-conscious physical traits. The empirical findings also suggested the additional metacognitive awareness facet, as participants spontaneously mentioned what they thought during the microlesson. In this way, the educator dimension represented the top-down/bottom-up. We will discuss the five categories within the educator dimensions: physical attributes, pedagogical self-knowledge, metacognitive awareness, emotions and emotion regulation, and motivation.

Physical Attributes

This sub-category reflects educator physical attributes, including verbal (speech and voice tone) and non-verbal (appearance, facial expressions, gestures, posture, body movement, and eye contact) behaviors critical to the teaching-learning act.

Verbal communication. Effective verbal communication includes more than talking, it also constitutes message delivery and receipt. According to Bambaeeroo and Shokrpour (2017), educators should deliberately select vocabulary that delivers the concept clearly, concisely, and accurately. A great communicator should display intentions to the audience (Najafi & Rahmanzade, 2013). Clear speech, language structure, and pragmatic etiquette aid verbal communication. Speech's TBI factor highlights the verbal attributes an educator needs to recognize. Johnson (1999) noted despite standard English representing principal communication, some students may not functionally communicate in it. On these occasions, educators must recalibrate their teaching, adapting to the student's linguistic level to help material understanding or perhaps engage in code-switching.

Non-verbal behaviour. Verbal and non-verbal communication are interrelated because both emphasize or clarify speech. Balzer (1969, cited in Steele, 2010, p.73) professed non-verbal communication provides close to 75% of an educator's classroom management, whereas, according to Miller (1988), as much as 93% of classroom conversation is non-verbal. Consequently, educators must recognize non-verbal behavior, which Steele (2010) divided into four theoretical categories: proxemics, coverbal behavior, paralanguage, and appearance (Brooks & Wilson, 1978; Rashotte, 2002; Woolfolk & Galloway, 1985). Proxemics embodies the speaker's distance from the audience and the use of physical space, and coverbal behavior refers to gestures and corporeal signals needing interpretation. The TBI places these aspects under

enthusiasm. Paralanguage's third category deals with the behavioral attributes supplementing speech, like tone or rhythm (pitch, regularity, volume), as situated under the TBI's speech category. Finally, non-verbal appearance refers to cultural aspects like appeal, fit, and clothing (Herbon & Workman, 2000). The TBI does not consider this item, but several psychologists have agreed a large portion of what people remember about an encounter relates to overall appearance and demeanor. Exceptionally accurate in postsecondary education, adult students notice and expect professionalism.

Simončić (2016) illuminated physical appearance biased university students' opinions and affected their educator perceptions (Peng, 2011). Understanding the impact of non-verbal behavior on learning remains significant to educators; they need to realize its influence on the learner. Love and Roderick (1971, cited in Steele, 2010, p.72) highlighted this aspect after realizing nonverbal cues, most educators changed their practices.

Pedagogical Self-Knowledge (Epistemology/Ontology)

Epistemology refers broadly to an individual's view about knowledge and knowing (Barger et al., 2016; Feucht et al., 2017; Hofer & Pintrich, 2012), while ontology engenders philosophical conceptual analysis, concentrating on reality perceptions (Bishop & Durksen, 2020; Hall & Cunningham, 2020; Samarji & Hooley, 2015). In education, epistemology predominantly includes pedagogical planning, organizing, and knowledge delivery, while ontology informs the educator's beliefs and perceptions based on the organization, knowledge, and best practices understanding. This subcategory revealed the reflection on the educator's epistemology and ontological assumptions.

Metacognitive Awareness

Metacognitive awareness implies educators can reflect on and enhance learning (Squier, 2016). Educators maintain metacognitive control while remaining aware of executive attention, connecting metacognitive knowledge and attention to update their working memory. Scholars have postulated educators can enhance metacognitive awareness to improve performance and act strategically during a learning event (Rivers, 2021). Researchers have contended self-knowledge remains fundamental to metacognition (Cheng & Chan, 2021b; Flavell, 1979). Educator flexibility depends on recognizing cognitive qualities and adapting them to improve pedagogy. This self-awareness allows educators to alter their teaching strategies according to learner needs. Awareness in metacognition constitutes educator mindfulness: remaining cognizant of the goals and why they pursue them. They must consider how they intend to achieve objectives and adapt skills contextually. Educators without metacognitive awareness perceive their role as limited and transmit this to their learning environment.

Emotions and Emotion Regulation

In education, emotional understanding and regulation remain essential: they are the core of the teaching and learning environment (Chen, 2016, 2021; Muis et al., 2018; Taxer & Frenzel, 2015). According to Pekrun and Linnenbrink-Garcia (2014), the educator does not merely transmit concepts to students; a great educator must express passion for the discipline and pass on an eagerness to learn. If they do not stimulate this curiosity, they could stifle student motivation. Starting from this assumption, teachers must recognize their emotions. Judicious emotional control remains critical for educators (Lee & Yin, 2011; Muis et al., 2018; Taxer & Frenzel, 2015). Educators face divergent emotional needs: Educators must mindfully manage their emotional sphere to teach and build positive relationships (Lee & Yin, 2011). As a

framework subcategory, while maintaining *savoir-faire*, educators must approach and accept their emotional experience, handling unpleasant and distressing emotions.

Motivation

Educator motivation directly affects classroom effectiveness (Han & Yin, 2016). Sinclair (2008) defined educator motivation as attraction, training, professional commitment, engagement, and, pedagogy in courses, students, peers, and the teaching and learning environment. Motivation, not merely an internal construct, plays a vital role in student motivation (Neves de Jesus & Lens, 2005; Neigel et al., 2017). It influences teaching effectiveness, style, quality, and practice. Each educator motivation factor directly affects pedagogical instruction. Consequently, this impacts student learning objectives and outcomes (Flitcroft & Woods, 2018; Han & Yin, 2016; Neigel et al., 2017). Hein et al. (2012) positively correlated motivation to an effective teaching style, focusing on student needs. Non-autonomously motivated teachers frequently use reproductive teaching strategies, not centering on the student. As a subcategory, educator motivation impacts teaching choices in style, student and peer interactions, lesson structure, assigned projects, and evaluation.

Teaching

Teaching does not solely entail entering a classroom and lecturing students. Educators engage in many meaningful activities fostering learning. The teaching dimension encompasses pedagogy, highlighting a learner-centered teaching environment. The educators' approach to teaching spans philosophy to knowledge, including preparing for knowledge exchange, various teaching techniques (discussion stimulation and using concrete examples and case studies), managing the session, and assessment. Reviewing the commenting categories and questions under this dimension will be done in the following section (see Table 4).

Table 4

Prompts for Scaffolding Self-Reflection in the Teaching HERF Dimension

Comment category	Prompt questions
Presentation Abilities	• Was I relaxed and confident? Fluency and competency? • Did I encourage my audience to ask questions? • Was I overly dominating in any way?
Presentation Quality	• Was my presentation concise and informative? • Was the material delivered in a clear and structured manner? • Were the visual aids in my presentation effective, and did they complement my verbal predictability? • Did the presentation contain practical examples and techniques?
Activating Students' Prior Knowledge	• How did I activate my students' prior knowledge? • Did I miss any opportunities to do so?
Teaching Plans	• Did I have specific learning outcomes and strategies for teaching and assessment? • Did I provide an overview, summary etc.?
Instructional Techniques	• How was my collaboration with the class? • Did I activate two-way communication? • Did I successfully break down complex structures and processes?
Philosophy of Teaching	• How was my teaching informed or shaped by my teaching philosophy?
Session Management	• Did I reach my session objectives and teach to the learning outcomes I had planned? • How were my class management skills?
Assessment	• Did I assess my students' learning? • Will students have the opportunity to correct their work?
Time	• Did I have enough preparation time with the material prior to the class? • Did I plan and use the session time well?

Colton and Sparks-Langer (1993) discussed the pedagogical approach, translating theories and broad techniques generically used in teaching. Furthermore, Colton and Sparks-Langer (1993)

highlighted students' past experiences, ranging from educational history, educator experiences, the content they have engaged in, observations of others, and previous student discussions.

In terms of the empirical data that we collected, teaching was the most common reflection dimension engaged in. When we gave participants the framework, we found they produced significantly more self-reflection within the teaching dimension than their non-scaffolded counterparts. We also found the scaffolded group expanded the number of categories they mentioned within the teaching dimension in their self-reflection, partially because they were not commenting as much on their physical attributes. That is, having the framework helped them to go from focusing on themselves as an entity to focusing on the actions of teaching.

Teaching and Learning Philosophy

An educator's teaching and learning philosophy describe pedagogical values and beliefs (Levin, 2014; Pajares, 1992). Educators develop standards and principles based on knowledge and experiences to form pedagogical understanding (Barendsen & Henze, 2019; Pajares, 1992). The philosophy addresses student goals and content and selecting a presentation style. Matching content to student needs makes the student feel comfortable, and interacting and participating embody the primary teaching philosophies elements. The educator's teaching philosophy expresses the reasons behind choices. This framework considers this sub-category particularly relevant. While recognizing pedagogical values and beliefs, educators must understand classroom needs, setting good aims and appropriate learning levels. Thus, they must adapt teaching styles to create a meaningful program for student success.

