A Conceptual Model Incorporating Mindfulness to Enhance Reflection in a Situated Learning Environment

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Dissertation submitted to the faculty of Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy in

Curriculum and Instruction

(Instructional Design and Technology)

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March 15, 2016
Blacksburg, VA

Keywords: situated learning, reflection, mindfulness, reflection-in-action

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Abstract

Key to designing instruction for situated learning is ensuring the ability of learners to transfer acquired knowledge to a variety of situations. Common to models of instruction and frameworks for situated learning is the importance of including activities for promoting reflection within the design of the learning environment. However, these models currently do not include detailed support for reflective practice that will help instructional designers prepare learners to meet the demands of situated learning. One method to meet the demand of the ill-structured nature of situated learning and provide adaptability for instructional design is through reflection-in-action and mindfulness. The purpose of this study was to apply design and development research methodologies to develop a conceptual model of reflection that incorporates mindfulness to enhance reflection-in-action within a situated learning environment. This model illustrates the relationship of incorporating mindfulness to help learners increase and direct attention to the present moment in order to improve performance through reflection-in-action. Based on the results of the study, mindfulness and reflection strategies are incorporated before, during, and after the learning experience to enhance reflection-in-action.

Dedication

To my husband, Brett R. Stoner, and son, Samuel R. Stoner

I am forever grateful for your love, support, and encouragement throughout this process. I cannot imagine this journey of life without you. Sam, your recent arrival into my life has forever changed me. Becoming a parent has been an incredible experience and we are so blessed to have you as our son.

To my parents, Lesia Marino-Brolinson and Samuel V. Marino

Mom, I am the person I am today because of you. I cannot thank you enough for all of the support, encouragement, and sacrifices you have made to give me the opportunities and experiences my life has had to offer. Dad, while you are no longer with us, not a day goes by I don't think of you. Your love, laughter, and spirit will always be with me.

To my sister, Dr. Natalie M. Fadel

I am so lucky to have you as my big sister and my best friend. Thank you for your love, support, and inspiration.

Acknowledgements

There are many people I would like to thank as this dissertation process would not have been possible without them. I first would like to thank my committee chair, Dr. Katherine Cennamo. I have truly enjoyed working with you throughout this process. I am very grateful for your support, encouragement, and advice.

I would also like to thank my committee members, Dr. Barbara Lockee, Dr. John Burton, and Dr. Kerry Redican. Your feedback, encouragement, and guidance is greatly appreciated. I have enjoyed getting to know each of you and learning a great deal from each of your expertise.

Thank you to my expert reviewers. I appreciate you taking time out of your very busy schedule to help my improve my model and contribute to the field of instructional design. Your expertise and feedback was very valuable to this process.

I would like to also thank what we referred to as our "Dissertation Support Group." Eric Stauffer, Heidi Dickens, and Alicia Johnson, I cannot imagine my experience in this program without your friendship, advice, and encouragement. I will truly miss our meetings and time spent together in class. I am looking forward to working with the three of you in the field as colleagues.

Finally, I would like to thank my greatest cheerleaders, my family and friends. Without my husband's continual support and sacrifices, this would never have been possible. In addition, I am so blessed to have such amazing friends and family. Their support was invaluable and I am forever grateful. I also want to specifically thank my step-father, Dr. Per Gunnar Brolinson. He not only has been a mentor and inspiration for me in my career, but provided much appreciated company during my weekly trips to Blacksburg.

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CHAPTER 1

Introduction and Need for the Study

Many methods of formal education have been criticized for using decontextualized instructional approaches that result in a clear separation between knowing and doing leaving students with the inability to transfer knowledge (Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1992; Brown, Collins, & Duguid, 1989). These methods separate the acquisition of knowledge from the context and action in which it is utilized (Resnick, 1987). As educational theory evolved, many researchers began to argue that learning and cognition are dependent upon and embedded in the situation (Brown et al., 1989; Herrington & Oliver, 2000). As a result, situated learning emerged as a learning theory and a model of instruction that focuses on the process of learning while providing authentic learning environments in which learners are able to immerse themselves in an academic domain and participate in authentic tasks (Brown et al., 1989).

While the theory of situated cognition and situated learning has been discussed for quite some time, Brown et al. (1989) were the first to propose a model of instruction, followed later by the development of a framework which included critical characteristics for instructional design of authentic learning environments by Herrington and Oliver (2000). This model and framework have provided great insight into effective instructional design practices, however for situated learning, the process can be difficult due to the variability and uncertainty often presented within the learning environment (Brown & Duguid, 1993; Winn, 1993). In authentic learning environments, variables and outcomes are unpredictable, and rarely consistent across situations. Learners are presented with ill-structured problems that require enhanced cognitive skills to face

and adjust to daily dilemmas (Jonassen, 1997; Young, 1993). This makes it difficult to develop a set of guidelines for instructional principles that can be applied and adaptive across situated learning environments.

Key to designing instruction for situated learning is ensuring the ability of learners to transfer acquired knowledge to a variety of situations (Winn, 1993). The ability to transfer knowledge requires a student to be able to use the knowledge and skills acquired in one situation, and apply them to future activities and environments (Winn, 1993). There are two types of transfer including low-road transfer and high-road transfer (Salomon & Perkins, 1989). Low-road transfer is used when a learner has had extensive practice of the same behavior and the knowledge transfers to a very similar activity in which the learner engages in automaticity in a new context. High-road transfer is more difficult and requires abstraction from one environment for application in a completely different context. It has been suggested, especially for high-road transfer, to help develop instruction that is adaptable to all situations, instructional designers should work to provide learners with generic skills that can be utilized and applied across situations that are not only specific to which the learning originally occurred (Winn, 1993). It is essential to have a high level of generality providing learners the ability to meet the cognitive demand and adapt to unanticipated difficulties in novel situations (Brown & Duguid, 1993). One method to meet the demand and provide this adaptability of instructional design that has not been well studied within situated learning, is through the process of reflection-in-action and metacognitive support.

Common to both Brown et al.'s (1989) model of instruction and Herrington and Oliver's (2000) framework, along with other experiential learning models, is the importance of including activities for promoting reflection within the design of the learning environment in order to allow

students to form abstract conceptualizations that will aid in both low-road and high-road transfer. Reflection is necessary for cognitive restructuring and the ability to criticize tacit performance (Norman, 2014). It also provides many learning benefits allowing the learners to critically analyze their performance, make comparisons between themselves and other students and experts within the environment, and understand how learning can apply to future situations (Collins, 1991). Based on their research in anchored instruction, The Cognition and Technology Group at Vanderbilt (1990) purpose that providing opportunities for reflection within situated learning has the greatest potential to help learners transfer knowledge and further research is needed on this topic to aid in the instructional design process (Vanderbilt, 1990).

Reflective learning comes in many forms and is executed differently in various instructional settings. It often occurs through both individual and social interaction allowing learners to develop new perspectives and understanding of their own learning (Collins, 1991; Lin, Hmelo, Kinzer, & Secules, 1999). In situated learning, learners not only fill the role as students but they become practitioners within the environment as they become members of the community of practice. As a practitioner, as stressed and described by Schön (1983), it is not enough to only engage in reflection after the experience has occurred, known as reflection-on-action. Reflective practitioners must also develop the ability to engage in reflection-in-action which will allow them to more effectively engage in problem solving when facing uncertainty and novel situations (Schön, 1983). As a learner moves through increasing levels of participation in a community of practice, the ability to reflect-in-action could allow novices to face surprises and adjust to the ill-structured problems encountered in situated learning (Jordan, 2010; Nielsen, 2008).

Key to enhancing reflection and ensuring learners are successful in a situated learning environment is providing metacognitive support (Choi & Hannafin, 1995; Lin, 2001). One metacognitive strategy, mindfulness, not only has implications for enhancing reflection-in-action, but also likely plays a principle role in high-road transfer as described by Salomon and Perkins (1989). Mindfulness refers to one's awareness and attention to the present moment and accepting the experience in a non-judgmental way (Baer, Smith, & Allen, 2004; Bush, 2011; Davis, 2014; Kabat-Zinn, 1982). While mindfulness is relatively new to educational research and reflective practice, it can be closely linked to the existing body of knowledge within the literature including Schön's (1983) work on reflection-in-action (Baer et al., 2004; Jordan, Messner, & Becker, 2009; Schön, 1983). When mindful, learners are more sensitive to context and are able to draw clear distinctions among them (Langer, 1993). In addition, learners are able to recognize familiarity in novel situations while also becoming open to flexibility and adjustment when the situation presents uncertainty and is cognitively demanding (Langer, 1993) As mindfulness allows one to fully embrace the moment improving self-observation skills, perspective on internal experiences, emotional states, recognition, and responses (Goh, 2012), it has great potential to be used as an instructional strategy to enhance reflection-in-action. In a situated learning environment, developing and applying mindfulness skills could provide the learners a strong metacognitive support allowing them to focus on the present, enhance their reflection-in-action, and transfer knowledge and skills to future applications.

Reflection and metacognitive support are key components in supporting learners in a situated learning environment (Brown et al., 1989; Herrington & Oliver, 1995). However, situated learning models currently do not include detailed frameworks or support for reflective

practice that will help instructional designers prepare learners to meet the demand of situated learning.

Purpose of Study

The purpose of this study was to develop a conceptual model that incorporates mindfulness to enhance reflection-in-action within situated learning. This model will help describe the potential impact on performance of being mindful within a situated learning environment in order to promote reflection-in-action.

In an effort to translate principles of learning and instruction into the design, development, and evaluation of instruction, instructional designers will often use models as a reference to guide their work. Models are a "representation of reality presenting with a degree of structure and order" (pg. 66) (Richey, 1986). Models help create standards for design and aid practitioners in translating theory into practice (Richey, 1986, 2005). They also help organize complex knowledge from a variety of sources for future research development (Richey, 1986).

There are two types of models used in instructional design: conceptual models and procedural models (Richey, 1986). Conceptual models are analytic in nature and aim to identify, define, and describe the relationships between variables (Richey, 1986, 2005). Conceptual models are often taxonomies, but can also exist as path diagrams, visualization, or narrative descriptions (Richey, 1986, 2005). Most often these type of models are generalized to context and are developed based on experiential knowledge or a synthesis of a limited research base within the literature. Procedural models differ from conceptual models in both structure and function. They are very prescriptive in nature and provide step-by-step guidance to a design process most often to solve an identified problem (Richey, 1986, 2005). Procedural models are often somewhat flexible in order to relate to the intended learners, learning environment, and

delivery method (Richey, 1986, 2005). In addition, they may be intended to guide entire design projects or a specific aspect of design such as design, development, or evaluation (Richey, 2005). Procedural models are developed from experiential knowledge, previously developed models, a solid literature foundation, and when developed, reflect current and proposed practices (Richey, 1986, 2005).

While the relationship between mindfulness and reflection-in-action has been discussed in other areas including social work, medical education, organizational management and service-learning, little attention has been given to this topic within situated learning (Alrutz & Stewart, 2012; Jordan et al., 2009; Mishna & Bogo, 2007; Pezzolesi, Ghaleb, Kostrzewski, & Dhillon, 2013). A conceptual model of instruction that promotes reflection-in-action by integrating mindfulness for situated learning is needed to help provide a foundation not only for designers, but also for future research. This model will help define the concepts and illustrate the relationship between the variables as they apply to reflection in situated learning. Reflection-in-action and mindfulness are essential skills that can be translated across instructional environments. It is hoped that by integrating enhanced reflective practice and metacognitive support for situated learners, instructional designers will be able to address many of the issues faced when designing for the variable and uncertain environments that arise within situated learning.

This conceptual model built upon Brown et al. (1989)'s model and expanded on the reflection piece of Herrington and Oliver (2000)'s framework placing emphasis on reflection-in-action, by incorporating mindfulness. It is anticipated this conceptual model will help instructional designers in addressing difficulties faced with designing for situated learning, particularly in promoting reflection-in-action within the environment.

Methodology

This study followed a type two model development methodology as described by Richey and Klein (2007) including model development and model validation. The first phase of the research included data collection through an extensive literature review to identify current methods, instructional strategies, and models of reflection-in-action, mindfulness, and situated learning. The literature review sought to identify key strategies along with design and implementation guidelines to incorporate mindfulness as a metacognitive support to enhance reflection-in-action in situated learning. Based on the evidence presented within the literature, phase two included developing a conceptual model by identifying patterns in the data collected in the literature review. The conceptual model intended to expand on Brown et al. (1989) model of instruction and Herrington and Oliver (2000)'s framework for authentic learning environments, isolating the element of reflection. The model was based on a synthesis of the literature which identified overlap between key concepts of mindfulness and reflection-in-action as applicable to situated learning. In phase three of the study, model validation was conducted by recruiting an expert reviewer within the areas of expertise of situated learning, reflection, and mindfulness, to review and provide critical feedback of the model. Based on the responses from the expert reviewers, the model was adjusted for improvements. Results included the responses from the expert reviewers and the discussion will addressed responses from the experts along with any necessary adjustments to the model.

Benefits and Potential Limitations to the Study

As educational practice continues to explore situated learning and other forms of authentic learning, creating more mindful and reflective learners may help the issue of transfer and also create stronger life-long learners. In addition, this study will help instructional designers incorporate learning strategies that support instructional practice in the variability and uncertainty across situated learning environments. One potential limitation to this study is the limited empirical evidence that currently exists on mindfulness within educational practice. However, within the history of the concept and the current movement to create more mindful learners, this study will help further not only the research on reflective practice in situated learning, but also the application of mindfulness across educational disciplines.

Organization of this Study

Chapter One provides background information including the need and purpose of the study, research questions, benefits and potential limitations to the study and a brief overview of the methodology. Chapter Two includes an extensive literature review covering relevant information for the foundation of the conceptual model that was developed in this study. It explored the theoretical foundation, major concepts and instructional strategies of reflection in situated learning, reflection-in-action, and the foundations of mindfulness and its role within the field of education. The relationship between mindfulness and reflection-in-action and how it applies and enhances a situated learning environment was also described. Chapter Three describes in detail the specific methodology that was used to conduct the study. Chapter Four provides results of the data collection through an extensive literature review and the detailed conceptual model developed in the study. Chapter Five provides the responses and results from

the expert reviewers, along with a description of adjustments made to the model based on the responses. Finally, Chapter Six summarizes the study and discusses the contributions and limitations of the study, along with implications for future research.

CHAPTER 2

Introduction

The following section provides an extensive literature review to illustrate how mindfulness can be used as an instructional strategy to enhance reflection-in-action to improve performance within a situated learning environment. The literature review sought to answer the following key questions:

1. What are the theoretical foundations of situated learning and reflective learning?
2. What are the limitations in instructional design for situated learning?
3. How does reflection-in-action contribute to learning in situated learning?
4. What research exists that analyzes mindfulness and reflection-in-action as instructional strategies within educational settings?
5. What is the relationship between mindfulness and reflection-in-action and how does this relationship enhance situated learning?