Activating Student Prior Knowledge

A classroom does not offer a neutral setting because students bring their personal beliefs and previous experiences. This prior knowledge impacts learning and scholarship (Cheng & Chan, 2021a; Rodgers et al., 2022; Thompson & Zamboanga, 2003). Researchers have confirmed prior knowledge's role in helping students achieve goals (González & Skultety, 2018; Thompson & Zamboanga, 2003). Knowing students background remains vital because past experiences influence educational progression. Educators must consider background experiences not as a requirement but as a starting point. According to the seminal work of Vygotsky (1978), the educator sets a zone of proximal development (ZPD), where an supports student learning beyond the progress learners could achieve alone. The educator understands prior student knowledge and the scholarship range (Glogger-Frey et al., 2018; Hailikari et al., 2008; Saxena, 2017). Diversity embodies another integral factor. A diverse student population, containing immigrants, young and mature students, and lifelong learners, brings a mix of prior (sometimes advanced) knowledge. This dynamic makes it imperative for educators to develop teaching practices in which they are sufficiently aware of student backgrounds (Sheets, 2009). When developing teaching material, Campbell and Campbell (2009) found most educators focused closely on content and paid minimal attention to linking pre-existing knowledge, affecting student learning, where they either failed to acquire new knowledge or misunderstood it.

Colton and Sparks-Langer (1993) emphasized prior experiences under the heading of influences on interpretation. In contrast, in the TBI, this subcategory reviews earlier presented material addressed at the beginning of class. This framework recognized this sub-category, suggesting educators reflect on activating prior student knowledge. Teachers could teach through debates, examples, material, and tests to deal with the student’s previous learning.

Presentation Abilities

Every educator employs a range of abilities in the classroom, including crucial content presentation. Researchers have illustrated learning suffers if the educator does not present the content lucidly (Khan & Ghosh, 2016). This sub-category closely intertwines with the physical attributes subcategory. Physical attributes, like body language, verbal and non-verbal behavior, affect educator presentation. However, this category focuses explicitly on classroom presentation. According to Martin and Lueckenhausen (2005), high-quality university teaching requires aggregating topic expertise and an emotional range, including enthusiasm. Other experts have also asserted that knowledge and subject expertise positively influence self-confidence and external educator perception (Åkerlind, 2007; Burdick & Hallman, 2021).

Although the educator selects various materials based on the learning activities, the focus remains on the presentation in this subcategory. It also regards educator verbal skills, preparation, confidence, body language, and interpersonal skills (engaging learner interest, enthusiasm, humor, and spontaneity). In the TBI, multiple factors encompass this subcategory: clarity, enthusiasm, interaction, organization, pacing, and speech. This framework addresses this sub-category, suggesting educators reflect on how they could present the content skillfully and knowledgeably, keeping it succinct, well-timed, and executed while keeping learners and their needs in mind.

Presentation Quality

Educators must customize teaching and learning according to the classroom and its composition. Good technical knowledge and well-thought-out design allow educators to explore possibilities, personalizing the lesson depending on learner interests, concerns, and levels (Bates, 2019). A custom-made lesson involves students. Factors such as visual aids could represent a

valuable vehicle for complex concepts, but with a diversified, exciting style, they also capture student attention. According to Roksa et al. (2017), student motivation and engagement directly connects with perception of a clear, organized lesson and educator engagement and commitment. In this way, learners can understand their capabilities and optimize them. On this basis, a good educator organizes lessons attentively, considering style. The sub-category presentation quality concentrates on the content chosen, selecting the best method to present it, educator attributes, and the exhaustiveness of the presented material. In the TBI, multiple factors comprise this subcategory: clarity, enthusiasm, interaction, organization, pacing, and speech. This framework incorporates this sub-category, suggesting educators reflect on their presentations, concentrating on structure, visual appeal, pace, and delivery inclusiveness.

Teaching Plans

Lesson plans schedule goals and timing to organize the teaching session (Whitton et al., 2010) while providing educators with a purposive map to lead students (Vdovina & Gaibisso, 2013). Hence, the teaching plan comprises a document in which the educator establishes a single lesson structure with a sequential plan in which the educator details the timing, content, and resources necessary for cohesion. Scholars have purported lesson plans remain unique, varying among educators. Lesson plans mirror interpretations, beliefs, expertise, methods, and materials and reflect an awareness of prior student knowledge and abilities (Moore-Cox, 2017; Yonkaitis, 2020). According to Ruys et al. (2012), planning elicits an awareness in educators, forcing them to reflect on the lesson content, teaching strategy, and self-evaluation. The teaching plan also tries to predict which complex topics could kindle questions in learners, generating further deliberation to plan possible answers and programmatically alleviate doubts. A good lesson plan benefits the organization and manages session time. It should include overarching course goals,

related teaching, learning activities schema, and an evaluation moment programmed to inquire into student outcomes and doubts (Moore-Cox, 2017; Vdovina & Gaibisso, 2013; Whitton et al., 2010; Yonkaitis, 2020).

In the TBI, multiple factors constitute this subcategory, like clarity, interaction, organization, pacing, and disclosure. This framework dealt with this sub-category, recommending educators reflect on planning effective classroom sessions based on well-defined objectives, clearly stated learning outcomes, prior knowledge assessment, pre-testing, and session closure, followed by a knowledge acquisition assessment or evaluation.

Time

Time in the educational context engenders teaching and preparation (Assude, 2005; Leong & Chick, 2011; Neumann, 2001). According to Simkins et al. (2009), time and speed measure learning progress; educator didactic activity also depends on them. Assude (2005) asserted didactic time results from a broader process, transforming personal knowledge into content others can share, teach, and learn. Bowen and McPherson (2016) asserted that educators must set up a learning environment where students can learn effectively, requiring material planning, strategies, and timing. Prior knowledge activation, resource availability, session objectives (content and structure), teaching method, assessment type, and feedback influence the time required to prepare and deliver the class (Cox, 2017). Eggen and Kauchak (1988) concluded lectures remain widely prevalent due to their effectuality, as observed when emphasizing time management while preparing a class. Subsequently, educators often overlook teaching strategies promoting efficient learning. Experts have demonstrated active learning, such as interactive or multi-modal learning, enhances critical thinking. However, Bucklin et al. (2021) weighed in lectures save professors' time due to straightforward, quick execution, alleviating planning,

preparation, execution, and revision. Akın et al. (2016) further emphasized the complex time management educators grapple with during active learning. Giving students additional time to reflect and investigate remains fruitful, but unpredicted divergency could derail the teaching plans and learning goals. Educators should track the time, reign in diversions, and draw conclusions. These issues often push educators to choose time-saving, static, and controlled lessons, compromising quality and enthusiasm (Bucklin et al., 2021; Song, 2015; Wang, 2011). In the TBI, multiple factors highlighted this subcategory, whereas this framework addressed this sub-category, urging educators to allocate time to reflect on the strategies to convey content and achieve learning goals. It also underlines prioritizing and managing the lesson according to teaching plans.

Instructional Technique

Technique while teaching holds equal importance to the subject matter. Educators tend to prefer teaching styles based on their teaching philosophy. A mindful approach toward teaching style can bolster one's approach, boosting student engagement. Successful learning mixes strategies appropriately within one's teaching approach to disseminate the content effectively. Several teaching styles have emerged (Persaud, 2019; Vaughn & Baker, 2001, 2008; Vermote et al., 2020). Bibace et al. (1981) identified instruction models as assertive, suggestive, collaborative, and facilitative, defined according to centrality— teacher or student. Grasha (1996) highlighted five teaching models with a similar progressive distinction: expert, formal authority, personal model, facilitator, and delegator. Similarly, Mohanna et al. (2007) categorized six teaching approaches: general, big conference, no-nonsense, official curriculum, one-off, student-centered, sensitive, and straight facts.

This style range connects to the educator role and personal temperament. Before selecting the method, an educator must consider various factors: learner background and capability, quality of relationship with learners, setting, and audience conceptual level (Persaud, 2019; Vaughn & Baker, 2001). An educator-based style following individual preferences and attitudes could hinder learning. An engaging, mixed approach based on student learning remains best (Vaughn & Baker, 2008). However, according to Vaughn and Baker (2008), educators' default to their preferred teaching pattern during chaotic conditions. In the TBI, all eight factors encompass this subcategory, considering pedagogy depicts educator teaching style. This framework encompassed this sub-category, indicating educators reflect on how their instructional technique can create mutual learning, focusing on classroom learning strategies.

Assessment

Assessment, well-established as core to learning (Evans, 2013; Gikandi et al., 2011), validates knowledge acquisition, offering feedback and support towards adapting and improving instruction (Broadbent et al., 2018; Evans, 2013; Gikandi et al., 2011). The two evaluation forms, summative and formative, concentrate on learner needs. Summative assessment appraises meeting documented standards leading to an outcome or grades (Broadbent et al., 2018; Gikandi et al., 2011; Hattie et al., 2011). Due to infrequency, a whole assessment event should compare learners and provide educators feedback on course quality (Andrade & Cizek, 2010; Broadbent et al., 2018; Hattie et al., 2011; Wisniewski et al., 2020). On the other hand, formative assessment entails intervals (as opposed to cumulative). The feedback helps revise and improve the learning process (Andrade & Cizek, 2010; Bennett, 2011). Researchers have contended formative assessment improves student performance and prompts independence, improving self-regulated learning and self-efficacy (Andrade & Cizek, 2010; Bennett, 2011). According to

Gibbs and Simpson (2004), educators inwardly know the significance of assessment in their work. They remain aware it occupies the most significant learning facet, asserting evaluation offers the utmost scope for improvement. Revaluating assessment strategies can improve teaching. In the TBI, this subcategory comprised multiple components, like interaction, organization, pacing, and disclosure. This framework addressed this sub-category, recommending the educator reflect on how to make assessments to identify and respond to the student learning needs, adjusting to advance learning.