Review of the Literature

Situated Learning

There has been a long interest in creating authentic learning environments in which learners learn through experience. Authentic learning environments are those in which learners are provided contexts and activities utilizing knowledge as it would be applied in real-life situations outside of a traditional classroom environment (Herrington & Oliver, 2000). John Dewey was one of the first theorists to comment on experiential learning as he believed in order for learning to occur, action and knowledge must be connected which in turn links personal development with academic and cognitive development (Dewey, 1938). Over the years, the

theory of situated learning evolved placing emphasis on authentic activities and the context in which learning occurs. As defined by Collins (1991), "situated learning is the notion of learning knowledge and skills in contexts that reflects the way knowledge will be useful in real life" (p.122). The relationship between the learner and variables in the environment directly impacts the way knowledge is formed and retrieved. According to the situated learning theory, knowledge will remain inert if learned outside of the authentic environment in which it is used (Brown et al., 1989). Therefore, the emphasis in situated learning is on placing learners in authentic learning environments that will allow them to acquire the knowledge and skills used in everyday practice (Choi & Hannafin, 1995).

In addition to environmental variables, building off of Vygotsky's sociocultural theory, culture is also a key influence to situated learning. Knowledge is built through lived practices within a society therefore, as Brown et al. (1989) note, knowledge, activity, and culture in which the learning is taking place are intimately connected. The authentic activities in which learners are engaged are simply ordinary practices of the culture (Brown et al., 1989). Learners must understand how to engage with the technologies of the culture, the social practices, and especially the use of language (Lave & Wenger, 1991). In situated learning, learners must not only be able to learn from the discourse of the culture, but also learn to talk within the culture as an active participant. This will help in coordination, understanding, memory, and reflective learning practices.

In situated learning, learning occurs through participation within a community of practice defined as: "an activity system about which participants share understanding concerning what they are doing and what that means in their lives and for their communities" (Lave & Wenger, 1991, p. 98). Learners enter a community of practice as newcomers and by observing and

interacting with the sociocultural aspects of the community, they shape their individual identity and role within the community (Henning, 2004). As learners advance in both knowledge and skills, they become full members of the community of practice. According to Lave and Wenger (1991), this process by which a newcomer acquires the knowledge and skills to become a full participant within a community of practice is known as legitimate peripheral participation. It can also be thought of as moving from a beginner to expert status within a practice. Legitimate peripheral participation is meant to describe, when supported appropriately, an invitation to the community of practice with access to knowledge and opportunities for involvement and growth. As a peripheral participant advances to a full participant, they then take on the role of mentoring and teaching to the other newcomers in the community of practice. A classic example of legitimate peripheral participation is the apprenticeship. Peripheral participants enter a community of practice as an apprentice observing and learning from the mentorship of a full participant. As they advance in their knowledge and skills, they will begin to take on tasks independently until they have acquired the status of a full participant within the community of practice. Apprenticeship has been used as a form of learning for centuries and is often used today especially in professions that require high pressure and cognitively demanding situations such as the medical field.

Outside of apprenticeships there are other communities of practices that exists for situated learning in which legitimate peripheral participation and membership differs (Wenger, 1998). As a result, Wenger (1998) describes five learning trajectories that describe various states of identity a leaner may develop through legitimate peripheral participation. These include peripheral, inbound, insider, boundary, and outbound. Peripheral is where a learner never reaches full participation either by choice or necessity. An inbound learner is one that has joined a

community of practice and due to motivation and commitment will likely advance to a full member. Insider trajectory results in the formation of an identity that is not considered full membership but continues to change as the participant faces new roles, responsibilities, and tasks. Boundary identities cross boundaries working to connect different communities of practice. Finally, outbound identities are those participants that from the very beginning of participation have the intention that they will eventually leave a community of practice.

Within an authentic learning environment, learners use what Rogoff and Lave (1984) refer to as everyday cognition. This differs from the cognition used in a formal school environment where learners are often required to engage in rote learning in a decontextualized manner (Brown et al., 1989; Henning, 2004; Lave, 1988). Lave (1988) uses the term "just plain folk" to describe people who use everyday cognition when learning in daily activities. This type of cognition makes use of sociocultural tools and situational clues that aid them in problem solving when encountering complex problems (Henning, 2004). Everyday thinking "is not illogical and sloppy but instead is sensible and effective in handling the practice problem" (Rogoff & Lave, 1984, p. 7). In situated learning, learners engage in everyday problem solving using the tools and schemas that are socially provided within the environment and community of practice. Therefore, knowledge is produced from both the activity and cultural implications of situations: the very foundation of situated learning (Brown et al., 1989).

Situated learning as an instructional strategy. While situated learning is used across disciplines, it is most commonly implemented through apprenticeships, anchored instruction, placing a learner in an actual work setting such as an internship, or using simulated or a virtual version of an actual work environment (McLellan, 1994). Traditional apprenticeships consisted of a learner spending extensive time with an expert in the field and working to develop the

cognitive tools of a domain in an authentic learning environment. (Brown et al., 1989; Dennen & Burner, 2008; Winn, 1993). They begin with the student simply observing and over time he or she will begin to take on a more active role of participation until they have acquired the necessary knowledge and skills to perform the trade independently (Dennen & Burner, 2008). Central to the apprenticeship model are five key instructional strategies including: modeling, coaching, reflection, articulation, and exploration (Collins, 1991). Today, to address feasibility issues often faced within a typical educational environment, many apprenticeships have shifted from the traditional work environment to the classroom. Teachers play the role of the full member of a community of practice and use instructional strategies key to the apprenticeship model in effort to guide students through the process similar to a traditional apprenticeship (Dennen & Burner, 2008; Winn, 1993). Also, many computer mediated web based environments are now designed to support the apprenticeship model and are readily used within a classroom environment (Collins, 1991; Dennen & Burner, 2008; Herrington & Oliver, 1995).

Anchored instruction is another means of situated learning that allows instructors to bring authentic activities into the classroom. This type of instruction creates environments that allow students to observe and engage in authentic problem solving similar to those experts face in everyday situations (Vanderbilt, 1990). Anchored instruction can be delivered as small independent cases for each subject known as micro-contexts, or it can be extended to a macro-context that are extended cases requiring interaction from multiple perspectives (Young, 1993). For example, the Cognition and Technology Group at Vanderbilt developed the Young Sherlock project in a 5th grade classroom to anchor instruction helping the students learn language arts and social studies content (Vanderbilt, 1990). They found that the experimental group exposed to the anchored instruction were more likely to use the targeted vocabulary, were able to make more

informed inferences, and were able to recall more of the knowledge learned from the videos as compared to the control group. Another famous example of anchored instruction is the Jasper Series again developed the Cognition and Technology Group at Vanderbilt. This was a series of videodiscs that featured the main character, Jasper, and guided students through his many adventures. Students were required to engage in and document mathematical problem formulation and problem solving exercises that helped guide Jasper to safety (Vanderbilt, 1990).

Regardless of method of delivery chosen for instruction, situated learning is used as an instructional strategy to provide real-life learning environments, in an effort to provide a more contextualized learning experience to enhance the transfer of knowledge across situations. It has become a means to build skills used in daily life and facilitate real-world practice (Herrington, Reeves, & Oliver, 2014). As described by Collins (1991), there are many benefits for using situated learning as an instructional strategy. Learners develop the ability to use their knowledge in a flexible manner which allows for invention and adaptability to novel situations. Also, through the authentic learning activities, students are able to view the results of their work and gain a deeper understanding of the implications of the knowledge they are using. Students begin using knowledge as a tool rather than simple facts or procedures removed from the appropriate context (Brown et al., 1989; Vanderbilt, 1990). Choi and Hannafin (1995) add, authentic activities in situated learning provide learners with the ambiguity and unpredictable problems they will face in everyday practice, supporting the transfer of real-life problem solving skills across environments. The authors further comment that situated learning environments enhance learner's cognitive abilities, self-monitoring skills, and self-correcting skills.

Designing instruction for situated learning. Since the theory of situated learning was first introduced, researchers have been working to determine how to best design instruction for

authentic learning environments. Designing for situated learning can be very difficult due to the nature and unpredictability of real-life environments. Grounded in apprenticeship, Brown et al. (1989) were the first to develop an instructional model for situated learning. This model was designed based on key components that would move students from embedded activity to grasping general principles of the culture. The six key components included: apprenticeship, collaboration, reflection, coaching, multiple practice, and articulation of learning skills. Not long after this model was developed, Brown and Duguid (1993) posed the question to the research world within the field of instructional design: "How can these situated theories be operationalized" (p.10). In response to this question, several frameworks have been proposed to identify and isolate those key components described for instructional design of situated learning. Young (1993) grounded his framework in ecological psychology emphasizing perception rather than memory to describe four tasks in the design process: selection of the situation, provision for scaffolding, support for the instructor, and assessment. Multiple situations should be utilized to help students form abstract conceptualizations. Scaffolding techniques allow students to create both problems and solutions with type and duration of scaffolding dependent on the learning environment. Since situated learning requires the learner to learn from the surrounding environment, the role of the teacher is more of a coach rather than to simply deliver instruction. Support should help teachers engage collaboratively with the students, track and assesses progress, and further develop their own skills associated with the context. Finally, Young recommends three key metrics for assessment including affording transfer, providing meaning, and providing an anchor for cross-curricular investigation. This framework was then illustrated using anchored instruction with the classic example of the Jasper Series.

Similarly, another framework was developed which identified four critical areas that need to be considered and play a role in situated learning (Choi & Hannafin, 1995). After an extensive literature review of the theoretical foundations of situated learning, the authors determined consideration of roles of context, content, facilitation, and assessment are essential when designing instruction for situated learning environments. Designers need to ensure the context includes the use of everyday cognition, an appropriate level of authenticity, and situational factors that enhance the transfer of knowledge. The content should be appropriately embedded aiding learners in using knowledge as a tool through a diversity of situations helping in transfer of knowledge. Several facilitation methods such as modeling, scaffolding, and collaboration should be applied in the design of situated learning to ensure learners are developing higher-order thinking skills, metacognitive abilities and also tools for self-assessment and self-regulation. Finally, assessments differ from traditional methods and are more student centered focusing on measurement of cognitive growth rather than if the learner can simply recall and recite factual knowledge.

Finally, Herrington and Oliver (2000) conducted an extensive design and development study developing and implementing a framework that included critical characteristics of an authentic learning environment based on the evidence from an extensive literature review (Table 1). Qualitative analysis were utilized to evaluate the development and implementation of a multimedia program applying the framework which was developed in the first phase of the research design. They determined based on the results of the study, this framework was effective in designing an authentic learning environments that allowed for the development of advanced knowledge.

Table 1
An Instructional Design Framework for Authentic Learning Environments, Herrington and Oliver (2000, pp. 25-28)

1. Provide authentic context that reflect the way knowledge will be used in real life
2. Provide authentic activities
3. Provide access to expert performances and the modelling of processes
4. Provide multiple roles and perspectives
5. Support collaborative construction of knowledge
6. Promote reflection to enable abstractions to be formed
7. Promote articulation to enable tacit knowledge to be made explicit
8. Provide coaching and scaffolding by the teacher at critical times
9. Provide for authentic assessment of learning within tasks

While these frameworks provide insight and guidance for designers and practitioners, situated learning environments can be very challenging to implement. Within situated learning, learners are continually confronted with ill-structured problems in which they must apply higher order thinking skills such as inferential reasoning. Typically, instructional design operates under the assumption that most learning environments are stable and often learning designs can be translated across situations (Winn, 1993). However, as illustrated by Winn, in situated learning, the environment is highly variable and the learning outcomes are dependent upon the context in which the learner is engaged. When designers work to design for situated learning, it is nearly impossible for them to plan and design for every possible environment and situation. Therefore, as suggested by Winn, in effort to address the instructional problem, it is important to incorporate instruction for skills that can be applied across environments and allow learners to transfer knowledge to novel situations. Instruction will then become more adaptive and better suited for situated learning environments.

In the instructional model developed by Brown et al. (1989) and Herrington and Oliver (2000)'s framework for authentic environments, reflection plays an important role within situated learning. Reflection and metacognitive strategies are everyday skills that can help

learners address ill-structured problems in authentic learning environments (Jonassen, 1997). It has been proposed that in addressing the design challenges of situated learning, enhancing metacognitive support and reflective practice will help provide the learners with the skills that are generalized across situations to aid in adapting to novel situations (Winn, 1993). However, there has been little discussion or guidance within the literature on how to design situated learning environments that will promote reflective practice among the learners.

Reflection in situated learning. As described above, in situated learning, learners develop knowledge and skills through their experiences and their interaction with the community and environment. The importance of reflection when learning through experience has long been discussed, first by John Dewey, and later on, further expanded by David Kolb and other researchers focusing on the importance of reflection within experiential learning. Dewey (1938) believed reflection is necessary in order to connect experience and theory as new knowledge is created when learners move between experience and reflection. Kolb (1984) developed a four stage learning cycle according to experiential learning theory that included concrete experience, reflective observation, abstract conceptualization, and active experimentation. As learners encounter new concrete experiences they analyze and reflect on the process through reflective observation. This allows them to develop and transform current concepts into abstract conceptualizations, or newly formed knowledge. Hypotheses and strategies are generated to test these new ideas through active experimentation in future novel experiences.

In a model of reflection for learning that directly relates to learning from reflecting on a learning experience, the authors define reflection as “a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations” (Boud, Keogh, & Walker, 1985, p. 19). The authors’

model of reflective learning is intended to help practitioners understand the impact of reflection on educational outcomes and provide guidance as to how to incorporate it into a situational or experiential learning environment. The model first begins with the full experience of the learner including their behavior as a response to the experience and the personal feelings and ideas in which they are cognitively aware. As the learner reflects, he or she attends to personal ideas, feelings, and reactions while fully evaluating the experience which occurred. As a result of the reflective process, learners are able to develop a personal synthesis, an integration of knowledge, validate current levels of knowledge, create a new affective state, and finally make decisions for future behavior.

By engaging in reflective learning in a similar process described above, it has been suggested that when students reflect on their experiences in situated learning they enhance their ability to transfer knowledge to other environments (Vanderbilt, 1990). Additional benefits of reflecting during situated learning, include, the learners' ability to analyze their performance and determine how to improve in future experience, compare themselves to experts and other practitioners in assessing essential knowledge and skills for improved outcomes, characterize strategies, and compare multiple performances to form abstractions (Collins, 1991). Within the context of an apprenticeship through computer technology, Collins describes four methods for reflecting on performance: imitation, replay, abstracted replay, and spatial reification. Other recommendations were also made by Herrington and Oliver (2000) in their guidelines for authentic learning environments to promote reflection based on the existing literature. In their framework and across the literature, opportunities for learners to compare themselves with experts and other practitioners throughout the experience is an important design consideration (Herrington, Reeves, et al., 2014). They indicate it is important to place emphasis on creating an

authentic environment with authentic content and tasks that enable reflection. Collaboration between students with the goal of reflecting as a group on the experience with particular emphasis on attention is also beneficial to the reflective process within an authentic learning environment. In addition, learning should occur in a non-linear fashion with opportunity to return to a previous element for reflection (Herrington, Reeves, et al., 2014).

While these reflection strategies are important within situated learning, many of the authors fail to recognize the relationship between the role of the learner within a community of practice and the type of reflection in which the learner should be engaging. In situated learning, learners participate in a community of practice and ultimately function as a practitioner. Therefore, instructional design should promote reflective skills that enhance the performance of a practitioner. Most of the current reflective practices recommended are intended for learners to reflect after the experience or what Schön (1983) describes as reflection-on-action. In order for learners to face novel situations and deal with the ill-structured problems situated learning presents, they need to develop an awareness of themselves and learn how to reason within a given situation (Winn, 1993). Situated learners could benefit and improve performance by increasing their capability to be adaptive thinkers with the ability to solve problems and reflect within the present moment of the experience. This type of practice according to Schön (1983), is referred to as reflection-in-action.

Reflection-in-action

Although reflection is an important component in the design of situated learning, little guidance is provided in the literature on how to incorporate reflection into a situated learning activity. Reflection is often interpreted as one's ability to reflect independently after an experience has occurred, however there are other methods of reflection that can enable a learner

to engage in reflective practice. Reflection-in-action, as first described by Schön (1983), is one method that instructional designers can use to facilitate skills that are transferrable across environments and promote reflection within situated learning. Whether it is practitioners in the workforce, or students in a typical classroom, people engage in regular tacit actions every day, resulting in automated behavior. Behavior and performance are carried out with little to no thought prior to engaging in the action. This, according to Shön (1983), is known as knowing-in-action. Within a community of practice, the full members of participation have the greatest level of knowing-in-action as they likely engage in practice without thinking about how they learned the material, their personal recognitions, judgments, or actions prior to performance. However, when confronted with a "surprise" or a moment of unique uncertainty, knowing-in-action can often leave learners and practitioners without a proper response to adjust to the situation. A reflective practitioner on the other hand, when facing surprises in the environment, either good or undesirable, will respond by engaging in reflection-in-action or thinking about an action while in the midst of performance. Reflection-in-action allows one to analyze and criticize tacit performance and think about feelings, perceptions, and actions as they are occurring in order to better adjust to the present moment and perform better. When facing unfamiliar environments with uncertainty and ill-structured problems, similar to those of situated learning environments, reflection-in-action could be an effective tool in adapting to the situation and determining an effective solution.

Contrasting with reflection-in-action, and most often utilized in situated learning and other educational environments, is reflection-on-action. Reflection-on-action occurs when learners reflect after the experience resulting in no connection to the present moment (Schön, 1983). Typically reflection-on-action allows for greater length of reflective time and more

intensive state of reflection (Carroll, 2009). This permits one to engage in personal curiosity and inquiry to understand the individual perspective, behavior, and future implications of the past experience on which the reflection is occurring (Carroll, 2009; Schön, 1983). Practitioners, who learn to effectively reflect-in-action and critically reflect-on-action, have the ability to improve their tacit knowledge and further improve everyday performance (Schön, 1983).

Reflection-in-action strategies are incorporated in many learning environments and have been shown to increase reflective practice such as reflection-on-action, overall performance (Jordan et al., 2009), and the ability to engage in critical thinking skills (Austin, Gregory, & Chiu, 2008). As described by Horton-Deutsch, Drew, and Beck-Coon (2012):

> Reflection-in-action is a complex cognitive activity that requires learners to be conscious of what they are doing and how they are doing it in the moment of practice. Processes for reflecting-in-action are those creative strategies that learners can use in the moment of practice, when learners are being, thinking, and doing simultaneously (p.80).

However, creating an environment that supports reflective practice can be very difficult. Reflection-in-action requires complex cognitive skills of which most learners and practitioners are not naturally accustomed. Providing learners with metacognitive strategies to enhance reflection-in-action will allow them to perform better in the moment and find deep meaning when reflecting back on the experience (Horton-Deutsch et al., 2012; Pezzolesi et al., 2013). According to Von Wright (1992), "metacognitive skills refer to the steps that people take to regulate and modify the progress of their cognitive activity: to learn such skills is to acquire procedures which regulate cognitive processes" (p.64). Metacognitive skills do not come naturally to most students and rarely will they spontaneously engage in metacognitive thinking (Lin, 2001). Therefore, when designing instructional environments, especially those of situated

learning, Lin (2001) argues the importance of including metacognitive support to enhance learning. One metacognitive strategy that has recently been introduced to the educational research field is mindfulness. Mindfulness has strong implications as an instructional strategy to not only provide metacognitive support, but also enhance the reflective learning process in situated learning environments.

Mindfulness

Mindfulness is a method used to direct attention that has its roots in Eastern culture as a pillar of Buddhism meditation practices. Now widely practiced within Western culture, today a commonly accepted definition of mindfulness includes one's awareness and attention to the present moment and accepting the experience in a non-judgmental way (Baer et al., 2004; Bush, 2011; Davis, 2014; Kabat-Zinn, 1982). Many associate mindfulness with religious connotations, however the very foundation of mindfulness rests in a pragmatic scientific way of thinking (Epstein, 1999; Hart, 2004). Everyone is mindful to some degree as it is an instinctive human capability (Kabat-Zinn, 2003). Buddhist principles are associated with mindfulness as this culture originally taught and still emphasizes bringing mindfulness to daily life (Kabat-Zinn, 2003). It is a skill that when acquired allows one to focus attention on the present moment and observe themselves along with their own personal behavior and inner dialogue (Goh, 2012; Lynn, 2010). The mind has a natural tendency to wander to other thoughts, memories, or feelings often leaving behind much of what actually occurs in the present moment (Kabat-Zinn, 2003; Paulson, Davidson, Jha, & Kabat-Zinn, 2013). Mindfulness creates a space allowing one to acknowledge the mind wandering but then actively redirect attention back to the present (Kabat-Zinn, 1982).

From a cognitive perspective, the practice of mindfulness includes two major components including self-regulation of attention and an orientation to one's experience (Bishop et al., 2004). Self-regulation of attention involves both sustained attention to current experience, along with a flexibility to engage in switching in effort to bring attention back to the present after acknowledging the observed thought or feeling (Bishop et al., 2004). This allows one to directly experience the object or moment rather than experiencing it through the lens of personal emotions, beliefs, or expectations (Bishop et al., 2004). Creating space between preconceived prejudices to an experience and the present moment allows one to fully experience the moment and identify new and otherwise unnoticed details from a given event. In this respect, mindfulness is identified as a metacognitive skill both from a theoretical and neurological perspective (Bishop et al., 2004; Holas & Jankowski, 2013). Intrinsic to mindful practice is a level of meta-awareness that allows individuals to deliberately monitor their own consciousness, more frequently perceiving thoughts unrelated to a given task (Holas & Jankowski, 2013; Paulson et al., 2013). Individuals have the knowledge of if their mind is wandering and what their mind is observing and thinking. This inherently uses metacognitive skills that help manage cognitive processes including inhibitory control and cognitive flexibility (Holas & Jankowski, 2013). Both mindfulness and metacognition involve top-down processing that has been shown to be controlled by the prefrontal cortex in the brain (Jankowski & Holas, 2014; Paulson et al., 2013). This neurological mechanism allows an individual to suppress one cognitive activity while activating another, a key feature of both mindfulness and metacognition (Jankowski & Holas, 2014).

Orientation to one's experience refers more to the key piece of mindfulness: attitude (Bishop et al., 2004; Shapiro, 2009). It is not only enough to direct one's attention, but how one

directs his or her attention is essential. With mindful awareness, as the mind wanders, an attitude of curiosity, openness, and acceptance is required (Bishop et al., 2004; Kabat-Zinn, 2003; Shapiro, 2009). Siegel (2007) describes this awareness as approaching a situation with curiosity, openness, acceptance, and love (COAL). Without these attitudinal qualities, it is likely that one will bring judgment, personal emotions, and preconceived expectations to a given experience. With a level of openness, compassion, and kindness, one is able to become fully open to whatever the present moment brings (Shapiro, 2009). Possessing the proper attitude will help one avoid aspects of the experience, increase an individual's ability for self-observation, and recognize cognitive and affective qualities of the experience (Bishop et al., 2004).

Mindfulness in education. There has been a large interest in the application of mindfulness across disciplines, especially for clinical and psychological treatment. Mindfulness approaches such as Mindfulness-Based Stress Reduction and Dialectical Behavior Therapy are often used to help patients with a variety of clinical diagnoses including pain management, anxiety, depression, addiction and many other behavioral disorders (Bishop et al., 2004; Kabat-Zinn, 1982, 2003; Shapiro, 2009). Additionally, mindfulness is increasingly being incorporated into educational curriculums across disciplines as an instructional strategy (Bush, 2011; Lynn, 2010). Educators and administrators have taken an interest in determining how being more patient in the classroom affects cognitive functions and learning outcomes (Bush, 2011). As a result, several organizations have been established including The Center for Contemplative Mind in Society, the Association for Mindfulness in Education, and Mindfulness in Education Network, which have increased awareness and encouraged bringing mindfulness practices into the classroom (Davis, 2014).

Mindfulness plays a different role in an educational setting as compared to clinical practice. According to Stewart (2010), practicing mindfulness allows students the ability to approach learning with cognitive flexibility preventing mindless automated behavior and an ability to fully embrace the moment for future transfer of knowledge. Ritchhart and Perkins (2000) describe the role of mindfulness in education:

> Consequently, the real educational potential for mindfulness lies not in raising test scores but in addressing some of the other intractable problems of education such as the flexible transfer of skills and knowledge to new contexts, the development of deep understanding, student motivation and engagements, the ability to think critically and creatively, and the development of more self-directed leaners.

Within the context of education, Langer (2000) defines mindfulness as "a flexible state of mind in which we are actively engaged in the present, noticing new things and sensitive to context" (p.220). When mindful, learners will draw new distinctions and notice novelty within a situation with behavior guided by rules and routines but not predetermined by them. This differs from what the author refers to a mindlessness way of learning where our thoughts and behavior are governed merely by previously programmed knowledge blinding the learner to only one possible perspective or solution. Throughout her extensive research, Langer has found many benefits of mindfulness within education and believes mindlessness is a result of the way content is delivered to the learners.

In two influential studies, incorporating a mindfulness way of delivering instruction increased learners' level of creativity when facing novel situations and spontaneously utilizing knowledge from a previous experience (Langer, Hatem, Joss, & Howell, 1989; Langer & Piper, 1987). Both of these studies used experimental approaches, teaching the experimental group of

learners from a mindful approach where the information was delivered in a more conditional manner using words such as “could be,” “perhaps,” or “from one perspective.” The control group received a more mindless way of delivering information that was more absolute and less conditional. While Langer and Piper (1987) focused on college students, and Langer et al. (1989) examined both college students and children along with also adding an additional variable of confidence to instruction, both studies found similar results.

Langer and Piper (1987) conducted three experiments recruiting an equal number of both male and female Harvard undergraduate students. Participants were introduced to unfamiliar objects in either a mindful, conditional manner, leaving the function or need of the object as flexible, or in a mindless or unconditional manner, providing one absolute function for the object. After instruction had taken place, the researchers introduced a scenario where there was a need for an object for assistance that the object currently present could not explicitly fulfill. In all three experiments, those students introduced to the unfamiliar object in a mindful conditional manner were able to provide a creative solution to the problem using the object in a novel way whereas the control group was not. Individuals were evaluated based on behavioral responses and groups were compared using Chi-square analyses.

Similarly, Langer et al. (1989) conducted a series of three experiments with various age groups. In each experiment, groups were again either given conditional or unconditional instruction. After the instruction, the participants had to carry out a task such as writing a type of poem, completing an exam, or delivering a training module. Results were evaluated using three raters to evaluate creativity, performance and overall level of mindfulness. Those students taught from a mindful perspective were able to use the information in a creative manner to develop solutions, while those students taught from an absolute perspective, were able to recite

the information they had learned, but were limited in applying the knowledge in a spontaneous or creative manner.

Mindfulness in education has also been shown to increase attention, result in a greater level of personal liking and meaning with the content material, and improve memory (Langer, 1997). In one experimental study of children (Carson, Shih, & Langer, 2001) and one experimental study of adults (Levy, Jennings, & Langer, 2001), participants in the mindful group were asked to view objects (pictures and maps) from multiple perspectives while the participants in the control groups were not given any direction on how to focus their attention. As a result, those who were able to mindfully attend to the objects demonstrated improved attention and also improved memory of the objects they observed. It was concluded those in the mindful groups were able to draw on information from multiple perspectives, increasing their memory, rather than have one fixed viewpoint of the object.

In addition to these early studies on mindfulness in education, more recently, additional benefits have been illustrated in the literature (Bush, 2011). In an examination and synthesis of recent college courses, including several academic disciplines that all were introducing mindfulness within the classroom practices, the author drew the conclusions that across these courses, professors reported the following changes in the learners: increased concentration, greater ability for synthetic thinking, increased cognitive flexibility, and a greater appreciation for the learning process (Bush, 2011). The results varied across each example and were self-reported in a focus group interview setting by instructors who were implementing mindfulness in their courses. As illustrated in Table 2, each instructor approached the utilization of mindfulness in education somewhat differently depending on the intended outcome.

Table 2
Examples of Mindfulness Practices in Higher Education as Described by Bush (2011)

Discipline	Method of Mindfulness Utilized
Studio Art	Meditation to find writing strategies to enable students to think critically and see the work as a whole rather than small parts
Contemplative Arts and Society	Practice paying attention and using an open awareness to connections with environment and peers. Focused attention on movements such as painting after learning, and attention to breath
Religious Tradition	Students engaged in contemplative reading and journal writing
Chemistry and science	Mindfulness of sound or "listening out" to help reflect on work in relation to a broader perspective Directing mindful practice towards natural and manmade objects for more in depth observations
Democracy	Mindfulness practice (shamatha) was used to help students face injustice and suffering within a service-learning setting
Psychology	Breath-focused mindful attention, mindful listening, reflective journaling
Information and Technology	Mindful sitting, mindful walking, mindful choice making
Law	Staying present through discomfort and completing the same task blindfolded

Similarly, in a sociology course, a research study incorporated mindfulness with the aim to help increase understanding of the complex relationship between society and the individual (Song & Muschert, 2014). At the beginning of each class, the students were introduced to a different mindfulness practice and then actively participated in the practice of the day. Examples included stillness practices, visualization, creative practices such as journaling and contemplative art, deep listening, walking meditation, and creating a personal space. Students not only reported that mindfulness was a positive experience in relation to their learning, but they also developed

an enhanced level of personal awareness and a broader perspective and understanding of the content.

Finally, in a study of social work students who were working in an experiential learning environment in the field, mindfulness training was incorporated to help students face the stressors and increase cognitive support during their experiences (Birnbaum, 2008). Using qualitative analyses, the researchers found students who were using mindfulness training during their experiences reported an increased self-awareness, increased emotional support for stressors in their field experiences, and a greater personal insight into their professional self-concept than prior to having participated in regular mindfulness practices throughout the course. (Birnbaum, 2008).