Session Management

Often compared to a presentation, a teaching session markedly differs from a significant educator-learner interaction, and the final result expects the learner to acquire the knowledge presented (Eilks & Byers, 2015; Millard, 2000; Nicholls, 2002). Heinich et al.'s (1999) ASSURE model, originally developed as a guide to plan and deliver teaching sessions, integrates technology and media sources (Smaldino et al., 2019). However, educators implement ASSURE generically as a session planning and management tool (Kim & Downey, 2016; Smaldino et al., 2019). The model consists of six stages: audience analysis of the goal and required standard-setting, appropriate strategy and source selection (technology, media, and materials), technological tools use, student participation requirement, and evaluating and reviewing of the process (Smaldino et al., 2019). This session management subcategory concentrates on reflecting on the teaching session. The educator engages with the learner, activating prior learner knowledge and engaging with new content. Session management primarily focuses on transferring knowledge and achieving learning outcomes. Finally, the educator reviews and analyzes the session to improve practice (Nicholls, 2002). In the TBI, multiple factors comprise this subcategory: clarity, interaction, organization, pacing, disclosure, and rapport. This

framework addressed this sub-category, urging the educator to reflect on the achievement of session objectives and pre-planned learning outcomes. Furthermore, the framework guides educators through time management reflection, integrating teaching material, session structure, learner engagement, and pedagogical adaptation.

Learner

The learning process is not only dependent on the teacher and their teaching, but learners also take an active role, reading new content, interpreting it according to their cultural background and experiences, and learning preferences, in conjunction with auxiliary facets, to make the concepts meaningful and sustainable (Blumberg, 2016; Colton & Sparks-Langer, 1993). Colton and Sparks-Langer (1993) noted educators need to remain cognizant of and appreciate prior experiences. In our empirical research, we found participants engaged in about 50% of the categories, and we did not find any significant effects of giving the participants the framework. However, we did discover in the qualitative questioning at the end of the study, many participants mentioned they had not thought about the importance of the learner during their reflection. This system deals with the subject and content, establishing student comprehension. Ideally, it aims to produce comprehensive, active, meaningful, and measurable knowledge (Anderson & Krathwohl, 2001). Here we will review the commentary categories and prompts under this dimension (see Table 5).

Learner Characteristics

Before engaging with students, the educator usually informs themselves about the target group. Learner knowledge acquisition requires a smooth amalgamation of educator pedagogy, disseminated content, and learner characteristics.

Table 5

Prompts for Scaffolding Self-Reflection in the Learner HERF Dimension

Comment category	Prompt questions
Learner Characteristics	• Did I meet my students at their level? • Was I able to scaffold students who have fallen behind? • Were my expectations of my students realistic? • Did I cover content based on my student's understanding?
Learner Needs, Motivation & Goals	• Did I have an understanding of the needs of the students? • Did I motivate or lose my students? • Did I help my students become independent learners? • Did I identify what was essential to the student's learning?
Learner Support & Mentorship	• Do I have evidence that my students feel supported in my class? • Will I need to support or mentor students outside of my formal class?

Note. Self-reflective comments falling under categories in the "Learner" Dimension relate to the individual(s) in the role of learner.

Educators must know learner traits to tailor student-specific instruction. They could also design efficient, customized lesson material considering these individual features. Drachsler and Kirschner (2012) purported varying learner attributes can involve personal, academic, cognitive, emotional, and social features, deepening each. Personal characteristics, i.e. age, gender, maturation, language, and economic or cultural background, indicate the information linked to learner demographics. Such characteristics encompass individual needs and disability or skill challenges. When detailing personal traits, learner diversity comes to the forefront. Educators must cater to classroom diversity: Learners can possess various standards, skills, and expertise. Drachsler and Kirschner (2012) emphasized academic characteristics focus on student education and learning backgrounds. Educators must set individual and group learning to target the appropriate educational program and level.

Social and emotional characteristics affect student classroom relationships, sociability, agency, and self-image. Finally, educators must consider students' cognitive characteristics. Attention, memory, reasoning strategies, and mental capabilities establish how a student can remember and re-elaborate concepts, illustrating the educator must attend to how learners store and use information. This framework addressed this sub-category, suggesting educators reflect on how they inform themselves about student understanding and project the instructional program tailored to learner needs. The professor can design efficient lessons based on learner traits, set realistic expectations, and support learner diversity.

Learner Needs, Motivation, and Goals

Educators must support learner needs, narrowing the gap between actual knowledge, skills, passion, and learning goals (Baran, 2021; Minderhout, 2007). Diversity is required in instruction, and educators must keep in mind every student and educational situation, which requires a distinct strategy congruent with learner skills and motivations (Alamri et al., 2020; Minderhout, 2007). Collecting student needs helps with lesson preparation, as educators can use these data to customize educational material and set reasonable learning goals (Watson & Watson, 2017). This discussion about learner needs facilitates designing a reliable course and ensures educator feedback. Along with learner characteristics, the learners' needs and motivations affect course projections. Good motivational strategies should shift learner priority from external rewards (grades and qualifications) to inner motivation (Watson & Watson, 2017). An educational approach must prioritize students and subjects, not quantitative, extrinsic outcomes (Daskalovska et al., 2012). Hence, educators must know why the learners decide to take courses, what attracts curiosity, and student expectations and primary interests (Alamri et al., 2020; Watson & Watson, 2017). The prompts in Table 5 engender this procedure.

Educators need to also consider learning goals. Learning goals vary. Some student groups respond to a mixed-goals approach, merging short and long-term aims, but other classrooms require a specific, focused goal to pursue pre-fixed outcomes (subject-area goals). Working through short-term goals allows educators to parse the program, incrementing measurable accomplishments. Long-term objectives require a more complex strategy with expected achievements throughout the academic year or semester. Linear subject-area aims direct the problem because educators and learners detect particular subject issues and collaborate to prioritize them. Then, subject-area milestones become specific, where achievement could improve grades in a particular unit (Marzano, 2010).

A specific knowledge objective refers to personal knowledge; it could comprise a topic a person wants to explore, a skill, or an analytical concept. This goal accommodates tailored learning. Educators must investigate students' genuine, passionate interests to customize and enhance lessons (Hansen, 2020). Based on this, they can also imagine unit deepening or even putting the students in the condition to teach colleagues autonomously, giving them a lesson to prepare. Within this framework, the educator can reflect on understanding learner needs and motivation and their origins, what motivates course attendance, and learning experience expectations. Moreover, professors can tailor pedagogy when they comprehend educational objectives.

Learner Support and Mentorship

The learning environment must remain inclusive, inviting each member to contribute. Therefore, educators must convey an authentic, supportive culture through mentorship and supporting students. Online discussion can assist, where learners can find valuable resources from peers and externalize concerns. This framework incorporated this sub-category,

highlighting educators reflect on the steps to create a favorable, supportive learning setting to foster learning. They can also reflect on the advisory role in the learning community and improve their mentoring.

Learning

The learning method was at the center of Keefe's study (1985), whereas Dunn et al. (1985) fixated on knowledge actions and replies. Riechmann and Grasha (1974), on the contrary, considered the social environment of the learning experience, observing student social behaviour in the class (Jonassen & Grabowski, 2012). Colton and Sparks-Langer (1993) discussed this dimension as an ideal learning relationship providing effective student progression through ZPD. As part of an educators' professional knowledge base, they pointed out how teaching unites generic approaches and paradigms pertinent to any topic and content comprehension. The latter aspect requires portraying ideas and student content-specific concepts accurately. In our empirical work, we found participants engaged in about half of the categories in the learning dimension. This result did not significantly change when participants had the framework, revealing educators may need additional scaffolding to engage with these categories. The following section reviews the categories and prompts that fall under this dimension (Table 6).

Table 6

Prompts for Scaffolding Self-Reflection in the Learning HERF Dimension

Comment category	Prompt questions
New Knowledge Consolidation	• Did I review new material along with older material? • Did the way I teach reinforce the understanding of new ideas?
Experiential Learning	• Did I incorporate a pattern of inquiry to think and solve problems while still involved in the experience?
Student Feedback	• How effective was I at providing feedback to my students? • Were my students allowed to provide me feedback? Was I receptive to it?

New Knowledge Consolidation

Dale (1969, as cited in Boctor, 2013) asserted, "people learn 10% of what they read, 20% of what they hear, 30% of what is demonstrated, but 90% when what is said and done is combined" (p. 97). Dahlborg (2022) detailed this assumption, comparing the theoretically-introduced student outcomes with the concept comprehension of a student who uses it practically. The distinction between knowledge and facts, theoretical and practical skills, relates to the learning process. Improving learning, controlling the learning experience, and efficiency awareness remain paramount. Hence, educators must push learners to link concepts with their personal experiences to absorb them. Another principal element of consolidating new student knowledge entails reminders, beneficial to long-term memory. Research on periodic reminders of previous information-optimized memory integrating participant knowledge in controlled studies (Barber et al., 2008; Blessing et al., 2012; Karpicke & Roediger III, 2008). Rapid classroom technology deployment could emphasize core concepts from previously learned content, consolidating learning and content recall. This framework addressed this sub-category, recommending the educator reflect on how they review the new material to support its learning and internalization when choosing the appropriate stimuli and memorization strategies.

Experiential Learning

Experiential learning resides in the methodical reflection of previous experiences. It embodies active learning, where students can learn through experience (Alvi & Gillies, 2021). Experiential learning allows learners to be actively involved in the whole process and to emotionally, cognitively, and affectively bond with the concept (Heinrich & Green, 2020; Heinrich & Rivera, 2016). Various approaches to HE experiential learning have emerged (Kurthakoti & Good, 2019), including learning strategies like role-playing, games, case studies,

simulations, presentations, and group work. Each engenders a specific interactive modality to improve learning (Budhai, 2017; Kurthakoti & Good, 2019). HEEs must employ experiential strategies, realizing possibilities to enhance cognitive, behavioral, emotive, and social results (Kolb, 2014). Educators must detect the specific needs of the learning community to choose suitable programs and content to frame the activities and foresee issues to create efficient experiential learning (Wurdinger & Allison, 2017). Educators should initially define parameters, plans, and learning goals. Experiential learning allows students to link theory with practice when learners face actual situations. This connection with real-life stimulates student interest, so they perceive the tasks as activities and not as assigned, impersonal work (Wurdinger & Allison, 2017).