Mindfulness as an instructional strategy. While sometimes confused as merely a form of relaxation, mindfulness is a cognitive skill that can be developed and acquired under the appropriate training and practice (Bishop et al., 2004). There are many methods to help learners develop mindfulness skills that could be helpful in implementing mindful learning as an instructional strategy for situated learning. Mindful learning requires a very active role of the learner and therefore requires certain features of the learner to engage in mindful learning. These key features are apparent within the literature and further summarized by Siegel (2007) to include "openness to novelty, alertness to distinction, sensitivity to different contexts, implicit, if not explicit awareness of multiple perspectives, and orientation to the present" (p.237).

Shapiro (2009) developed a model of mindfulness training that encompasses these elements through three main themes: attention, attitude, and intention. From a cognitive perspective, mindfulness is an attention regulation skill, therefore one element of the model includes attention of both internal and external experiences within the present moment (Shapiro,

2009). Epstein (2003a) expands on the importance of attention in his conceptual model of mindfulness for the training of medical students and practicing physicians. Learners must be able to engage in critical observation of themselves becoming aware of their own perceptions and bias during a given situation. In alignment with openness to novelty and alertness to distinction (Siegel, 2007), this includes looking for both the familiar and unexpected within in an experience and solving a problem (Epstein, 2003a).

The next key feature of mindful practice is attitude (Shapiro, 2009). As supported in the extensive research of Langer described above, for mindful learning to occur, learners need to embrace critical curiosity and an openness for new information and awareness of multiple perspectives (Langer, 1997; Siegel, 2007). Critical curiosity of the learner involves inviting doubt and a flexibility to pursue the situations from multiple perspectives (Epstein, 2003a). When the learners view the situation free of premature cognitive commitments, they have a greater ability to examine information from new perspectives to create new schemas or categories for which the novel experiences will align (Langer, 1997). This according to Epstein (2003a) is maintaining a "beginners mind" and includes tolerating doubt and uncertainty in order to maintain openness.

Finally, the intention of the learner in engaging in mindfulness is important (Shapiro, 2009). A learner's sensitivity to context, openness in a nonjudgmental way to the present, and staying within the present in order to engage in mindfulness will result in more mindful learning (Epstein, 2003a; Langer, 1997; Siegel, 2007). A learner must have intention to engage in mindful practice as it will not occur naturally.

While the existing literature of mindfulness incorporated as an instructional strategy within education is limited, there have been recommendations and applications of methods that

could be utilized to develop mindfulness within an instructional setting. As recommended for training mindfulness skills in other disciplines, in order to achieve mindful learning, a foundation of mindfulness skills should be developed and then carried forward for application into everyday activities (Kabat-Zinn, 1982).

Mindfulness can be incorporated into instruction using both formal and informal mindfulness practices (Carmody & Baer, 2008; Pezzolesi et al., 2013; Shapiro, 2009). It is often the case that formal mindfulness meditation practices will be used to help learners build the foundation for mindfulness skills in order to apply mindfulness in everyday activities through informal mindfulness practices (Carmody & Baer, 2008; Pezzolesi et al., 2013; Shapiro, 2009). Without formal practice it is difficult to achieve the ability to engage in informal practice. Formal practices include activities such as sitting meditation, body scan, yoga, or breathing exercises. Informal practices, which are more consistent with what would be utilized in situated learning, include applying mindfulness skills to any routine activity in which one is engaging and attempting to become aware of all sensations one is experiencing. This can include eating, walking, doing chores, or engaging with others (Carmody & Baer, 2008; Pezzolesi et al., 2013; Shapiro, 2009).

Based on application of building mindfulness skills within a clinical setting, within an instructional environment, formal mindfulness practice can begin with simple formal practices such as attention to breath until attention has become stable and as the learners build their skills, allow their attention to expand to other objects to include all physical and mental events within the room (Kabat-Zinn, 1982). When individual mindfulness skills have been developed, group mindfulness practices can also be used. Epstein (2003b), developed a teaching method to improve health professionals' practice by helping in effectively teaching mindfulness. This

method including priming, availability, asking reflective questions, active engagement, modeling, practice, praxis, and assessment. Additional methods that have been utilized for incorporating mindfulness in learning environments include building an environment of self-observation, reflective journaling and discussion for inviting curiosity, modeling while thinking out loud, experiential learning, and intuitive writings (Birnbaum, 2008; Epstein, 2003b). From a content delivery perspective, mindful learning requires using conditional instruction in contrary to an absolute perspective in effort to create an openness to other perspectives and a sensitivity to context of information (Langer, 1993, 1997, 2000).

As described above, mindfulness as an instructional strategy can provide situated learners with the ability to focus their attention on the present moment and maintain an openness to different perspectives, helping them adapt to the ill-structured nature of situated learning. This is an essential metacognitive skill that instructional designers could integrate to provide support for learners in an unpredictable situated learning environment and to enhance learners' ability to act as reflective practitioners within the community of practice. As described by Horton-Deutsch et al. (2012), when mindful, "learners bring clarity to what they are sensing, feeling, thinking, wanting, and willing to do. Integrating mindfulness into educational pursuits lays the foundation for reflective learning" (p.81).

Mindfulness and Reflection-in-Action

Mindfulness and reflection-in-action are intimately connected and when integrated, it has been previously suggested that mindfulness is one strategy that could be used to improve reflection-in-action (Jordan et al., 2009; Pezzolesi et al., 2013). In a study that applied auto-ethnography and action research methods, the authors examined how medical professionals utilize mindfulness in both their professional and personal lives (Nugent, Moss, Barnes, &

Wilks, 2011). Based on their findings, the researchers concluded mindfulness is facilitative of reflective practice. Qualitative analyses revealed the participants reported that mindfulness enhanced reflection by offering a place to stop and think, deepened their relationship with themselves, and provided clarity for them to perceive things in a different way changing the way they responded and behaved within a situation.

Mindfulness also enhances reflection-in-action as it has been suggested to play an influential role in an individual's decision making (Epstein, 1999). In an extensive synthesis of literature within social work education, Mishna and Bogo (2007) investigated how mindfulness and reflection-in-action can benefit social work instructors in teaching socially sensitive content to diverse classrooms. In the development of their framework, the authors concluded the integration of these principles enhances the instructor's ability to adjust to conflict within the classroom through improved reactive decisions when facing conflict. When engaging in mindful reflection-in-action they have the ability to respond with creative and novel solutions rather than in an automated habitual way that may impede the trusting culture of the classroom. Similarly, however not formally tested, based on evidence within medical education practice, it has been suggested that mindful reflective practice could allow healthcare professionals to relieve stress, increase their attention and awareness, and as a result improve treatment for patients by reducing medications errors that resulted from poor attention and automated behavior (Pezzolesi et al., 2013).

Additionally, mindfulness integrated with reflective practice enhances overall learning and performance outcomes as it provides the learners the ability to gain a better understanding as a result of experience in the present moment (Horton-Deutsch et al., 2012). In a series of two studies which integrated mindfulness and reflection within a social work classroom curriculum,

researchers examined how mindfulness and reflection effect the learners' ability to develop and apply active learning skills when working with a patient, a foundational strategy for social work practice (Goh, 2012). After qualitative analyses of both group and personal reflections, the results indicated when mindfulness and reflection were combined within an instructional environment, learners reported an enhanced awareness of poor habits that hindered their active listening skills and the ability to adjust their attention to improve performance within the present moment. In addition, learners reported an enhanced personal awareness and stronger learning outcomes as a result of engaging in mindfulness and reflective practices.

While not empirically test, other benefits of incorporating mindfulness for reflection-in-action have been identified and described within the literature. Horton-Deutsch et al. (2012), indicate that mindfulness practice enhances reflection-in-action as it can free the learner from previously engrained perceptions and schema, tacit knowledge, and automated habitual behavior (Horton-Deutsch et al., 2012). This creates an openness which allows for learners to reflect-in-action in analyzing the experience as it occurs in order develop creative solutions that will allow them to adapt to novel situations and solve complex problems. When mindful, learners and practitioners have a personal awareness that allows them to access information that would normally be outside of the perspective allowing for deeper reflective thinking in reflection-in-action (Bishop et al., 2004; Horton-Deutsch et al., 2012). When learners engage in reflection-in-action supported by mindfulness they are able to find more meaning in the present moment which in turn enhances the meaning making process when they engage in reflection-on-action (Horton-Deutsch et al., 2012). As situated learners act as practitioners within a community of practice, it is essential for learners to have skills that allow them to succeed as practitioners by facing ill-structured problems and novel situations. Based on the benefits of the integration of

these two concepts as indicted in the existing literature, mindfulness and reflection-in-action are two instructional strategies that if incorporated into the design of the learning could enhance a situated learning environment.

Summary

Expanding on theorists' work in experiential learning and socio-cultural theory, the theory of situated cognition and situated learning evolved grounded in the idea that learning and cognition are dependent upon the context in which they are embedded (Brown et al., 1989; Herrington & Oliver, 2000). In a situated learning environment, learners become members of a community of practice participating in authentic tasks often through means of apprenticeships, anchored instruction, or computer mediated simulations. Designing instruction for situated learning can be difficult as authentic environments are often unpredictable and vary greatly across situations and disciplines (Winn, 1993). It has been suggested, to aid instructional designers in designing situated learning environments, that skills that can be developed and transferred across environments are essential to support situated learners in facing the ill-structured problems and unique environments (Winn, 1993).

Reflection to promote abstraction and transfer of knowledge to future situations has been identified in the literature as a key component to situated learning (Brown et al., 1989; Herrington & Oliver, 2000). However, there is little to no discussion within the research as to how to best incorporate reflection to support learners in a situated learning environment. The role of learners in situated learning differs from that of students in a typical formal learning environment, as situated learners participate as practitioners in a community of practice. Therefore, reflective learning as suggested by Schön (1983) occurs through reflection-in-action. As reflective practitioners, individuals can think about what they are doing as they are doing it in

order to adjust to novel situations and develop effective solutions to ill-structured problems. In effort to support reflection-in-action within a situated learning environments, metacognitive support is key (Lin, 2001).

One metacognitive skill that has been illustrated and suggested to enhance reflection-in-action is mindfulness (Epstein, 1999; Jordan et al., 2009; Mishna & Bogo, 2007; Nugent et al., 2011). Within the situated learning environment, learners who engage in mindfulness could have the ability to free themselves of preconceived perceptions and tacit knowledge allowing them to more effectively engage reflection-in-action which will aid in problem solving and transfer of knowledge (Horton-Deutsch et al., 2012). Reflection-in-action and mindfulness are essential skills for practitioners that can be translated across instructional environments. By integrating mindfulness to enhance reflection-in-action in a situated learning environment, instructional designers could address difficulties faced when designing for situated learning, particularly in promoting reflection within the environment.

Mindfulness has recently been incorporated as an educational strategy but has not yet been explored within situated learning. In addition, little discussion or guidance is provided within the literature on how to implement reflection within a situated learning environment to support the cognitive needs of the learners and enhance performance and learning outcomes. This study sought to fill a gap in the literature by developing a conceptual model that integrates mindfulness strategies to promote reflection-in-action within situated learning. This will help to provide a foundation for future research within situated learning and assist instructional designers in addressing many of the issues faced when designing for the variable and uncertain environments that arise within situated learning.

CHAPTER 3

Introduction

This section describes the methodology that was used throughout this research study. The purpose of this research was to develop a conceptual model that will support the design of reflective practice within a situated learning environment by incorporating mindfulness as a metacognitive strategy to enhance reflection-in-action. Through the development of the model, this research sought to answer the following three questions:

1. What strategies for mindfulness practice are applicable for education?
2. How do these strategies transfer to promoting reflection-in-action during situated learning activities?
3. What features of mindfulness should be included to promote reflection-in-action within a conceptual model of reflection for a situated learning environment?

Study Design

Design and Development Research

The field of instructional design works to improve learning and performance through both instructional and non-instructional methods. While many different research methodologies are utilized in the field, unique to instructional design is design and development research. As defined by Richey and Klein (2007), design and development research is "the systematic study of design, development and evaluation processes of instructional and non-instructional products and tools and new or enhanced models that govern their development" (p.1). The scope of design and development research spans from studying the design and development process in its entirety, a portion of the process, or the particular impacts of a design and development project (Richey & Klein, 2014). The major goal of design and development research is to inform

practice by creating knowledge grounded in empirical data (Richey & Klein, 2007). Research questions most often evolve from actual workplace and educational practice, emerging technologies, or theoretical questions found within the existing literature (Ross et al., 2008). This type of research is appropriate for the current study as there is a need to create a model that includes activities for promoting reflective practice within a situated learning environment. Currently there is no existing model, framework, or guidelines as to how to design or best support reflective practice within a situated learning environment. Creating a conceptual model for reflection will help designers in facing the variable conditions present within a situated learning environment by incorporating metacognitive support for reflection-in-action to provide learners skills that transfer across environments and help them adapt to the ill-structured nature of situated learning.

Design and development research utilizes many approaches to research including quantitative, qualitative, and mixed methodologies. There are two major categories of design and development research: product and tool research and model research. Product and tool research has classically been referred to as Type 1 design and development research while model research is classified as Type 2 (Richey & Klein, 2007). The first type usually focuses on the design and development of products and tools often documenting the process in its entirety (Richey & Klein, 2014; Ross et al., 2008). Product and tool research often requires the researcher to act as both the designer and researcher of the process as they create the tool while studying the process of development (Ross et al., 2008). Three major classes of product and tool research include: comprehensive design and development projects, phases of design and development, and tool development and use (Richey & Klein, 2014; Richey & Klein, 2007). Model research differs from product and tool research as it focuses on the development and validation of models. These

studies focus more on the process rather than the demonstration of the model and are often more generalizable than product and tool development research (Richey & Klein, 2014). Type 2 studies may illustrate the effectiveness of a new or existing model or process and help determine conditions that facilitate design and development (Ross et al., 2008). There are also three major classes of model research: model development or the creation of a new model, model validation that implements a process to evaluate the validity and effectiveness of a model, and model use or studies which examine the context in which models are used and the impact of various environmental variables on the application of the model (Richey & Klein, 2014; Richey & Klein, 2007; Ross et al., 2008).

This study used Type 2 design and development methodologies for model development and model validation research. Richey and Klein (2007) describe several methodologies to implement both Type 1 and Type 2 studies (see Table 3). Based on their recommendations, this research included four key phases: literature review, model development, expert review evaluation for model validation, and revision (Richey & Klein, 2007).

Through model development, a new conceptual model was developed to help guide the design process of developing instruction that supports reflection-in-action by incorporating mindfulness within a situated learning environment. The conceptual model identifies and illustrates the relationships between mindfulness and reflection-in-action, and the impact on reflective practice for situated learning. In addition it builds upon Brown et al.'s (1989) instructional model and Herrington and Oliver's (2000) framework for authentic learning environments by expanding on the reflection component and incorporating it throughout each aspect of situated learning. The phases of this development research are described below.

Table 3.
Common Methods Employed in Design and Development Research Richey and Klein (2007, p. 40)

Type of Research	*Project Emphasis*	*Research Methods Employed*
Product & Tool Research	Comprehensive Design & Development Projects	Case Study, Content Analysis, Evaluation, Field Observation, In-Depth Interview
Product & Tool Research	Phases of Design & Development	Case Study, Content Analysis, Expert Review, Filed Observation, In-Depth Interview, Survey
Product & Tool Research	Tool Development & Use	Evaluation, Expert Review, In-Depth Interview, Survey
Model Research	Model Development	Case Study, Delphi, In-Depth Interview, Literature Review, Survey, Think-Aloud Methods
Model Research	Model Validation	Experimental, Expert Review, In-Depth Interview
Model Research	Model Use	Case Study, Content Analysis, Field Observation, In-Depth Interview, Survey, Think-Aloud Methods

Phase 1: Literature Review

Phase one of the research began with an extensive review and synthesis of the literature to identify considerations for creating instruction that incorporates mindfulness to enhance reflection-in-action within the design of a situated learning environment. The literature review was the foundation for the development of the conceptual model. An extensive review of current methods, instructional strategies, and models of mindfulness, reflection-in-action, and reflection within situated learning was included in this phase of the research. The review sought to determine critical elements for incorporating mindfulness as a metacognitive support to enhance reflection-in-action along with recommendations for design and implementation within situated

learning based on evidence within the literature. Data collected through the literature review was organized using a synthesis matrix created in Microsoft Excel.

Literature was reviewed within the field of situated learning, but also spanned other educational disciplines that are similar or applicable to practices of situated learning. The review was limited to studies that examine mindfulness from an educational perspective drawing from practices from its original roots as supported within the field of education. Finally, as discussed above, situated learners share roles to practitioners. Therefore, the review was limited to studies that examine reflection-in-action within situated and experiential learning environments as well as within the practice of a reflective practitioner. Databases that were searched within the literature review included JSTOR, EBSCOhost, ERIC, and ISI Web of Science. All non-peer reviewed and non-empirical materials were eliminated from the search criteria and the review did not consider websites or trade magazines. Keywords used in the search process included, situated learning, authentic learning, reflection, reflection-in-action, mindfulness, instructional strategies, instructional design, and situated learning models. After applying the exclusion criteria to the literature search, a total of thirty-three empirical studies were identified and used as data for the development of the model. Of the total articles, thirteen focused on strategies for promoting reflection within situated learning, eight on strategies for reflection-in-action within situated learning, and twelve on strategies for mindfulness within education.

Phase 2: Model Development

In order to identify elements essential to integrate mindfulness for reflection-in-action within a model of situated learning, a conceptual model was developed that provides evidence for the relationship and impact of the key variables. A synthesis of the literature review was the foundation for the model, providing existing recommendations and best practices of each

variable grounded in data within the literature. Through comparison methods, the literature was analyzed to identify patterns and overlap between key concepts and strategies of mindfulness and reflection-in-action as applicable within situated learning. This process was completed by first analyzing the literature separately within each of the three major areas of focus as described above: reflection in situated learning, reflection-in-action in situated learning or authentic learning environments, and mindfulness within education. After critically reviewing an article, the strategies examined within the research and associated outcomes were recorded within the literature review synthesis matrix. Within Microsoft Excel, for each article, the author(s), study design, and research question were first listed within their respective columns. Then, the strategy applied within the research design, for example mindful instruction, was recorded along with the major outcome found associated with the strategy within the research. The strategies were then grouped into major categories for each of the three main areas examined within the literature review. These categories are listed in Table 4. Within the model, outcomes associated with the strategies were listed to illustrate the effects of incorporating the strategy within an instructional environment (see Table 8). Finally, the main categories were then again synthesized and grouped into broader categories as applicable within the three main phases of the model: reflection-before-action, reflection-in-action, and reflection-on-action.

Table 4
Categories Developed Within Each Area of Research for Model Development

Reflection in Situated Learning	Reflection-in-Action in Situated or Authentic Learning	Mindfulness Within Education
1. Build a context and environment that promotes reflection	1. Build a context and environment that promotes reflection-in-action	1. Provide an orientation to mindfulness
2. Incorporate social interaction with others	2. Incorporate social interaction with others	2. Include formal and informal mindfulness practices

(Table Continued)

Table 4 (Continued)

3. Consider duration and timing	3. Develop learners' level of personal awareness	3. Deliver instruction in a mindful or conditional way
4. Provide Feedback	4. Incorporate multiple forms of reflection	
5. Provide opportunities to revisit an experience	5. Provide feedback	
6. Promote spontaneous reflection		

The model built off of existing recommendations for reflective practice however, it expanded reflection to include reflection-in-action and creating mindful situated learners. Key to the model is that it builds upon Brown et al.'s (1989) instructional model and Herrington and Oliver's (2000) framework for authentic learning environments by expanding on the component of reflection and incorporating it throughout each aspect of situated learning. This ensures the model is grounded in foundational theoretical roots of situated learning and reflects the evolution of the field and modern recommendations for practice. The model identifies the benefits for creating an environment that promotes reflection-in-action to support learners in a situated learning environment. It also provides evidence for including mindfulness as an instructional strategy for metacognitive support in effort to enhance reflection-in-action.

Phase 3: Expert Review Evaluation

Validity and dependability is critical for the model to be a successful addition to the field of instructional design and situated learning. In order to determine if the model developed was accurate and appropriately supports enhanced reflection-in-action for situated learning, as well as appropriately defines and illustrates the relationship between all variables, three expert reviewers were recruited to review and analyze the model. Prior to recruitment, approval from the university Institutional Review Board (IRB) was sought, however, it was determined by the

board, IRB oversight was not needed for the study therefore the application was cancelled (See Appendix C). The experts were recruited from the following areas of expertise for proper triangulation: situated learning, mindfulness, and reflection. Each expert was contacted via email to request their participation in providing a review of the model.

Based on their expert opinion, the reviewers evaluated if the model appropriately supports incorporating mindfulness to enhance reflection-in-action in a situated learning environment. As recommended by Richey and Klein (2007), all reviewers received, via email, expectations for the review process, the newly developed conceptual model, the extended literature review provided in Chapter Two, along with review questions to guide the evaluation, ensuring completeness and consistency (see Appendix A). While a specific amount of time was not given to the experts to complete their review, all reviewers completed the review within about a month of first receiving the material. Follow-up emails were sent to each expert after the first two-weeks to determine an approximate timeline and ensure they did not have questions regarding the review. Each expert was given the option to provide a written response to the questions or participate in an interview. All three reviewers chose to respond through written feedback. The results of the review were examined individually and then synthesized to identify patterns across all three responses.

Phase 4: Revision

As this was a process of formative evaluation, in the final phase of the research, the model was revised to incorporate the expert reviewers' recommendations and revisions (see Appendix B). Data collected using the results from the reviews was analyzed individually and then synthesized to modify and improve the model developed in this research. The responses from the reviewers were coded and grouped into major into five major themes: 1) strengths of

the model, 2) examples needed for implementing strategies, 3) readability and level of familiarity of the reader, 4) provide a clear goal for the model, and 5) barriers for implementation. The decision to make revisions to the model using the suggestions from the experts was based on two criteria: if multiple reviewers identified the same limitation and recommended the same improvement, or if only one expert recommended the revision, but it was one of his major concerns and weaknesses of the model.

CHAPTER 4

Introduction

As described in Chapter Three, an extensive literature review was conducted that sought to identify methods to promote reflection within situated learning, methods to promote reflection-in-action within situated learning, and mindfulness strategies that are applicable for education. As a result of this review and synthesis of the literature, several major themes emerged that served as the foundation for design and development of a conceptual model of reflection within situated learning. The following section presents the results of the literature review and the model developed based on these results. The model that has been developed is intended to build off of existing effective strategies for reflection within situated learning, however it is expanded to include mindfulness strategies within education that promote reflection-in-action. The model was designed to aid instructional designers in addressing difficulties faced with designing for situated learning particularly in promoting reflection within the environment.

Literature Review Results

The following section provides the results of the literature review conducted to collect data for the foundation of the model. The review sought to determine critical elements for incorporating mindfulness to enhance reflection-in-action, along with recommendations for design and implementation within situated learning, based on evidence within the literature. Based on the criteria of the review as described in Chapter Three, the results are divided into the three main areas covered by the review: reflection in situated learning, reflection-in-action within situated learning, and mindfulness within situated learning. Strategies identified for each area of

research along with associated outcomes are described. These results were then further analyzed and synthesized to produce the model presented later in this chapter.

Strategies for Reflection in Situated Learning

Currently, there is little guidance within the literature on how to design reflection within a situated learning environment. However, there are strategies described within the literature, which when included in situated learning, have been found to promote reflection. These strategies, along with variables to support incorporating these strategies are illustrated in Table 5 and include: building a context and environment that promotes reflection; incorporating social interaction; considering duration and timing of reflection; providing feedback; providing non-linear navigation; and promoting spontaneous reflection.

Table 5
Strategies for Promoting Reflection in Situated Learning

Strategies	Variables to Support Incorporating the Strategy
1. Build a context and environment that promotes reflection (Granville & Dison, 2005; Huisman & Edwards, 2011; Ovens & Tinning, 2009)	• Include context that provides a relatable experience for students (Granville & Dison, 2005; Huisman & Edwards, 2011) • Utilize an authentic context and environment (Croker, Alison, Stillman, White, & Tonkin, 1998; Herrington & Oliver, 2000; Herrington, Parker, & Boase-Jelinek, 2014)
2. Incorporate social interaction with others (Bell & Mladenovic, 2015; Eick, Ware, & Williams, 2003; Herrington & Oliver, 2000)	• Create opportunities for collaborative group work (Herrington & Oliver, 2000) • Peer observation (Bell & Mladenovic, 2015) • Provide opportunities for observation and interaction with experts (Croker et al., 1998; Eick et al., 2003; Herrington & Oliver, 2000)

(Table Continued)

Table 5 (Continued)

3. Consider duration and timing (Boudreau, Macdonald, & Steinert, 2014; Bringle & Hatcher, 1999; Carroll, 2009; Eyler, 2001, 2002; Granville & Dison, 2005; Huisman & Edwards, 2011; Stalmeijer, Dolmans, Wolfhagen, & Scherpbier, 2009; Stewart, 2010)	• Consider a longer duration of learning experience (Boudreau et al., 2014; Granville & Dison, 2005; Huisman & Edwards, 2011; Stalmeijer et al., 2009) • Include opportunities for reflection early on: reflection-before-action (Bringle & Hatcher, 1999; Carroll, 2009; Eyler, 2001, 2002; Granville & Dison, 2005;Stewart, 2010)
4. Provide feedback (Herrington & Oliver, 2000; Herrington, Parker, et al., 2014; Stalmeijer et al., 2009)	• Use a variety of sources; feedback from experts, instructors, other students (Herrington & Oliver, 2000; Herrington, Parker, et al., 2014; Stalmeijer et al., 2009)
5. Provide opportunities to revisit an experience (Croker et al., 1998; Herrington & Oliver, 2000; Stalmeijer et al., 2009)	• Non-linear navigation (Croker et al., 1998) • Include self-observation (Stalmeijer et al., 2009)
6. Promote spontaneous reflection (Boudreau et al., 2014; Herrington, Parker, et al., 2014)	• Develop reflection skills of the learners (Boudreau et al., 2014; Herrington, Parker, et al., 2014)

Build a context and environment that promotes reflection. Situated learning provides an opportunity for authentic learning to occur in variety of settings and includes many different types of activities. Within the literature, it is apparent that context and the environment directly impact both the type and quality of reflection (Granville & Dison, 2005). Within their study on student teacher reflection practices in a situated learning experience, Ovens and Tinning (2009) found learners use different types of reflection within different contexts and "the discursive nature of each setting mediates the forms of activity, consciousness, and reflection that occurs in that setting." (p.1130). When the context enables students to form a connection and feel invested with the experience, students have been found to have a better quality and level of reflection (Granville & Dison, 2005). When designed correctly, the context of the learning environment

will help the students see the value in the learning experience, allowing them to connect and engage in more meaningful reflection (Huisman & Edwards, 2011).

Key to helping students make these connections, is creating or utilizing an authentic context and environment. Croker et al. (1998) conducted a study utilizing a situated learning framework to design an interactive multimedia program for nurses learning medication administration skills. They found, in order for students to reflect meaningfully on their learning, the program needed to provide authentic contexts and tasks with which students could readily identify. Authentic contexts have been found in other studies to promote reflection as they are associated with helping learners spontaneously reflect without the use of external cues or forced reflection exercises (Herrington & Oliver, 2000; Herrington, Parker, et al., 2014).

Incorporate social interaction with others. While reflection can often be an individualized experience, within situated learning, social interaction has been found to enhance students' reflective processes. When students were placed in collaborative groups, reflection was naturally encouraged as "the students frequently returned to the experience recollecting the important considerations and relating them to their partners." (Herrington and Oliver, 2000, p.39). One of the benefits of social interaction in situated learning that promotes reflective practice is peer observation. Through peer observation, students are likely to engage in reflection as it allows them to critically think about their own practices in context and compare themselves to the practices of others (Bell & Mladenovic, 2015). For example, in their study on the impact of peer observation for tutor development in a situated learning environment, the students reported, "It is great because the person you are reviewing is teaching the same content, so you can see how different tutors interact/engage with study. You can see/understand what you do well/poorly and what the person you are reviewing does well/poorly" (Bell & Mladenvic, 2015,

p.28). In addition, based on an extensive review of the literature, it was suggested that the opportunity to observe and interact with experts within the context of practice promotes and enhances reflection (Herrington & Oliver, 2000). Experts' performance provides a benchmark for which the learners can compare themselves as they engage in reflection (Croker et al., 1998). By reflecting on experts' performance, students have been found to learn how to make adjustments within the context of the authentic activity (Eick et al., 2003).

Provide feedback. As with most instructional designs, feedback appears to play a role in promoting reflection in a situated learning environment. Students reported their reflection was greatly supported through multi-source feedback (Stalmeijer et al., 2009). Specifically, when students received feedback from experts or instructors identifying their strengths and weaknesses, they found value in the reflective experience. Incorporating opportunities for feedback into the design of situated learning experiences has been found to help students reevaluate the experience and understand how to integrate new knowledge for future use (Herrington & Oliver, 2000). Additionally, as situated learning can often be a new and variable environment for the student, feedback has been shown to provide the student support and reinforcement to help him or her reach further academically through reflection (Herrington, Parker, et al., 2014).

Consider duration and timing. There is evidence identified in the literature that supports consideration of timing in promoting reflection within situated learning. When situated learning experiences are longer in duration, students have been found to engage in more regular reflection (Huisman & Edwards, 2011; Stalmeijer et al., 2009). Also, in learning experiences of longer duration, researchers found students are more engaged and involved in the experiences allowing them to feel more invested, and as a result, they reflected more meaningfully (Granville

& Dison, 2005). Another study indicated that reflection becomes more of a natural habit, with students reflecting spontaneously the longer they participate in a situated learning experience. (Boudreau et al., 2014).