The educator in the experiential classroom differs from the traditional one. The educator mixes various skills in the experiential classroom, becoming a guide, a cheerleader, a resource, and a supporter (Wurdinger & Carlson, 2009). According to Fink (2013), experiential teaching facilitates acquiring and memorizing concepts. This framework dealt with this sub-category, urging educators to reflect on session modeling to reinforce theoretical concepts using practical examples and appropriate activities. It also directs attention towards their role and the support they provide.

Student Feedback

While learning, feedback remains pivotal. This final phase allows educators to understand learner efforts and outcomes, guiding learning (Hattie & Timperley, 2007). Researchers have indicated feedback as cyclical, constructive communication leading to the learner positively attempting to bridge the gap between actual and projected performance. This process involves re-evaluating outcomes and performance to ascertain learning accomplishment,

narrowing the disparity. (Boud, 2015; Boud & Molloy, 2013; McGinness et al., 2020). Continuous and interpersonal dialogue between learners and educators demonstrates feedback usefulness because it monitors learning methods' evolution and efficacy and eventually adjusts for weaknesses. Furthermore, educators should improve classroom motivation and interaction (Boud, 2015; Hattie & Timperley, 2007; McGinness et al., 2020). This framework addressed this sub-category, suggesting educators reflect on feedback, comments, and relational responses to the students, assessing mutually beneficial efforts and outcomes.

Content

Lesson content comprises a core element in the learning process, broadly dealing with objective, evidence, and creative ideas or processes. Educators know their subjects and discipline practices (Kavanagh et al., 2019). They spent much time designing a program and selecting sources and materials. Several occasions arise where educators cannot decide the lesson topic because the government, accreditation agencies, or professional licensing boards establish a curriculum to which the educator must adhere (Bain, 2006). These mandates could cause pressure and stress, pushing educators to check if they follow guidelines. Educators must have vast subject knowledge to differentiate programs and content according to student needs, skills, and competencies (Colton & Sparks-Langer, 1993). Experts have confirmed quality teaching maximizes student achievement (Hattie, 2015). In our empirical work, we found that participants did not engage very often with this dimension, and giving them the framework did not increase category use. Of course, this could have been artificially affected by the laboratory setting of the study. We elaborate on the ecological validity in the general discussion. The sections that follow will go through the many categories and prompts that belong under this dimension (see Table 7).

Subject Matter Knowledge

Educators must understand and convey the content to students (Kavanagh et al., 2019). Overall, understanding the lesson's content does not just entail knowing about concepts—it also includes the capability to organize those concepts meaningfully (see Loewenberg Ball et al., 2008). Shulman (1986) argued content knowledge includes facts, theories, and evidence.

Table 7

Prompts for Scaffolding Self-Reflection in the Content HERF Dimension

Comment category	Prompt questions
Subject Matter Expertise	• Did I have sufficient knowledge of the content I was teaching? • Did I select effective materials for teaching the content?
Task Knowledge	• Was I successful in my use of the instructional materials? • Did I make complex topics easier to comprehend? • Was I able to customize my teaching to the context and the audience?
Content Choice	• Was I comfortable with the assigned content? • Did I feel any mismatch between the content and the real-world applications?

Educators must also understand the organizing subject principles to determine the best approaches to deliver items practically. They must establish what is suitable to be taught and prioritized. Additionally, a good educator must know the critical discipline topics and peripheral elements. According to Diezmann and Watters (2015), educators with deep subject knowledge tend to focus on systems and underlying concepts rather than on content effectively implement inquiry learning. In contrast, educators with superficial subject matter knowledge emphasize isolated concepts and adopt transmissive, static teaching, compromising engaging, inquiry-oriented lessons (Trigwell, 2011). Substantial content knowledge can positively impact

pedagogy. Alexander (2003) tried to define expertise, professing it integrates domain and strategic knowledge with a strong subject interest. Educators must comprehensively know all education dimensions (domain knowledge), content purpose and importance (strategic knowledge), and passionate intrinsic interest. According to Kavanagh et al. (2019), content knowledge embodies student learning, an educator's assumption. This achievement involves more than knowing facts, for it requires educators to put content into practice and dynamically cooperate with learners.

Task Knowledge

Shulman (1987) identified pedagogical content knowledge (PCK) as one of seven categories of teachers' knowledge base, defining it as "that special amalgam of content and pedagogy that is uniquely the province of teachers, their special form of professional understanding" (p. 8). PCK, a principal teaching expertise component, epitomizes unique knowledge involving what educators know about their subject (content knowledge) and what they know about teaching (pedagogical content knowledge). Shulman (1987) highlighted how educators must make content understandable to learners, knowing the challenges of their subjects (Shulman, 2015).This pedagogical skill involves educator concern about student preconceptions, pushing them to plan strategies to overcome them. Loewenberg Ball et al. (2008) differentiated content and pedagogical content knowledge: knowing much about the subject does not correlate to transmitting this knowledge. Coe et al. (2014) evidenced PCK as a critical element in effective teaching. Researchers have revealed a correlation between educator content knowledge and student response to knowledge (PCK). Additionally, variable PCK urges educators to keep the learners' responses in mind, including misconceptions. More importantly, Shulman (1986) highlighted two essential PCK elements: educator cognizance towards specific concepts and

possible hurdles to acquiring these theories and knowledge and experience executing various teaching strategies to clarify that concept (Barendsen & Henze, 2019). This framework addressed this subcategory, recommending educators reflect on a clear vision of disseminating, segmenting or subdividing content using appropriate examples and covering specific material segments based on learner understanding.

Content Choice

Choosing the right content is challenging because societies transform and develop over time and teaching locations (Gulliksen & Hjardemaal, 2016). Savage et al. (2006) categorized the learning the educators wish to encourage in particular frameworks for specific students, highlighting the need to assess the educational content for significance. Klafki (2000) elaborated on the prospect of certain content considered imperative due to student demographic needs or its historical and cultural significance (Gulliksen & Hjardemaal, 2016). Educators need to remain cognizant of anticipated changes that may influence content validity. Several scholars have unveiled a mismatch between the knowledge and know-how of graduates and the actual applications and tasks the job market proposes (Puckett et al., 2020; Pujol-Jover et al., 2022). Hence, educators must cover the content and impart up-to-date knowledge to foster student learning. This framework incorporated this sub-category, indicating the educator reflect on content selection while following the required guidelines and addressing the educational value and future real-world applications.

Context

Educators work within the context. The educational setting includes the physical, social, and personal aspects affecting teaching and learning (Colton & Sparks-Langer, 1993; Oleson, 2021; Rink, 1997). The classroom environment engenders the relationship between students and

educators, so classroom context impacts. Fluctuating contexts about the policies, practices, and group norms within which knowledge is imparted influence the ever-changing learning process. Additionally, the individual differences between educators' learner-specific variables (skills, socioeconomic status, cultural background, racial profile, learning amenities, equipment availability) impact the context (Colton & Sparks-Langer, 1993). In our empirical work, we discovered participants rarely engaged in the context dimension, which we assume to be a side effect of the laboratory setting. In an actual classroom, it would likely be of significant consideration. The next sections will elaborate the many categories and prompts that fall under this dimension (see Table 8).

Physical Learning Environment

The overt classroom setting constitutes knowledge exchange through teaching and learning (Oleson, 2021; Strange & Banning, 2015). Researchers have identified factors such as acoustics (Zannin & Zwirtes, 2009), infrastructure (Bolden III et al., 2019), resources (Oleson, 2021), lighting (Krüger & Zannin, 2004), technology (Martínez-Gautier et al., 2021), temperature (Cheryan et al., 2014), groups categorization, daily schedule, routine timings, and day of the week that can impact knowledge acquisition (Baafi, 2020; Jacob & Rockoff, 2011). Experts have explored the physical environment, emphasizing class composition, size, and management. Seat management affects learning (Oleson, 2021). Manipulating the physical classroom space can facilitate effective learning (Strange & Banning, 2015). Additionally, any physical learning setting needs to offer a safe learner platform, providing support, appreciation, and involvement (Oleson, 2021; Strange & Banning, 2015). This framework dealt with this sub-category, urging educators to reflect on the physical setup, the environment, technology, audio-visual support, and other physical aspects influencing learning.

Table 8

Prompts for Scaffolding Self-Reflection in the HERF Context Dimension

Comment Category	Prompt Questions
Physical Learning Environment	• What was the classroom environment like? Did it support my teaching approach? • Were audio and visual materials well designed and intentional?
Social Learning Environment	• Was there energy in my class? • Did the learning environment reflect respect for diversity? • Did I explain any ground rules I expect people to follow in my class? • Was I able to create the dynamics I wanted between students and myself? And among the students? • Did I encourage my students by celebrating successful learning?
Personal Learning Environment	• Did I pick up any new ideas about teaching in general or in teaching this material? • Did any new factors facilitate (or impede) learning? • Did I learn anything new? • Did I unlearn anything old? • Did I realize anything else I would like to learn?

Social Learning Environment

A positive classroom social environment fosters learning (Pickett & Fraser, 2010) based on the social actors in the learning setting. It includes the dynamics between the educator and the learners and among the learners themselves. Cultural norms and relationships play a social role, especially when fostering learning. Age, attitude, cultural background, ethnicity, gender, and socioeconomic status affect the social learning environment (Jindal-Snape & Rienties, 2016; Schwarzenthal et al., 2018). A positive social environment must appreciate diversity and difference, and display characteristics of inclusivity (Hymel & Katz, 2019). Furthermore, a positive learning setting can facilitate an equal and collaborative culture wherein clear

expectations and a code of conduct are practiced (Jindal-Snape & Rienties, 2016). Building healthy relationships to which learners contribute also enhances results (Fraser, 2012). Organized classroom management requires discipline, but coercive strategy refusal remains equally vital (Freiberg et al., 2009). This framework addressed this sub-category, suggesting educators reflect on classroom cultural norms and interpersonal relationships while recognizing learner differences in gender, age, social class, and ethnicity. They must also reflect on strategies to create a healthy social learning environment.

Personal Learning Environment

Besides creating a positive physical and social context, the critical ability necessary for becoming a successful educator epitomizes the predisposition to learn rather than to teach (Ackoff & Greenberg, 2008). Teaching embodies a vocation with enormous learning capacity, and Feiman-Nemser (2012) presented learning as a work in progress, which an educator builds through one's past experiences and the created social relations. Darling-Hammond (2008) proposed if educators viewed students as a learning source and personal growth, they could affect learning. According to scholars, student learning and educator teaching strategies remain interconnected; thus, educators grow through teaching experiences and learning outcomes. Educators must develop reflection and self-reflection through the teaching activity and repeated experience with multifaceted classrooms (Marcos et al., 2011). If educators do not digest this wealth of knowledge, they will not actively adapt their mental schemes, style, and teaching strategies (Boud et al., 2013). Learners and educators can cooperate in mutual synergy, improving learning through reciprocal interaction. Harding et al. (2019) explored factors such as educator and student wellbeing to understand ideal personal learning environments, along with educator proficiency (Dixon et al., 2014), educator commitment (Collie, 2021), educator

professional development (Sims & Fletcher-Wood, 2021) and professional collaboration (Datnow & Park, 2018). This framework addressed this sub-category, suggesting educators reflect on their learning in the educational environment. By observing the classroom setting and their experiences, educators can adapt pedagogy, learning, and unlearning.

General Discussion

This paper presented the Higher Education Reflection Framework, a conceptual and practical tool for promoting pedagogical self-reflection among HE educators. The tool is available in Appendix One. In the HE literature review, we found self-reflection as a teaching improvement tool significantly employed in K-12 but scarcely in HE, revealing the need for a HE-specific reflection framework. We began our project by investigating self-reflection in the psychological and educational literature. We then created a system for breaking down the self-reflection in which higher educators engage. Finally, we bolstered and expanded that system using empirical research from HEEs in our lab. That work helped us to convert our framework from a research concept to a potentially practical educator tool.

Here we will discuss potential practical implications and use cases for the HERF and the potential benefits to themselves as educators, their students, and their institution. Then we will discuss some framework limitations and the research surrounding it, such as a lack of external validity and evidence for positive outcomes as postulated. We also discuss how future research could address these weaknesses.

HERF: A Flexible Tool for Scaffolding Pedagogical Self-Reflection

Given the incentive of the HE structure, the importance of internal and external research funding, and the many publications required in the tenure, professional development of pedagogical practice can remain underdeveloped. HE educators who develop pedagogy tend to

do so because it embodies a personal passion or the resources are provided for them (or some combination). Here is an attempt to help with the latter by providing a tool we believe is easy to use and can be engaged at any level, from a profound reflection of one's pedagogy to a quick checklist or evaluation. HE educators have limited time to spend on pedagogical improvement, leaving room for change and improvement. The HERF entails a system as it exists. First, it depicts something higher educators want. Participants did not have guidance or a framework for how to reflect on their teaching. Second, the HERF does not require extensive training or the need for another individual. Empirically, we found the participants increased the number of categories they mentioned, meaning more people engaged in self-reflective comments increasing categories by reviewing the list without any prompts or instruction.

Finally, we have designed the HERF to be flexible and agile. It can be used at many engagement levels. If a HEE wanted to use the HERF to deep dive into their teaching or with a colleague, one could engage in video recorded self-reflection think-aloud task going systematically through the 26 categories. If HEEs wish to track progress for their evaluation, either for their interest or tenure and promotion materials, a section of the HERF could be added to such evaluation. It would be relatively easy to note or score throughout the semester. Given that positive benefits for competence, confidence, and mastery emerge when educators self-reflect, we designed straightforward HERF to be as easy to use, flexible, and accessible.

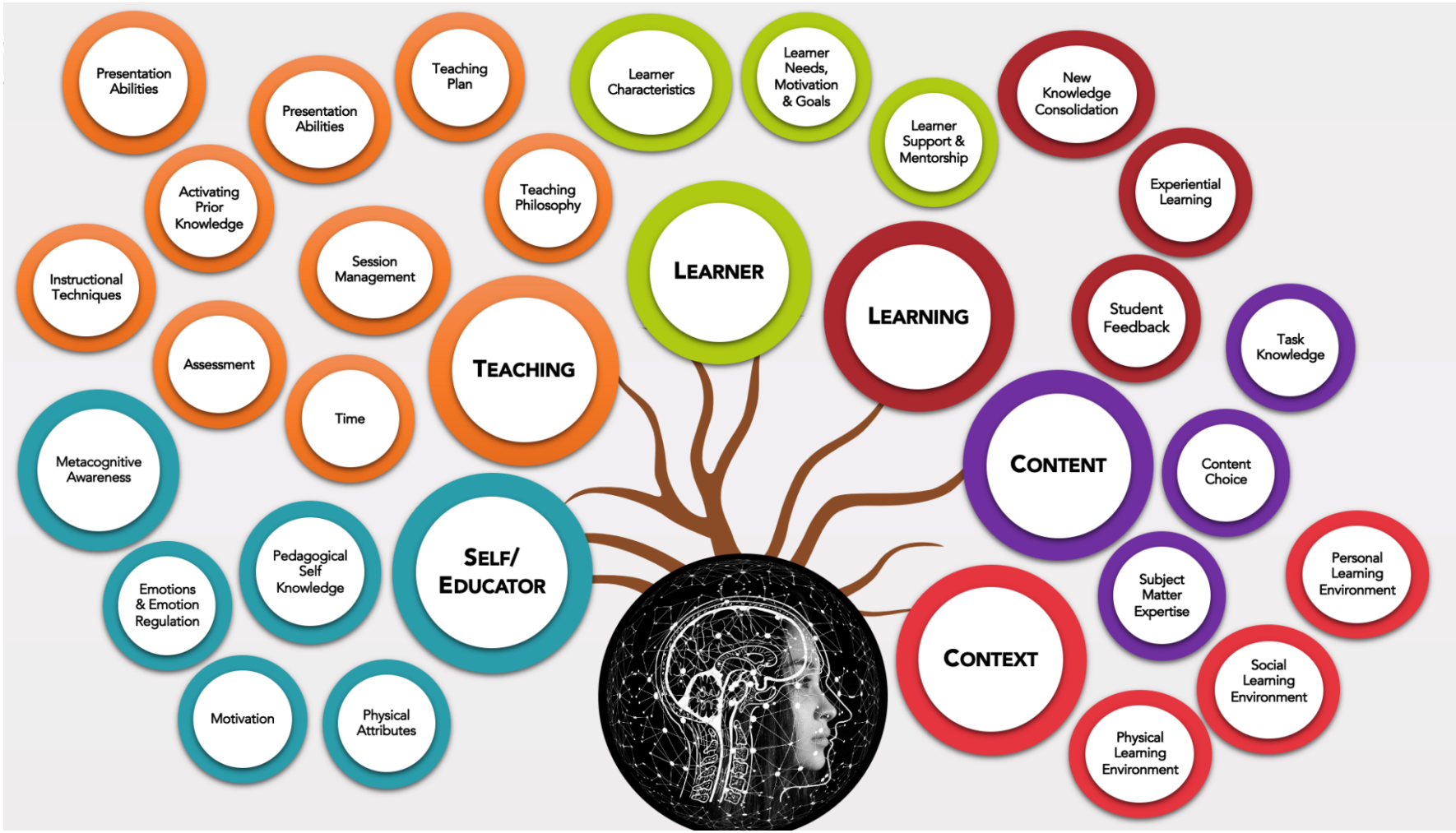
Implications for Practice and Research

Reflection commonly improves teaching in K-12. We found it is sporadic in HE and rarely fostered constructively and straightforwardly. This section will describe the potential benefits of reflection for the educator, their students, and the institution.

Generally, reflection can positively affect the educator's attitudes and behaviors, developing one's pedagogical self-development and professional satisfaction. Empirically, we found that some educators mentioned ways self-reflection could help them in lesson planning and assessment, going beyond what we had when preparing the tool. In one case, an educator claimed they would be more likely to think about the learner's current knowledge level in designing their lessons, proactively using the reflection tool with an eye toward future reflection. In other words, HEEs remain flexible and could likely adapt the HERF to their personal needs, find other benefits, and assess students' previous knowledge. The benefits of reflection could even spread beyond professional experiences, making individuals more self-aware— linked to increased personal happiness and satisfaction.

Figure 6

The Reflection Dimensions and Categories of the HERF



In terms of student diversity, disability, and accessibility, we designed the HERF to encourage educators to see things from their students' points of view by considering the learner characteristics and the learner's place in the context and the learning actions in which they engage. Particularly in cases where students are neurodivergent or experience learning challenges, it offers a positive educator tool, as it encourages them to see things from the student's vantage point to consider the learner's state. Especially in cases where students are neurodiverse or differ from their classmates, when educators do not consider their views, they may interpret poor teaching as a personal failure to understand instead of as an educator.