In addition to a longer learning experience, reflection in situated learning is promoted when it is encouraged and incorporated very early on in the learning process. This helps build a habitual foundation from which learners will engage in deeper reflection more frequently throughout a learning experience (Granville & Dison, 2005). Encouraging reflection early-on in experiential learning often involves engaging in reflection prior to the experience. Building an environment and relationships that facilitate reflection will aid the student in engaging in reflection prior to entering an authentic learning experience (Carroll, 2009). Creating an atmosphere of trust between the instructor and students is important to ensure students are open to questioning themselves and others (Bringle & Hatcher, 1999). Helping students become aware of their own personal perceptions, assumptions, and feelings about the learning experience is important to raise self-awareness (Eyler, 2001, 2002)**.** Reflection-before-action allows them to confront their personal beliefs and sets the foundation for continual self-monitoring and observant behavior during the learning experience (Eyler, 2002; Stewart, 2010)**.**

Provide opportunities to revisit an experience. Another strategy that has been shown to promote reflection within situated learning is non-linear navigation, or the opportunity to return to a previous section of the learning experience. This feature is possible mainly in a computer mediated learning activity. However, by allowing students to return to experiences, reflection is facilitated (Croker et al., 1998) and students can reevaluate the experience while attending to their feelings (Herrington & Oliver, 2000). Another method for non-linear navigation that facilitates reflection is through self-observation. For example, in a clinical setting using cognitive

apprenticeships, students were video-taped and later had the opportunity to watch themselves and discuss the performance. This strategy not only facilitated reflection but also helped students understand the value in self-reflection (Stalmeijer et al., 2009).

Promoting spontaneous reflection. Situated learning environments are intended to be authentic in which the learner is actively engaged in the activity. Therefore, it is important for learners to develop the skills to reflect spontaneously as reflection will need to occur as a result of surprises and unfamiliar events (Boudreau, 2014). The authenticity of the environment is lessened when moments are taken to try and teach learners how to intentionally reflect. However, if given the skills, it is likely they will develop the ability to spontaneously reflect within the situation independently. It is argued, "The provision of the conditions conducive to reflection-rather than explicit direction-provide a powerful enabler for this most critical of learning functions" (Herrington et al., 2014, p.9). Strategies that have been found in the literature to help learners reflect spontaneously include engaging in authentic tasks, and including reflection-on-action to further enhance the reflective process (Herrington, Parker, et al., 2014).

Strategies for Reflection-in-Action in Situated Learning

Situated learners become members of a community of practice and act as practitioners as part of the learning environment. Becoming reflective practitioners will assist them in facing conflict and uncertainty in novel situations. While reflection-in-action is a fundamental component of becoming a reflective practitioner, methods for reflection as described above in situated learning have only focused on reflection-on-action. In order to understand how mindfulness can support reflection-in-action in a conceptual model for situated learning, it is important to understand strategies to promote reflection-in-action within situated learning or similar learning environments. As illustrated in Table 6 and discussed below, several strategies

are apparent within the literature that should be included in the design of reflection-in-action for situated learning environments: build a context and environment that promotes reflection-in-action, incorporate social interaction with others, develop learners' level of personal awareness, incorporate multiple forms of reflection, and incorporate feedback throughout the experience. Many of these strategies overlap with the general strategies for reflection described in Table 5, however, variables to support incorporating these strategies differ in regards to promoting learners' reflection-in-action. Within a model for reflection in situated learning, these strategies can be combined in order to help students learn to become reflective before, during, and after a learning experience.

Table 6
Strategies for Reflection-in-Action in Situated Learning

Strategies	Variables to Support Incorporating the Strategy
1. Build a context and environment that promotes reflection-in-action (Edwards, 2010; Jordan, 2010; Seibert, 1999)	• Expose learners to a variety of practices within an experience (Jordan, 2010) • Create an authentic context and environment (Edwards, 2010) • Provide a comfortable and open-minded environment (Edwards, 2010; Seibert, 1999) • Include promotive and directive pressure (Russell, Norton, Uriarte, & Wisner, 2011; Seibert, 1999)((Seibert, 1999)
2. Incorporate social interaction with others (Edwards, 2010; Russell et al., 2011; Seibert, 1999)	• Provide opportunities for engagement and observing of peers (Edwards, 2010; Russell et al., 2011; Seibert, 1999) • Provide opportunities for engagement of experts (Russell et al., 2011)
3. Develop learners' level of personal awareness (Mishna & Bogo, 2007)	• Develop learners' level of self-awareness (Mishna & Bogo, 2007) • Develop learners' level of awareness of the environment and surroundings (Mishna & Bogo, 2007)

(Table Continued)

Table 6 (Continued)

4. Incorporate multiple forms of reflection (Goh, 2012; Keevers & Treleaven, 2011; Russell et al., 2011; Seibert, 1999)	• Reflection-on-action (Seibert, 1999) • Include multiple opportunities for reflection (Goh, 2012; Keevers & Treleaven, 2011; Russell et al., 2011; Seibert, 1999) • Incorporate mindfulness to enhance reflection (Goh, 2012; Russell et al., 2011)
5. Provide feedback (Jordan, 2010; Seibert, 1999)	• Incorporate feedback from learners' personal reflection (Seibert, 1999) • Incorporate feedback from learners' performance results (Seibert, 1999) • Include critique from experts and peers (Jordan, 2010; Seibert, 1999)

Build a context and environment that promotes reflection-in-action. As described in Chapter Two, learners often have difficulty facing new situations due to their natural ability to engage in automated behavior as a result of their knowing-in-action (Schön, 1983). It has been found that exposing learners to a variety of experiences will help introduce learners to reflection-in-action and is linked with an increase in reflective practice within the experience (Jordan, 2010). Jordan (2010), assessed several different practices to order to determine how to best support novice nurses in becoming reflective practitioners within the anesthesiology setting. Utilizing "on the-job training, interdisciplinary case-based teaching, systematic emphasis on the genesis of practices through 'war stories', and monthly rotation through the sub-departments," (Jordan, 2010, p. 408) the authors found the diverse practices incorporated were linked to more reflective practitioners.

Another important variable associated with context and the learning environment is the creation of an authentic environment in which learners feel comfortable engaging in reflection. This must occur from the beginning of the experience in order for learners to develop skills to become reflective practitioners. Specifically, Edwards (2010) found Library and Information

Services undergraduate students were more likely to engage in reflection-in-action when they felt there was an openness within the environment to speak up and ask questions without feeling embarrassed or uncertain. Additionally, integrating a level of autonomy for learners to feel independent, taking ownership in their learning and performance within the environment has been associated with learners thinking for themselves and therefore was recommended as a condition conducive for reflection-in-action (Seibert, 1999). Reflection-in-action is also supported when learners are situated within an authentic learning environment. Learners are more reflective when they are interacting with situations and materials in which they feel are relevant and they are able to personally connect to the experience (Edwards, 2010).

A final environmental condition conducive for reflection-in-action was identified by Seibert (1999). Through a case study research design using qualitative interviews, the researchers determined that including a level of promotive and directive pressure helped the learners engage in reflection-in-action. Within Seibert's (1999) study, pressure included time demands and exposure to large amounts of new information. Learners were able to reflect-in-action, meeting the demands of the situation, and were also able to see the products of their performance which was another important component for reflection-in-action as further described below.

Incorporate social interaction with others. Within situated learning and organizational practice, reflection-in-action becomes very much a social process (Jordan, 2010). When designing for a situated learning environment, opportunities for social interaction should be incorporated. Within a social context, a reflective practitioner develops interactive methods to approach novel situations through engaging with others. By engaging and observing not only peers, but also skilled and knowledgeable individuals, learners are provided new ideas and perspectives that promote reflection-in-action and adaption to a situation (Russell et al., 2011;

Seibert, 1999). Edwards (2010) found students reported group work enhanced reflection-in-action: “Working in groups to actually apply the things we have learned is very helpful because we can see how they can be used and get help and new ideas from class mates" (p.22). Social work teachers engaging in reflection-in-action also self-reported through reflective journals and intergroup dialogue, their students learned how to become more reflective by observing them which created an environment for learners to practice reflection-in-action (Russell et al., 2011).

Develop learners’ level of personal awareness. In order for learners to engage in reflection-in-action, they need to not only develop a strong personal awareness, but also an awareness of the environment and their surroundings (Mishna & Bogo, 2007). In their study, Mishna and Bogo (2007) found a sound understanding of one’s personal thoughts and feelings, along with the ability to appropriately respond to a situation, will directly impact a practitioner’s ability to engage in reflection-in-action. Also, within a situated learning environment, there are many outside cues, dynamics, and variables a learner must learn to attend to or decide to ignore. An awareness of the environment and how to accept or reject these variables has been illustrated by Mishna and Bogo (2007) to aid a learner in engaging in reflection-in-action.

Incorporate multiple forms of reflection. Reflection-in-action is supported when learners have multiple opportunities and engage in multiple forms of reflection. This is similar to one of Eyler and Giles 5’Cs of critical reflection: continuity. This concept illustrates that learners should be engaging in reflection before, during, and after the experience as all three phases of reflection support and enhance one another. Within situated learning, Seibert’s (1999) research has listed reflection-on-action as one of their five conditions for reflection-in-action. Within the study, they recommend learners taking moments in solitude to engage in processing new information and the experiences in which they were previously engaged. A practice-based study

also found "multiple forms of reflection can strengthen and co-shape one another" (p.505) helping learners engage not only in routine activities but also in encountering surprises (Keevers & Treleaven, 2011). As part of including multiple forms of reflection, integrating mindfulness throughout the experience enhances reflection-in-action. Coupled with mindfulness, research has shown engaging in multiple forms of reflection enables learners to observe and process thoughts, feelings, and behaviors to become reflective practitioners and improve performance (Goh, 2012; Russell et al., 2011). Putting the pieces together will encourage and support reflective practitioners to succeed in a situated learning environment.

Provide feedback. As part of the reflective process and as motivation for reflection-in-action, feedback within the situation is essential. Jordan (2010) found that novice nurses who received feedback during the experience were provided with exposure to alternative methods and diverse perspectives that widened personal perspectives, exposing areas of weakness. This feedback helps practitioners bring new perspectives to future novel experiences and through reflection-in-action, better adjust to situations. As their second condition for strategies that support reflection-in-action, Seibert (1999) found feedback is essential and occurs as a result of one's performance outcomes, from the results from personal reflection, and from critique provided by experts and peers within the experience. Incorporating feedback within situated learning will provide learners with immediate information that enhances the ability to reflect-in-action and understand the results of engaging in the experience as a reflective practitioner (Seibert, 1999).

Mindfulness Strategies for Situated Learning

Mindfulness strategies have been integrated across many disciplines including education. Several mindfulness strategies are apparent in the literature that transfer to situated learning

environments to help promote reflection. As illustrated in Table 7 and discussed below, the following strategies can be incorporated when designing for reflection within situated learning particularly to promote reflection-in-action: providing an orientation to mindfulness, including both formal and informal mindfulness practices, and delivering instruction in a mindful or conditional way.

Table 7
Strategies for Mindfulness in Education

Strategies	Variables to Support Incorporating the Strategy
1. Provide an orientation to mindfulness (Birnbaum, 2008; Bohecker, Wathen, Wells, Salazar, & Vereen, 2014; Carroll, 2009; Crumley & Schutz, 2011; Epstein, 2003b; Shapiro, 2009; Trunnell, 1996)	• Include an introduction to what constitutes mindfulness and methods on how to become mindful learners (Birnbaum, 2008; Bohecker et al., 2014; Crumley & Schutz, 2011; Epstein, 2003b; Trunnell, 1996)
2. Include formal and informal mindfulness practices (Crumley & Schutz, 2011; Diaz, 2011; Mapel, 2012; Trunnell, 1996)	• Build a foundation for informal practices through formal practices (Crumley & Schutz, 2011; Diaz, 2011; Mapel, 2012; Trunnell, 1996) • Integrate informal into everyday experience (Birnbaum, 2008)
3. Deliver instruction in a mindful or conditional way (Anglin, Pirson, & Langer, 2008; Langer et al., 1989; Langer & Piper, 1987; Ryu & Lee, 2015; Sherretz, 2011)	• Present material from multiple perspectives (Anglin et al., 2008; Langer et al., 1989; Langer & Piper, 1987; Ryu & Lee, 2015; Sherretz, 2011) • Use conditional language to maintain cognitive flexibility (Anglin et al., 2008; Langer et al., 1989; Langer & Piper, 1987; Ryu & Lee, 2015; Sherretz, 2011)

Providing an orientation to mindfulness. While we are all mindful to some degree, most learners do not have the skills or training to naturally engage in mindfulness. Therefore, in order for learners to engage in mindfulness during a situated learning experience, they must first be oriented to what constitutes mindfulness and strategies to learn how to become mindful

learners (Birnbaum, 2008; Bohecker et al., 2014; Crumley & Schutz, 2011; Epstein, 2003b; Trunnell, 1996). This will set the stage for mindfulness, helping learners develop a mindful awareness and learn how to apply mindfulness within practice (Bohecker et al., 2014). Providing an orientation to mindfulness builds the attention, attitude and intention required for mindfulness practice (Shapiro, 2009). Additionally, it prepares students to be present in the moment, clearing space, and building cognitive flexibility in order to engage in reflection during the experience (Bohecker et al., 2014; Carroll, 2009).

Informal mindfulness and formal mindfulness. Included as part of the orientation to mindfulness should be both formal and informal mindfulness practices. As described in Chapter Two, mindfulness can be incorporated into instruction through either formal or informal practices. Most often, formal mindfulness meditation practices will be used to help learners build the foundation for mindfulness skills in order to apply mindfulness in everyday activities through informal mindfulness practices. Within education, formal mindfulness practices most often include guided meditation through body scan (learning to direct attention by focusing on the body in the present moment from head to toe) or through sitting meditation (focusing on breath and learning to focus on feelings, sensations, and the surroundings). An experimental study that assessed the effects of brief formal mindfulness practices through body scan, found music students reported experiencing decreased distraction and increased attention during learning and performance as compared to the control group (Diaz, 2011). Other educational research studies that assessed the effects of guided sitting meditation found learners reported attribution outcomes that indicated learners 1) were more present during the experiential learning process, decreasing boredom (Trunnell, 1996); 2) had an increased focus and better understanding of the course content (Crumley & Schutz, 2011); and 3) acquired a skill to help manage stressful situations

which enhanced learning according to quantitative and qualitative responses from the students (Mapel, 2012).

Without formal practice, it is difficult to achieve the ability to engage in informal mindfulness practice (Carmody & Baer, 2008; Pezzolesi et al., 2013; Shapiro, 2009). Informal practices, which are more consistent with what would be utilized in situated learning, include applying mindfulness skills to any routine activity in which one is engaging and attempting to become aware of all sensations one is experiencing. This can include eating, walking, doing chores, or engaging with others. Research on informal mindfulness practices incorporated into experiential learning, has found students who were using mindfulness training during their experiences reported an increased self-awareness, increased emotional support for stressors in their field experiences, and a greater personal insight into their professional self-concept than prior to having participated in regular mindfulness practices throughout the course (Birnbaum, 2008).