Institutionally, pedagogical self-reflection could positively benefit the institution's reputation. Alums fondly remember good educators who tried to see their point of view, supporting the fact that educator quality reflects how the student perceives the institution. Dynamic, adaptive, and self-aware teachers increase the positive institutional reputation and could increase alumni donations and recommendations. Variables like institutional reputation are not easily measured and do not automatically show positive outcomes – unmeasurable and improved by inclusive instruction.

Limitations and Future Directions

This paper illustrates a first attempt to present a theoretically driven, empirically rooted framework for HE educators to self-reflect pedagogically. At least two limitations exist regarding this design and empirical work supporting it. The empirical setting lacked ecological validity, and we did not find evidence that self-reflection directly improved student outcomes.

Our research does not show the HERF can support HEE reflection in the wild, as we gathered all of our research in a laboratory. We needed to capture a corpus of reflective comments HEEs make. As such, we created a laboratory setting to collect the data on

microlessons to begin it. This incipient stage revealed the research lacked ecological validity, which could threaten its effectiveness as a tool in the real world.

First, the classroom was not a real classroom, and the students were not genuine. In a natural class setting, students and educators would have the time to foster relationships and share common goals regarding the course information learned. The HERF is likely truncated in thinking about the relationship between teachers and students over time, causing us to overestimate the amount HEEs talk about themselves, as they were less knowledgeable about the learners, they did not share common ground in other class meetings, and they had no chance to establish relationships outside the course. In this case, the learner was underrepresented.

We also might have underestimated the likelihood HEEs could use the HERF in reality, as the individuals who participated in our research were likely interested in improving teaching because they volunteered. To counteract the possibility the HEE population could not understand, we gave the participants almost no information. They had the framework in hand. The participants did not have instructions, examples, or prompt questions in this paper and its accompanying publications. Since we saw some differences in the content and amount of reflection when the participants had the framework, it suggests the expanded version should be relatively easy for educators.

Still, some issues could complicate the framework in the real world. For one, a strong possibility of fatigue could preclude the energy to use this tool. After teaching (due to heavy workloads), not many would like to spend a similar amount of time reflecting on a video of their work, even if not performed frequently. In comparison, quick journaling can happen a few minutes after the class. We believe an alternative is that the HERF could be used as a journaling

prompt where one could focus on each reflection dimension in a journaling process. One can even transcribe verbal notes as one goes from one class to another.

Two potential issues may prevent HERF fidelity. A HEE may define the categories very narrowly and limit themselves from self-reflection because they may interpret the questions narrowly. Using the HERF in its current form emphasizes self-regulated learning. The entire onus for improvement falls on the educators, who must remain self-motivated to use it. Finally, because we asked individuals to watch a videotape of themselves, we may have biased them toward reflecting on their visual appearance and other physical attributes.

This study focused only on self-reflection. It did not indicate whether the individuals' reflections were accurate. It is not easy to see one's cues in the video when looking at themselves. Sometimes things are just epistemology or beliefs (whether right or wrong), so we become blind to a behavior, act, or style. The videotaped materials could be used to study whether the reflections remain consistent with an external evaluator.

In the way the study lacks ecological validity due to its laboratory nature, it also lacks a design allowing causal inference. We did not show causal evidence for the HERF improving teaching outcomes, learning, attitudes, or behaviours. We have the information from the participants who gave us their opinion about the HERF, but this is their opinion, not evidence of efficacy. We do not have data to show it positively impacted teaching. However, we believe it can make for more intentional lesson planning and more significant consideration of surrounding factors. A study that could potentially reconcile some ecological validity and causal argumentation would entail recruiting many HEs to try to use the tool as often as possible, throughout the semester, at varying intensity and see whether it impacts their or their student's behaviors.

Conclusion

The idea to develop a self-reflection framework came from research purporting it improves teaching, but researchers rarely focused on higher education. In K-12 teaching, reflection remains a staple, as well as in medical, professional, and legal practices. Developing a framework for reflection stems from the need for educators to enhance their pedagogy and the current lack of clarity in this area. The model aimed to advance reflective practice. Based on the literature, six dimensions guide reflection. Considering the potential areas influencing pedagogical reflection, we formed a six-dimensional conceptual framework divided into 26 subcategories. This deeper schematization reveals areas to improve pedagogy and prompt educator reflection. Moon (2015) noted instead of reflection being viewed as arduous, it must represent a deliberate, resolute practice. Through reflection, practitioners can intuitively think and hone implicit knowledge.

In addition to higher education, this model is potentially appropriate for many avenues. Its theoretical foundations and conceptual framework could offer an asset while undertaking goals related to professional development in several vocations. This model is presently being explored for its efficacy among academics through a series of studies, its ability to develop reflective higher education practice, and investigation of its validity in other disciplines. We will report the bearing of this model on reflection and its influence on pedagogy and transformational learning.

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Appendix A

Reflective Dimension	Comment Category	Potential Prompt Questions
Self as Educator	Physical Attributes	• Did I speak clearly, at the right pace, and at an appropriate volume? • Did I use my body language appropriately? • Did I look competent in my teaching?
	Motivation	• How was my motivation to teach? • Was I comfortable letting go of control of my class?
	Emotions & Emotion Regulation	• Did I engage in effective emotion regulation? • How did I feel at the end?
	Metacognitive Awareness	• Did I understand which strengths and weaknesses affected my teaching? • Was I aware of the teaching techniques I use?
	Pedagogical Self-Knowledge	• How did I respond, both inwardly and outwardly, when challenged? • Which resources and strategies did I favor, and which did I ignore? • What can I do to make myself more aware of my thinking and emotions?
Teaching	Presentation Abilities	• Was I relaxed and confident? Fluency and competency? • Did I encourage my audience to ask questions? • Was I overly dominating in any way?
	Presentation Quality	• Was my presentation concise and informative? • Was the material delivered in a clear and structured manner? • Were the visual aids in my presentation effective, and did they complement my verbal predictability? • Did the presentation contain practical examples and techniques?
	Activating Students' Prior Knowledge	• How did I activate my students' prior knowledge? • Did I miss any opportunities to do so?
	Teaching Plans	• Did I have specific learning outcomes and strategies for teaching and assessment? • Did I provide an overview or summary?
	Instructional Techniques	• How was my collaboration with the class? • Did I activate two-way communication? • Did I successfully break down complex structures and processes?
	Philosophy of Teaching	• How was my teaching informed or shaped by my teaching philosophy?
	Session Management	• Did I reach my session objectives and teach to the learning outcomes I had planned? • How were my class management skills?
	Assessment	• Did I assess my students' learning? • Will students have the opportunity to correct their work?

	Time	• Did I have enough preparation time with the material prior to the class? • Did I plan and use the session time well?
Learner	Learner Characteristics	• Did I meet my students at their level? • Was I able to scaffold students who have fallen behind? • Were my expectations of my students realistic? • Did I cover content based on my student's understanding?
	Learner Needs, Motivation & Goals	• Did I have an understanding of the needs of the students? • Did I motivate or lose my students? • Did I help my students become independent learners? • Did I identify what was essential to the student's learning?
	Learner Support & Mentorship	• Do I have evidence that my students feel supported in my class? • Will I need to support or mentor students outside of my formal class?
Learning	New Knowledge Consolidation	• Did I review new material along with older material? • Did the way I teach reinforce the understanding of new ideas?
	Experiential Learning	• Did I incorporate a pattern of inquiry to think and solve problems while still involved in the experience?
	Student Feedback	• How effective was I at providing feedback to my students? • Were my students allowed to provide feedback to me? Was I receptive to it?
Content	Subject Matter Expertise	• Did I have sufficient knowledge of the content I was teaching? • Did I select effective materials for teaching the content?
	Task Knowledge	• Did I effectively use instructional tools? • Did I tailor my teaching to the situation and audience?
	Content Choice	• Was I comfortable with the assigned content? • Did I feel any mismatch between the content and the real-world applications?
Context	Physical Learning Environment	• What was the classroom environment? Did it support my teaching approach? • Were audio and visual materials well designed and intentional?
	Social Learning Environment	• Was there energy in my class? • Did the learning environment reflect respect for diversity? • Did I explain any ground rules I expect people to follow in my class? • Was I able to create the dynamics I wanted between students and myself? And among the students? • Did I encourage my students by celebrating successful learning?
	Personal Learning Environment	• Did I pick up any new ideas about teaching in general or in teaching this material? • Did any new factors facilitate (or impede) learning? • Did I learn anything new? • Did I unlearn anything old? • Did I realize anything else I would like to learn?

Chapter 6: Overall Discussion and Future Directions

Overall Discussion

Research in reflection and reflective practice has been well documented for many decades. Moon (2015) asserts that reflection is what transforms surface learning into deep learning, which may be used to create rich cognitive networks that a person can utilise in practice by combining it with their prior knowledge and experience. To provide the essential pedagogical assistance, higher education (HE) institutions have embraced the notion and created departments devoted to assisting educators in strengthening their educational practice (Clarà, 2015; Korthagen, 2017; Landis et al., 2015; Leigh, 2016; McAlpine et al., 1999; Saroyan et al., 1997).

Highlighting reflection as a crucial element in improving teaching practice can provide the necessary assistance to support faculty and students in reflection and reflective practice as well as in numerous other areas related to education. Notwithstanding this support and commitment from institutions, there is little empirical evidence on reflection in HE educators. Significant empirical evidence exists in education addressing the needs of K-12 teachers. However, it has been well noted that the research cannot be ported over due to significant differences in both the educators and students - role and objectives (see Huang et al., 2016; Jensen, 2014; Kember, 1997; Parsons, 2015).

Over the last many years, it has been frequently noted that there is limited understanding of the components of reflection in HE and no clear path to scaffold practical pedagogical reflection (Al Riyami, 2015; Clarà, 2015; Marshall, 2019). The scant research in HE Educators (HEE) has frequently focused on the cognitive aspects of the reflective process (McAlpine et. al, 1999), thereby leaving a clear void in the physical, applied environment. With limited clarity and no scaffold to engage reflection, it has been noted that recurrently, reflection has been

perceived as a chore or check-box exercise (Clark, 2011) and is engaged in superficially (Cornish and Jenkins, 2012). Hence, there is a pressing need for research to bring perspicuity in the components that converge during reflection in HE and to further provide a pellucid path for reflection so that educators can engage easily and improve their pedagogy.

Noting key aspects of the research in Chapter 2, I realised that the reflective process does not just improve pedagogical practice, it can also help educators become lifelong learners. Once they have acquired the skills to engage in reflection, they can apply them to new, challenging tasks they encounter. In doing so, they can enhance their understanding and knowledge (Butler, 1996). Professional growth and continued professional development also exemplify factors where engaging in reflective practice enhances learning. Reflection can create and support a peer network facilitating interactions, dialogue, and collaboration (Epler et al., 2013; Sellheim & Weddle, 2015).

The overview also highlighted that the field of reflection has many tools, models, frameworks, facilitators, and other materials to scaffold what one should do during reflection or self-observations. However, Wass and Harrison (2014) suggested that reflection is personal in nature and, due to the disparate environments in which it is used, is field specific, thereby contesting the efficacy of a universal model for reflection. Additionally, differences exist even within the field of education where, for teachers in K-12, pedagogical self-reflection is required in the profession's training, whereas HEE training tends to require subject matter expertise (Lefebvre, 2022). Another marked difference between K-12 and HEE is in the teaching-learning dynamic where the K-12 teacher holds significant responsibility for the students learning, while in HE, the educator places responsibility on the student to engage in learning (Schwartz et al., 2008). Thus, the duties, demands, and expectations of educators in K-12 are very different from

those in HEE (Parsons, 2015; Saxena, 2017). Additionally, having multiple paths and a poor understanding of the components that support reflection have led to confusion and have negatively impacted HEEs' motivation to reflect. Further, it was found that HEEs do not have a benchmark for self-reflecting on their pedagogy, highlighting a gap in their understanding and scaffolding of reflection. These findings necessitated the need for further research that provides clarity on the key components of reflection in HE.

The literature was reviewed and key components that are part of the teaching-learning dynamic were identified and classified to develop an initial framework that could potentially scaffold HEE reflection. An exploratory study (Chapter 3) was conducted identifying and categorizing the commentary of MEs during pedagogical self-reflection which helped determine whether our envisioned framework reflected the instructors reflections. We discovered that it did, and we improved the framework and its components. We also found that MEs often concentrate on superficial traits, such as their physical traits or speaking patterns, when they lack systematic self-reflection. Our findings on teaching experience were equivocal since self-reflections in educators with high and low experience were comparable. The requirement for a framework to direct educational self-reflections was universally acknowledged by the participants, according to a qualitative analysis.

The existing gap in HE educator reflection highlights the need for support to enhance their pedagogy. According to this study, having a guided pedagogical self-reflection was welcomed by all of the MEs. Participants noted that with a little support, their contributions and the breadth of their reflection would have been improved. Even though many educators have an understanding of reflection, they unanimously noted that a scaffold would have helped. Importantly, participants had the special benefit of routinely reflecting as medical professionals,

hence as medical educators, this practice seemed to permeate their pedagogy, suggesting that gaining additional teaching experience did not negatively affect reflection. This exploratory study aimed to investigate how HE reflection is currently situated and how practitioners might use it to achieve effective results while resolving the discrepancy between realistic reflection and its actual scope.

The results highlighted the need for additional research to supplement the existing empirical findings by examining whether the benefits of scaffolding actually influenced pedagogical reflection. Consequently, the objective of the empirical investigation described in Chapter 4 was to further develop the framework that guides self-reflective strategies of HE educators and further evaluate the efficacy of the theory driven framework developed. In Study 1, educators acknowledged the fact that not having a scaffold limited the quality of their reflection. Hence the empirical study in Chapter 4 was conducted to determine if scaffolded reflection using our initial conceptual framework during the reflection phase would be more advantageous than receiving the framework after their reflection phase. The study further examined the results of our initial two iterative code refinement cycles.

A few significant findings from Study 1 were replicated in Study 2. First off, the initial framework substantially captured the range of reflective comments made by participants. Beyond the initial 21 categories in the six dimensions, based on our empirical analysis, we identified an additional 5 categories to add to the initial framework. We ended up with 26 coding categories across six reflective aspects based on the current research. Additionally, the data pattern was mostly consistent across the six dimensions: Participants reflected most frequently on the teaching, followed by the self as educator, learner, learning, content, and context.

Moreover, in Study 2, we found no connection between self-reflection and teaching experience. Teaching experience represented a potential predictor in every analysis and did not approach significance. In other words, it did not seem like pedagogical advancement as an educator would result in a change in one's reflective practices over time. We also noted that pedagogical self-reflection did not immediately inherit abilities from self-reflection in clinical practice. Finally, addressing the crux of this dissertation, in both studies, there was a universal agreement by the HEEs that the framework helped (or would help) structure their self-reflection. Educators in Study 2 who viewed the framework before their self-reflection acknowledged that having a framework guiding their self-reflection was valuable, whereas participants in Study 1 who saw it after their self-reflection were unanimous in saying that they would have benefitted from having our framework scaffold their reflection.

Comparing data across the two studies, we had a few discoveries to note. Scaffolding did support our educators' self-reflection. In contrast to educators who freely reflected, educators who participated in scaffolded self-reflection explored a wider range of coding categories, suggesting that a guide can incite medical educators to diversify their educational self-reflection repertoire. Second, we found that there were significant differences in engagement with the "teaching" dimension, with participants from the scaffolded reflection doing a greater amount of self-reflection that falls under this dimension (i.e., tokens). Additionally, scaffolded reflection encouraged more participants to explore a wider range of the framework categories, enriching reflection in the teaching dimension. Finally, scaffolded reflection encouraged more interaction within the dimension of self as an educator. Overall, these key findings indicated that educators when engaging with self-reflection, benefitted from being scaffolded by a reflective framework.

Acknowledging the utility of a framework during the self-reflection process, Chapter 5 describes the Higher Education Reflection Framework (HERF) that was developed as a conceptual and practical tool for promoting pedagogical self-reflection among higher education educators. Study 1 and 2 led to translating the reflection framework from a research concept to a potentially practical tool for use by educators.

The HERF is designed to be used in the HE system as it exists now. First, based on need, we noted that HEEs did not have any such practical guidance or framework for how to engage in reflection of their teaching. Second, the HERF is designed to be used without extensive training and without the requirement of a second individual to be involved. We found that the participants in our research increased the number of categories they mentioned – that is, more people engaged in self-reflective comments that fell into a greater number of categories – by simply being given the list without any instruction.

The HERF has been created to be adaptable and versatile. It may be engaged with at several different involvement levels. One might participate in a video-recorded self-reflection think aloud activity, going through the 26 categories, with an aim to examine their pedagogy in depth. Sections of the HERF can be utilized if HEEs want to track their progress, either for their own benefit or for materials related to their tenure and promotion. The ease of use would allow for one to simply take notes or assess oneself throughout the course of the semester or academic year. Given that educators' self-reflection positively impacts their pedagogy, the HERF was created to be accessible, simple to use, and adaptable.

In summary, this dissertation addressed the challenges of teacher reflection in HE by first extensively reviewing the literature on current theories, modes and models of reflection, their contributions and shortcomings, the field-specific nature of reflection, and the gap between

realistic reflection and its actual scope (Chapter 2). Next, research studies (Chapters 3 and 4) identified the reflective processes of medical educators, mapping the reflection dimensions experienced by educators, and assessing the utility of the proposed reflective framework in supporting HE educator reflection. Triangulating research on existing theoretical teaching models, with data obtained from the studies, and equipped with an understanding of educator reflective dimensions and their categories Chapter 5, a guiding framework supporting HE educator reflection was compiled and developed. Although reflection scholars have emphasized cognition and metacognition, we present a practical framework guiding higher education educator reflection, focusing on highlighting the key dimensions of the teaching-learning dynamic namely - the educator, their teaching, the learner, their learning, the content taught, and the educational context.

Implications

Nguyen et al. (2014) asserted that although reflection has been considered as a form of thinking, this does not imply that thinking and reflecting are interchangeable; reflection also consists of other components such as “thoughts and actions; attentive, critical, exploratory and iterative processes; an underlying conceptual frame; a view on change; and self” (p. 1180).

The dissertation's paramount implication is that it enriches and expands the body of knowledge on reflection and reflective practice among higher education educators. Despite being exploratory, this dissertation is important because the empirical evidence gained throws significant light on the subject and augments our knowledge of the components that are crucial to HEE reflection, as well as the advantages of having a framework to scaffold reflection. The findings are significant in general because they have a direct impact on post-secondary educational practice as a whole.

The ultimate objective of this research, in terms of its practical ramifications, is to scaffold educator reflection and thus produce a framework that higher education faculty members and medical educators may utilise to organise reflective practices. We were able to combine top-down literature comprehension with bottom-up empirical studies to achieve our initial iteration. Sharing the outcomes of the iterative process is aimed at making replication easier in other disciplines. We revealed that metacognition is equally crucial for reflection. Reflecting on action goals and making clear how they aim to accomplish instructional goals are necessary for metacognitive awareness. Planning, regulating, and monitoring metacognitive awareness produces pedagogy supporting learning (Hughes, 2017).

The positive effects of pedagogical self-reflection are distal compared to technical self-reflection which is immediate, emergent, and high stakes for medical educators. So, particularly when studying pedagogy, pedagogical self-reflection can seem less important than technical self-reflection. The implications are that reflection on one's teaching practices is less important, given the high-stakes emotional component of clinical reflection making pedagogical reflection in HE seem relatively less critical.