Mindful instruction. In order for learners to reflect-in-action, they need to have a level of cognitive flexibility that allows them to adapt to surprises and unfamiliar experiences. Mindful instruction, or presenting material in a conditional manner, helps students increase creativity by allowing students to see content and experiences from multiple perspectives or presentations (Anglin et al., 2008; Langer et al., 1989; Langer & Piper, 1987; Ryu & Lee, 2015; Sherretz, 2011). Similar to an orientation to mindfulness, mindful instruction builds the foundation for mindful learners who are able to reflect in the present moment by preparing them cognitively for future situated learning experiences. Several experimental studies have illustrated when instruction is delivered in a mindful versus a mindless manner, learners have an increased cognitive flexibility (Langer & Piper, 1987; Lee & Ryu, 2015), the ability to adapt and use

creative solutions to novel situations (Langer, Hatem et al. 1989, Langer & Piper, 1987), and also have a more balanced attitude towards content and experiences (Anglin et al., 2008). These are all essential skills in creating learners with the ability to critically reflection in a situated learning experience.

A Conceptual Model of Situated Learning Reflection Integrating Mindfulness

Based on a synthesis of results from the literature review described above, the following is a conceptual model of how to enhance reflection incorporating mindfulness within a situated learning environment. This model includes key elements for promoting reflection before, during, and after the experience, particularly reflection-in-action by incorporating mindfulness strategies throughout the model as supported within the literature. It is organized based on three phases of reflection: reflection-before-action (R-B-A), reflection-in-action (R-I-A), and reflection-on-action (R-O-A). Mindfulness strategies to promote reflection-in-action, along with key characteristics to facilitate reflection in situated learning, are included for each phase of the model. Associated outcomes are provided in Table 8 to illustrate the benefits for creating an environment that promotes R-I-A in a situated learning environment, and provides evidence for including mindfulness as an instructional strategy in effort to enhance R-I-A.

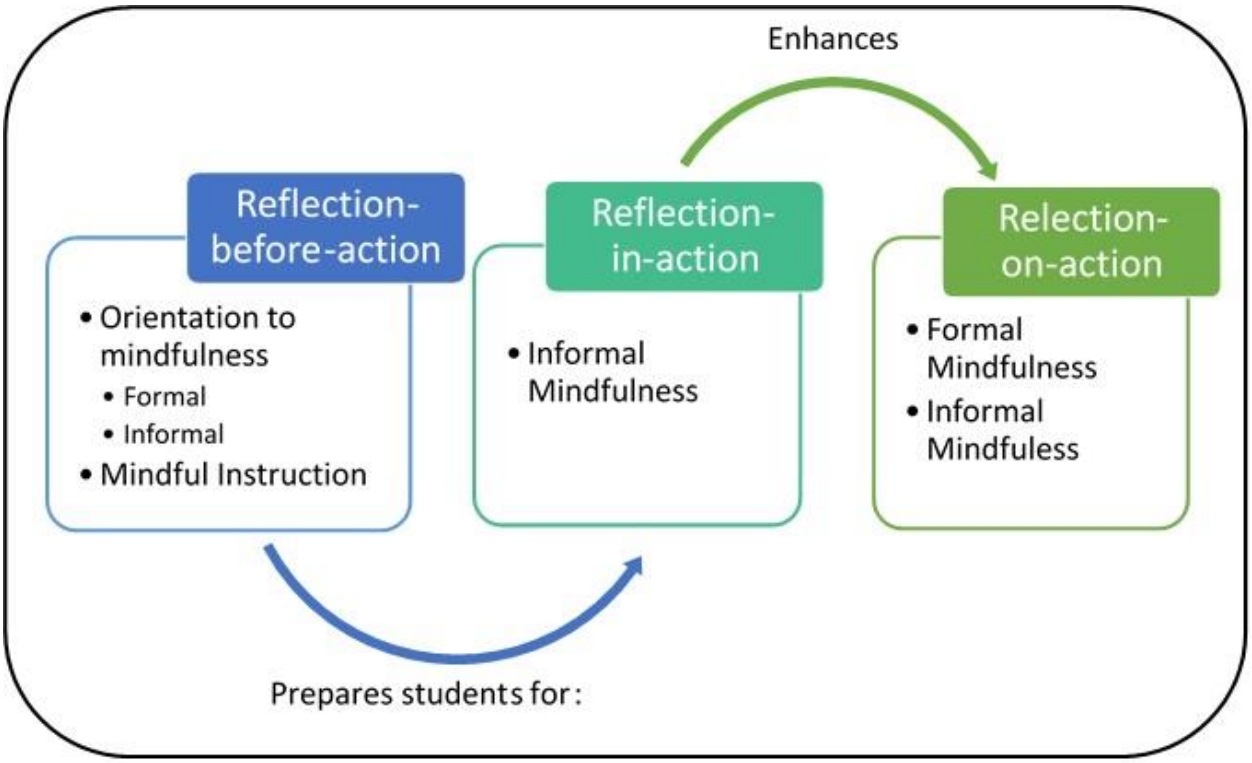

Figure 1. A conceptual model of reflection incorporating mindfulness in a situated learning environment.

Table 8
Conceptual Model of Situated Learning Reflection Integrating Mindfulness Including Associated Outcomes

Phase 1 – Reflection-Before-Action	
Strategies	**Outcomes**
• **Create a reflective environment**	• Encourages reflection early and often for the learners (Carroll, 2009; Granville & Dison, 2005) • Brings out students' awareness of personal assumptions and beliefs that may impede cognitive flexibility (Eyler, 2001; Stewart, 2010) • Prepares students to be observant, thoughtful, and address surprises (Carroll, 2009; Eyler, 2001) • Creates a culture that allows a student to learn to reflect spontaneously (Boudreau et al., 2014; Herrington, Parker, et al., 2014)
• **Utilize mindful/conditional instructional delivery methods**	• Increases cognitive flexibility (Langer & Piper, 1987; Ryu & Lee, 2015) • Increases creativity within a learning situation (Langer et al., 1989; Langer & Piper, 1987) • Creates more balanced attitudes towards content and situations (Anglin et al., 2008)

• **Provide an orientation to mindfulness**
  ○ Formal mindfulness
  ○ Informal mindfulness
	• Clears cognitive space for reflection (Carroll, 2009)
	• Provides s foundation for learners to engage in informal mindfulness practices (Carmody & Baer, 2008)
	• Prepares students to become present within an experience
	• Builds the attention, attitude, and intention required for mindfulness practice (Shapiro, 2009)

(Table Continued)

Table 8 (Continued)

Phase 2 – Reflection-in-Action	
Strategies	**Outcomes**

• **Create a learning environment to enhance reflection**
  ○ Include authentic activities
  ○ Extend the learning experience over an appropriate length of time
	• Enhances the quality and level of reflection (Croker et al., 1998; Granville & Dison, 2005; Huisman & Edwards, 2011; Ovens & Tinning, 2009; Stalmeijer et al., 2009)
	• Provides an authentic situation in which students can relate (Croker et al., 1998; Granville & Dison, 2005)
	• Helps learners reflect spontaneously and independently (Boudreau et al., 2014; Herrington, Parker, et al., 2014)

• **Create an environment that allows for social interaction with others to promote reflection-in-action**
  ○ Observe peers in practice
  ○ Observe experts in practice
  ○ Collaboration in groups
	• Allows for personal comparison and immediate reflection (Croker et al., 1998; Eick et al., 2003; Russell et al., 2011)
	• Facilitates reflection-in-action through personal comparison and adjustment in practice (Bell & Mladenovic, 2015; Edwards, 2010)
	• Promotes interactive and innovative reflective practitioners (Jordan, 2010; Seibert, 1999)

• **Engage in informal mindfulness to promote reflection-in-action**
  ○ Incorporate multiple forms of reflection
  ○ Focusing attention within the environment
  ○ Developing a personal awareness
	• Helps manage stressful and unfamiliar situations in a more productive manner (Birnbaum, 2008; Bohecker et al., 2014; Mapel, 2012)
	• Increases attention and focus with less distraction for the learner (Bush, 2011; Crumley & Schutz, 2011; Diaz, 2011)
	• Enhances interest, engagement, and involvement from the learner (Trunnell, 1996)
	• Enhances self-awareness (Birnbaum, 2008; Song & Muschert, 2014)
	• Allows for a sustained cognitive flexibility (Bush, 2011)
	• Helps meet demands of situation (Ovens & Tinning, 2009)
	• Meets demands of situation by limiting distractions or other tensions (Mishna & Bogo, 2007)

(Table Continued)

Table 8. (Continued)

Strategies	Outcomes
	• Allows one to detects thoughts and behaviors in order to better engage in and respond to a situation (Goh, 2012; Keevers & Treleaven, 2011) • Enhances ability to become reflective practitioners (Keevers & Treleaven, 2011; Russell et al., 2011)

• **Provide Feedback**
  ○ Instructor identifies strengths and weaknesses
  ○ Students ask questions throughout the experience
  ○ Provide results of performance from peers and instructor
	• Helps students see the value in reflection (Stalmeijer et al., 2009)
	• Gives students support when struggling with difficult situations (Herrington, Parker, et al., 2014)
	• Identifies alternative procedures and perspectives exposing areas in need of improvement (Jordan, 2010)
	• Provides immediate information that helps one reflect-in-action (Seibert, 1999)

Phase 3 – Reflection-on-action	
Strategies	**Outcomes**
• **Provide the opportunity for learners to reflect on the practice**	• Students re-evaluate the situation and begin to integrate new knowledge for future application (Herrington & Oliver, 2000) • Helps process new information gained from the experience (Seibert, 1999)
• **Learners engage in formal mindfulness**	• Learners attend to the reflective process to re-evaluate and improve future performance (Horton-Deutsch et al., 2012)

Reflection-Before-Action

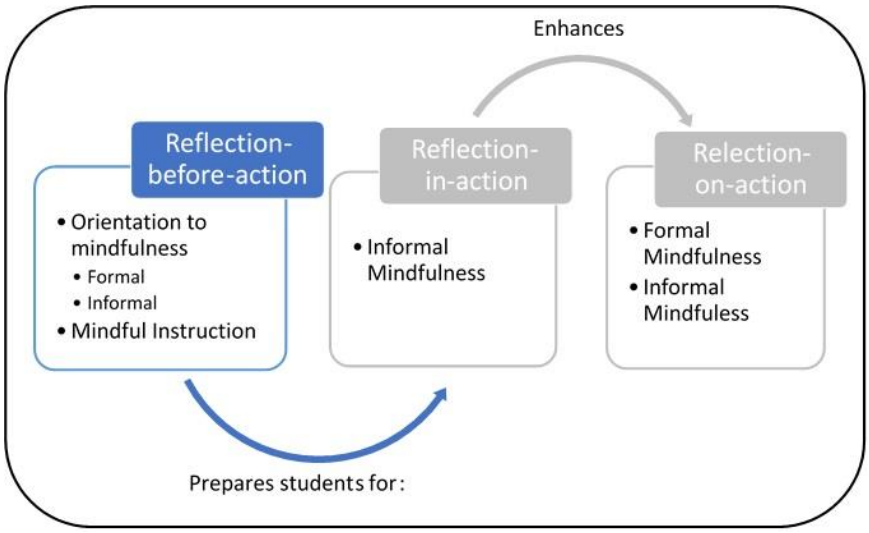

Figure 2. A conceptual model of reflection in situated learning highlighting reflection-before-action.

While R-I-A and R-O-A are important within a situated learning environment, engaging in R-B-A is also important. Prior to engaging in the learning experience, reflection can help students learn to be observant, thoughtful, and develop strategies to address surprises or conflict they may encounter (Eyler, 2001; Stewart, 2010). These are essential skills in being able to reflect-in-action within practice.

Create a reflective environment. In order to facilitate R-B-A, several strategies can be incorporated into the instructional design. The first addresses the learning context and environment. Learners are not always naturally reflective and often need guidance to initially promote reflection. Therefore, prior to engaging in situated learning, it is important to build a reflective environment: an environment that incorporates and encourages reflection throughout the learning experience. Creating a reflective environment will help learners incorporate many strategies that result in outcomes important for situated learning. When learners are encouraged to engage in reflection and feel comfortable within the learning environment, the instructor can

aid them in engaging in reflection earlier and more frequently throughout the learning process (Carroll, 2009; Granville & Dison, 2005). While students often need guidance to become effective reflective practitioners, the ultimate goal is for them to reflect spontaneously. Creating this type of environment will help reflection become part of a student's normal routine within the learning experience. As a result, the student will be more likely to engage in spontaneous reflection (Boudreau et al., 2014; Herrington, Parker, et al., 2014). Additionally, learners are able to reflect-in-action when they maintain a level of cognitive flexibility. Creating a reflective environment in which the learners feel comfortable engaging in discussion allows them to become aware of personal assumptions and beliefs that may impede their ability to remain open, aware, and creative within the learning situation (Eyler, 2001).

Utilize mindful instruction. Another strategy to incorporate during R-B-A is delivering instruction in a mindful versus a mindless manner. Mindful instruction involves presenting content in a conditional manner that allows learners to see a topic or situation from many different perspectives rather than only understanding it from one perspective or for one purpose. This prevents a mindlessness way of learning where thoughts and behavior are governed merely by previously programmed knowledge blinding the learner to only one possible perspective or solution (Langer, 2000). Using mindful instruction will help learners in the R-I-A process as it increases cognitive flexibility (Langer & Piper, 1987; Ryu & Lee, 2015), increases creativity within a learning situation (Langer et al., 1989; Langer & Piper, 1987), and creates more balanced attitudes towards content and situations (Anglin et al., 2008).

Orientation to mindfulness. In order for learners to become mindful during the situated learning experience, they must have an orientation to mindfulness that can be facilitated by engaging in R-B-A within the instructional setting. As with reflection, it is likely learners will

not have the ability to naturally engage in mindfulness practices. Therefore, providing an introduction to what constitutes mindfulness and how it can benefit learners will be an important first step in building the foundation for mindful practice. Incorporating opportunities for learners to actually engage in mindful practice, as they will within the situated learning environment, will enhance their ability to practice mindfulness regularly. Especially for students, first introducing and practicing formal mindfulness and then expanding to engage in informal mindfulness, will help them develop the basic skills that they will carry forward into the situated learning experience. Formal practices include activities such as sitting meditation, body scan, yoga, or breathing exercises. Informal practices, which are more consistent with what would be utilized in situated learning, include applying mindfulness skills to any routine activity in which one is engaging and attempting to become aware of all sensations one is experiencing. This can include eating, walking, doing chores, or engaging with others (Carmody & Baer, 2008; Pezzolesi et al., 2013; Shapiro, 2009).