Self-reflection enhances pedagogy, but we have yet to establish if self-reflection improves HE students' key performance indicators (KPIs). However, as K-12 has shown, educators must adopt best practices and adapt them to research. Also, HE pedagogy remains undervalued, for people perceive educators must know everything ideally before they adopt a practice. While we do not have causal evidence that instructor reflection promotes student indicators such as graduation rate, grade, or career engagement, we do have evidence that educators found reflection on their pedagogy helpful. Techniques to improve pedagogy do not always have to point to student indicators to merit usage.

We found self-reflective techniques do not seem to port from professional training to the educational setting. In our empirical studies, one set of participants were medical educators that is, medical professionals who also teach. In medical education, these teachers must learn how to self-reflect, as it fosters medical professional development and emotionally post-event debriefing. However, this knowledge about how to self-reflect on medical events was not carried over to teaching events. We did not find any differences between teachers who had been teaching for a short or long time. Having more significant experience in self-reflection in medicine did not increase the self-reflection variety. Indeed, we suspect the pedagogy self-reflection categories may vary across fields and must be expanded or specialized for those interested in pedagogy within each domain.

In K-12, pedagogical self-reflection is required in the profession's training. Student teachers and post-training teachers observe other teachers and receive feedback from others. The field has many tools, models, frameworks, facilitators, and other materials to scaffold what to do in these observations or self-observations. However, HE training tends to focus on becoming an expert and making scientific or critical discoveries. HEEs do not have a benchmark for self-reflecting on their pedagogy. In this regard, HE can learn new practices from K-12. A nascent assumption puts HE above K-12, but in this domain HE can learn from K-12. In a similar vein to school teachers, HE institutions can engage educators by having clear training and reflective practice requirements to help develop their practice as HE educators.

Challenges, Limitations and Future Directions

Although the studies in this dissertation provide insightful information, a number of pertinent and intriguing issues warrant more research. As with every research, there are certain constraints and restrictions that must be considered while analysing the results of this

dissertation. In this section, some significant problems and restrictions are acknowledged, and potential lines of further research are proposed.

It is crucial to note that the current research is exploratory, and as a result, conclusions should be interpreted with caution. As a result, further future research is necessary. Qualitative research has several evident limitations that should be taken into account: demonstration of rigour (Anderson, 2010); researcher bias (Noble & Smith, 2015); amount of time consumed (due to data volume; Flick, 2022); complexities in data interpretation (Berg & Lune, 2016); generalizability of results (Harry & Lipsky, 2014); lack of power to randomize (Gable, 1994); confidentiality; and sample size and sampling method limitations (e.g., the studies in the dissertation used snowball (convenience) sampling; Harry & Lipsky, 2014). Additional limitations are also considered and highlighted. For instance, participant biases, like a social desirability bias[5], and/or acquiescence bias[6] may be present (Mcdowell and Maclean, 1998).

There were several other limitations to this research that also should be noted. One limitation of the current study was that it only looked at medical educators' perspectives; thus, additional research should look at various other fields. Another limitation was that they all used the same type of reflection practice, thus there was limited insight into other types of reflection that could potentially provide varied results. Another limitation entailed a small sample size from a limited geographical area, consequently further research is needed to corroborate our results in other environments. Conversely, we found it difficult to recruit medical educators, probably one reason scholars may not have undertaken this exercise (Archibald & Munce, 2015).

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[5] Participant responds in a way that makes them seem socially acceptable to the researcher

[6] Participant responses are influenced by their perception of what the researcher would find desirable

Statistics constraints specifically related to Study 2 (Chapter 4) entailed comparing data across the two empirical studies. In this case, cohort effects, for instance, might manifest. Additionally, since we did not assign individuals at random, we are unable to make unequivocally causal arguments. Another limitation is that our sample lacked statistical power to detect variations between coding categories. It does, however, positively influence reflection, as we sought to determine. To run a randomised control study, we simply lacked access to enough educators, thus in our future work, we will aim for a bigger participant pool. The statistical techniques we utilised (linear and mixed effects logistic modelling) are often used for quasi-experimental data and do not requisite random assignment.

We also discuss several ecological validity issues that are crucial for future research. This study being experimental and conducted in a research setting, neither the students nor the classroom was authentic. In a genuine classroom, teachers and students would have more time to get to know one another and would have shared objectives about the material covered in the course. When considering the long-term interaction between instructors and students, the HERF is probably curtailed. In our study, since educators were less knowledgeable about the learners in general, it is plausible that we could have overestimated the amount to which HEEs are likely to talk about themselves. We also think these were factors in the commentary's lack of content and context.

To understand reflection in HE we had to start by gathering a corpus of introspective remarks made by HEEs. As a result, we developed a lab environment to gather the information on microlessons to start this corpus. This indicates that the research has some ecological validity issues, which may compromise its usefulness and it cannot be concluded from the results of our

research that the framework can facilitate reflection for HEEs in the real world. Furthermore, we also do not have any evidence that self-reflection directly improves student outcomes.

We could have underestimated the possibility that HEEs will benefit from the HERF in reality, given that the participants for our study were probably motivated by a desire to improve their pedagogical skills. We provided the participants with little information and the framework in hand to combat the chance that the general population of HEEs would not grasp this. Given that the participants' content and level of reflection varied when they had the framework in their hands, it appears that the enlarged version provided here should be rather simple for educators to employ.

However, there are certain problems that can make using the framework in the actual world more difficult. One reason is that there is a good chance that HEEs would not have the energy to use this tool. Few people would want to spend the same amount of time watching a video of their job after a long day of teaching. Comparatively, journaling may be completed shortly after class and takes much less time. In that case, we also think that the HERF may be used as a trigger for journaling, or that one could concentrate on each aspect of reflection separately as a prompt for writing, or even record vocal notes in between lectures.

There are four additional potential concerns that might hinder commitment in usage of the HERF. Firstly, a HEE may define the framework categories extremely narrowly; they may constraint themselves from participating in self-reflection because they may use the potential prompts as is and not use them as a guide to engage in that dimensions category. Second, the present implementation of the HERF places a strong focus on self-regulated learning, since educators are solely responsible for engaging in their pedagogical advancement. Third, because we invited participants to see a video of themselves, we risked skewing their reflections towards

their physical characteristics and attractiveness. Finally, for some HEEs there is the potential of discomfort arising from experiencing cognitive dissonance when viewing their video recording, since it may conflict with their sense of self-perception or proprioception.

Our research was limited to self-reflection. It did not indicate if the educator's reflections were accurate. One explanation is that it is difficult to see one's own cues in the video when looking at themselves. Sometimes, certain behaviours, acts, or ways of doing things are merely a part of our epistemology or beliefs (whether true or not), and as a result, we lose awareness of them. However, the videotaped data generated might be utilised as research data in another study to see whether the reflections overlap with an external judge.

Due to its laboratory setting, the study also prevents us from drawing any conclusions about causality. We failed to provide any causal evidence that the HERF was enhancing teaching, learning, attitudes, or behaviours. We have data from the participants who provided us with their feedback on the HERF at the conclusion of the teaching session, however this is only their opinion and not proof of efficacy. There is no evidence to support a favourable influence on pedagogy. However, we do think it can lead to more deliberate lesson planning and more attention to associated factors.

Future research should focus on improving the model and confirming its viability with a wider and more varied set of participating educators as this was the first attempt in this direction. Additionally, to advance the field, we may potentially research various teaching and learning environments and online education’s influence on educator reflection and student learning. The recruitment of various HEEs to try to use the tool as frequently as possible, throughout the semester, at varying levels of intensity, and to see whether there are any impacts on their behaviour, their students' behaviour, and so forth, would be a study that could

potentially help to resolve some of the issues with ecological validity and with causal argumentation. Furthermore, because teaching activities represent both what students experience and how reflection is carried out, they serve as a bridge between reflection and student learning. The implicit assumption in the literature is that enhanced student learning results from educator reflection. Future study could research this gap since no studies have truly verified this theoretical relationship.

Concluding Remarks

In conclusion, the findings obtained from the present dissertation contribute to the reflection in higher education literature by creating an overview of how reflection is positioned in HE. Additionally, this dissertation addresses the ambiguity surrounding the components of reflection and the prevailing murky path towards successful reflection and engaging in reflective practice in HE. By providing empirical evidence of the components that constitute reflection in HE as well as exploring the influence of teaching experience on reflection, this research furthers our understanding on the topic. The development of a practical framework to scaffold HE self-reflection based on both theoretical and empirical research can present educators with an opportunity to engage with their pedagogical practice and make progress towards improving it.

In fulfilling the requirements of this doctoral dissertation, this research set out to address some of the important gaps in the research on reflection and reflective practice in HEEs, highlighting the paucity in existing research. The research has led to important contributions to reflection and reflective practice in HEEs and specifically medical educators. The studies presented here investigated the reflection and reflective practice of HEE with the specific population of medical educators. Reverting back to the overarching question (“How can we

scaffold HEE reflection to help positively advance their pedagogical practice?"), we can claim to have advanced in our objective with clear limitations. The dissertation highlights the complexity in reflection and reflective practice in HEE and the limited scaffolding available when attempting to reflect in order to improve pedagogical practice. Withal the research's limitations, the studies given here collectively enrich our understanding of pedagogical reflection among HEEs and offer fresh perspectives that deepen our understanding of the crucial topic of pedagogical reflection.

Amidst the contributions of the dissertation, there is appreciably more research that needs to be done to advance our understanding of the subject. It would be expedient for educators, university administrators, and students if further study was conducted to broaden insights on reflection in HEEs.

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