Reflection-in-Action

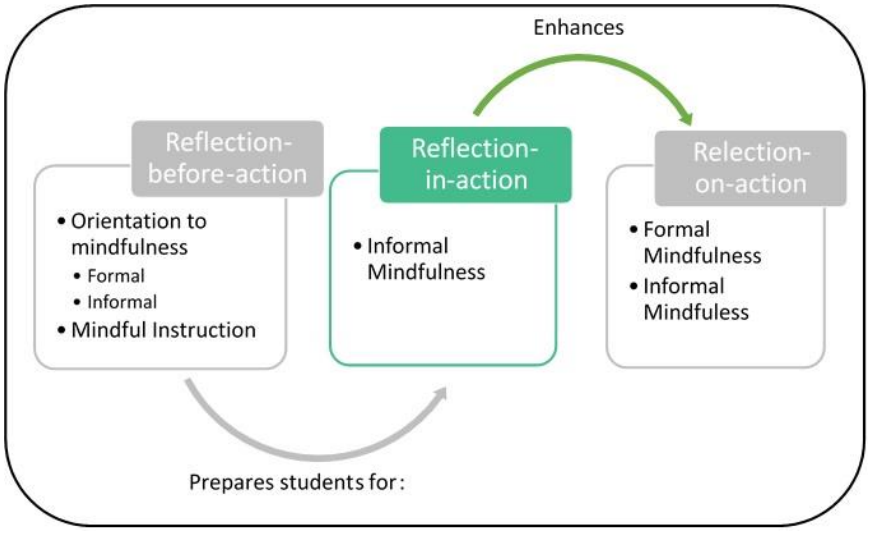

Figure 3. A conceptual model of reflection in situated learning highlighting reflection-in-action.

Once learners have had an orientation to mindfulness and have been immersed in a reflective environment which incorporates aspects of mindful instruction, they have the foundation to succeed as reflective practitioners when engaging in the situated learning experience. Several key design features regarding the context and environment are important to include for R-I-A in situated learning, as illustrated within the empirical evidence (Granville & Dison, 2005; Ovens & Tinning, 2009). These elements include: creating an authentic learning environment (Boudreau et al., 2014; Croker et al., 1998; Herrington & Oliver, 2000; Herrington, Parker, et al., 2014), creating an experience that is longer in duration (Boudreau et al., 2014; Croker et al., 1998; Granville & Dison, 2005; Huisman & Edwards, 2011; Stalmeijer et al., 2009), and allowing for ample social interaction between the learner and his or her peers along with experts in the field (Bell & Mladenovic, 2015; Croker et al., 1998; Edwards, 2010; Eick et al., 2003; Herrington & Oliver, 2000; Jordan, 2010; Russell et al., 2011; Seibert, 1999).

Create a learning environment to enhance reflection-in-action. Creating an authentic experience is the heart of situated learning and provides the foundation on which the theory is based. In regards to reflection, when learners are able to identify and connect to an authentic activity, the quality and level of reflection is enhanced. Additionally, the longer the situated learning experience, the greater involvement and engagement the student has with many of the challenges and issues faced within practice. Therefore, learners acquire the ability to reflect spontaneously and independently within the situation.

Provide social interaction with others. Social interaction is also key in facilitating R-I-A. While reflection is often considered a personal introspective activity, within situated learning, it is very much a social process. When learners interact with peers in activities, R-I-A is facilitated as they develop their own personal awareness through comparison and critical analysis

of their actions, allowing for adjustments in the present moment. Social interaction can occur through peer observation, group work, and group discussion during the experience. Also, interacting and engaging in self-comparison to expert performance facilitates immediate reflection, helping learners to adjust to surprises through innovative and interactive methods.

Engage in informal mindfulness exercises. Several informal mindfulness strategies can be incorporated during the experience to promote reflection-in-action among the learners. When mindfulness strategies are incorporated into a situated learning environment that includes the above design considerations, an ideal situation is created for R-I-A and promoting reflective practitioners. Informal mindfulness practices, as developed in the mindfulness orientation and over the course of the experience, should be coupled with engaging in R-I-A for learners to experience the optimal learning benefits. This includes being mindful as they observe, interact, and participate in the activities of the learning environment. Mindfulness strategies will help the learners meet the demands of the situation (Ovens & Tinning, 2009) by allowing the learners to manage stressful and unfamiliar situations in a more productive manner; this will allow them to reflect in the moment and adjust to conflict that arises (Birnbaum, 2008; Bohecker et al., 2014; Mapel, 2012). The learners' attention to the present is greatly enhanced, increasing their level of focus while decreasing cognitive distractions away from the learning situation (Bush, 2011; Crumley & Schutz, 2011; Diaz, 2011; Mishna & Bogo, 2007). Interest, engagement, and involvement from the learners will also be enhanced as practicing mindfulness brings an attitude and intention that is positive towards learning (Trunnell, 1996). Finally, mindful learners will have a deeper self-awareness and sustained cognitive flexibility that will allow them to reflect-in-action with a heighten awareness of the surroundings and a greater level of innovation and creativity to improve performance within the present moment (Birnbaum, 2008; Bush, 2011;

Song & Muschert, 2014). The learners will have the ability to perform as reflective practitioners, detecting their own thoughts and behaviors in order to better engage in and respond to a new situation (Goh, 2012; Keevers & Treleaven, 2011; Russell et al., 2011).

Provide feedback. The final element designers should include to enhance R-I-A during the learning experience is feedback. Feedback strategies that have been shown to enhance reflection in situated learning include: the instructor or expert providing real time feedback by identifying strengths and areas of improvement, the opportunity for students to ask questions throughout the situation, and the students receiving the results of their performance from their peers and instructor immediately. When incorporating mindfulness strategies to support R-I-A during the learning situation, these feedback strategies help the students see the value in reflection (Stalmeijer et al., 2009), and provide support to students when struggling with difficult situations (Herrington, Parker, et al., 2014). Feedback provides immediate information that helps one reflect-in-action (Seibert, 1999) and identify alternative procedures and perspectives, exposing areas in need of improvement (Jordan, 2010).

Reflection-on-Action

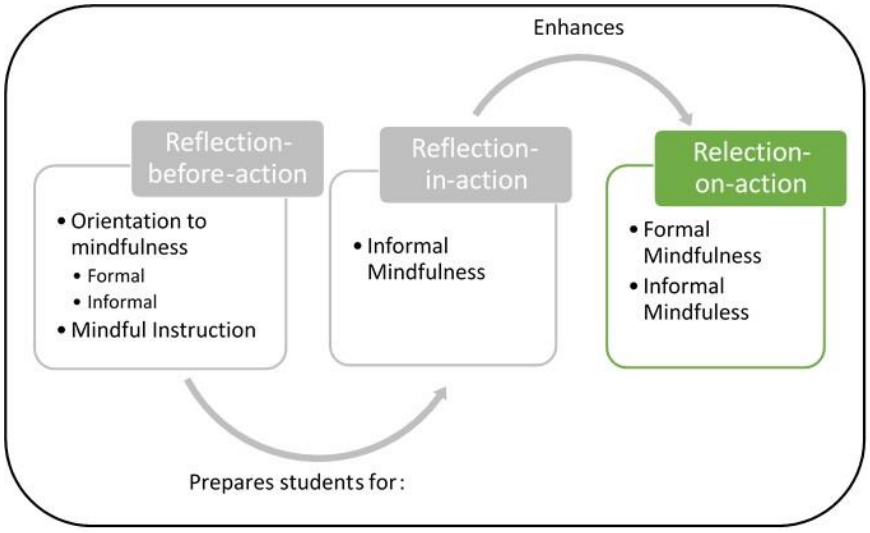

Figure 4. A conceptual model of reflection in situated learning highlighting reflection-on-action.

R-O-A is an important design element for reflection in situated learning. Most models and frameworks of situated learning reflection have focused on R-O-A. Students should have the opportunity to re-evaluate the situation, and through the reflective process, will begin to integrate new knowledge for future use (Herrington & Oliver, 2000). As multiple forms of reflection are important to the reflective process, R-O-A provides an additional means to develop reflective practitioners. R-O-A allows the student to process and critically analyze new information and strategies gained from the learning experience (Seibert, 1999). Depending on the learning environment, R-O-A can be accomplished in many ways including, but not limited to, journaling, group discussion, blogging, and if possible, returning to sections of the experience through reviewing recorded observations or non-linear navigation.

Engage in informal mindfulness. Reflection-on-action is directly related to mindfulness practices and enhanced by R-I-A. Practitioners, or in this case students, who learn to effectively reflect-in-action and critically reflect-on-action, have the ability to improve their tacit knowledge and further improve everyday performance. When learners engage in R-I-A supported by mindfulness, they are able to find more meaning in the present moment, which in turn, enhances the meaning making process when they engage in R-O-A (Horton-Deutsch et al., 2012). Additionally, as included in the first two phases of this model, mindfulness strategies should be included in the R-O-A phase. Formal mindfulness practices can be used to bring the learner to the present moment, reducing distraction and focusing attention. Through informal practices while reflecting on the learning experience, they will have stronger attention and metacognitive abilities to evaluate their thoughts, perceptions, and outcomes in order to reassess and improve future performance.

Summary

As a result of the literature review conducted in this study, several strategies for situated learning emerged within the empirical evidence that when applied, have the potential to enhance reflection and the learning process. Strategies for reflection in situated learning, reflection-in-action in situated learning, and mindfulness within education, along with associated outcomes, were analyzed within each of these three categories and then further synthesized to create a conceptual model of reflection for situated learning that incorporates mindfulness. Reflection is very much a continual process when used as a learning tool. Especially within situated learning environments, learning outcomes are potentially enhanced when reflection is occurring before, during, and after the learning experience. Therefore, the model created in this study was divided into three major phases: R-B-A, R-I-A, and R-O-A. This conceptual model is intended to illustrate the benefits of creating an environment that promotes R-I-A in a situated learning environment, and provides evidence for including mindfulness as an instructional strategy in effort to enhance R-I-A. This model is one of the first attempts to bring together three areas of research in an effort to improve reflection within situated learning. The desired outcome if the model will aid instructional designers in addressing difficulties faced with designing for situated learning, particularly in promoting reflection within the environment.

CHAPTER 5

Expert Review Results

In order to validate the model developed and described in Chapter Four, an expert review was conducted. Three experts were recruited via email and agreed to participate, utilizing evaluation questions to guide their review (see Appendix A). The review included an expert in situated learning, a retired Professor in Educational Psychology and former Director of the Center for Instructional Development and Educational Research from Virginia Polytechnic Institute and State University; an expert in mindfulness, an instructor in the Department of Human Development from Virginia Polytechnic Institute and State University; and an expert in reflection, an Associate Professor in the Department of English and Director for the Study of Rhetoric in Society from Virginia Polytechnic Institute and State University. Each reviewer provided written feedback based on his review of the model. The results of the review were examined individually and then synthesized to identify patterns across all three responses. Major themes that emerged are described below, along with direct quotes from the expert reviewers. This chapter provides the results of the review including their suggestions for improvement along with discussion on adjustments made to the model in effort to incorporate these formative suggestions to improve the model. Each reviewer was randomly assigned a number as illustrated in the responses to ensure anonymity. The newly adjusted model is included in Appendix B.

Strengths of the Model

Overall, the model was well received by each of the reviewers and they felt it had an important contribution to the current research and literature. According to Reviewer 1, “This model, which is based on three phases, certainly offers much for our field to use or learn from. Our field has not yet focused on the concept of mindfulness as a foundational strategy to teach

reflection…the argument outlined makes much sense and seems to offer an opportunity to further extend the benefits associated with a situational learning-based pedagogy." Reviewer 2 commented on the development and use of the model stating, **"**The nature of this model requires delving into at least three significant areas of research and theory (mindfulness, reflection—in and on action, and situated learning) and combining the three in a meaningful way, in an instructional design context. This was done in a very competent way, and I thought the writing throughout the documents I read was excellent. This was very nice to see." Additionally, he commented, "First, the model is logical and should be easy to follow." Similarly, Reviewer 3 commented on the usability of the model: "Overall, I think the model itself great, clear and easy to understand." Finally, Reviewer 2 commented on the major purpose and future application of the model as an additional strength: **"**The model should certainly open the door for designers who would like to explore incorporating mindfulness training and practice in instruction situations, situated or not."

Suggestions for Improvements to the Model

Based on their feedback, is appears the reviewers felt best practices of situated learning were utilized and the model incorporates mindfulness and instructional strategies that will promote reflection-in-action. For example, Reviewer 1 commented, "The strategies outlined in [the model] are very much in-line with current best practices in our field. Using an authentic context, providing opportunities for and encouraging collaboration, including reflection, and others all are well-documented strategies." However, as this was a formative evaluation of the model, each of the reviewers identified areas of the model that would benefit from improvements. A few major themes emerged across all reviewers, while some were suggestions by a single reviewer. Improvements centered mostly on the usability and clarity of the model to

help instructional designers' ease of use, especially those with less of a knowledge base across the synthesized disciplines within the model. These major and individual themes are discussed along with how the model was adjusted based on the feedback from the experts.

Examples needed for implementing strategies. Reviewer comments suggested the model lacked adequate examples of how to apply the strategies included in the model. This would make it difficult for designers or other users less familiar with an area of focus of the model such as mindfulness. Reviewer 2 commented, **"**However, with the model as written, designers will have to do their own digging to actually find examples of strategies that work in particular contexts, such as use of feedback, conditional instruction, supporting collaborative work among learners, and the like." Similarly, Reviewer 1 felt the reader is left with limited ability to understand how to implement the strategies: "In the model, however, the strategies, while seemingly in line with the well-supported strategies described in [the model], are not clearly delineated." He expands with, "My question, and I imagine other teachers' questions, might focus on the 'how.'" In regards to incorporating methods that promote reflection, Reviewer 2 also felt, "I am not certain this was done in a way that would provide concrete guidance to designers, particularly if the designers are not already familiar with the literature and foundational aspects of situated learning and promotion of reflection." To address this limitation, Reviewer 3 suggested, "Your readers may benefit from some tables that outline the specific strategies or skills that would be used at each stage, and how these differ necessarily because the cognitive demands and environmental constraints vary between RBA, RIA and ROA."

As a result of these suggestions, three tables were created (Table A2, Table A3, and Table A4) and can be found in Appendix B that list the strategy as included in the model along with several examples of how to implement this strategy as exemplified within the literature.

Each table was developed for its corresponding phase of the model: reflection-before-action, reflection-in-action, and reflection-on-action. In addition, further explanation of specific mindfulness strategies is provided within the text of each phase of the model to help the reader better understand the application and advantages of the suggested methods utilized to promote the type of reflection for that phase.

Readability and level of familiarity of the reader. This model attempts to bring together three distinctive areas of literature. The reviewers suggest while the areas are thoroughly explored within the literature review in Chapter Two, users of the model may have difficulty understanding some of the terms without an extensive background in all areas of the literature. Reviewer 2 suggested the model illustrates the benefits of incorporating mindfulness to enhance reflection practice very well, "but is best understood if users take the time to delve into the literature that was used in part to develop the model. In other words, users will have to read the fine print." Reviewer 3 also felt there were several examples within the text that relied on assumptions of previous knowledge of the reader causing confusing and potentially clouding major focal points of the model. He further explained, "These terms may be opaque to the average reader. If they have not already been clearly defined it will be difficult for the reader to understand the point you are making here." In order to help provide a better foundation of knowledge within the model, key terms within each discipline were redefined and expanded upon to ensure the reader has a sound understanding of the concept. Key terms that were expanded upon included situated learning, informal mindfulness, formal mindfulness, mindful instruction, reflective environment, and non-linear navigation (See Appendix B).

Provide a clear goal for the model. Based on the comments from Reviewers 1 and 3, it seems the major purpose and goal of the model was not effectively described. Reviewer 3 felt

the overall purpose and associated outcomes of the model were not communicated within the model. He suggested, “They [the readers] may also benefit if you [were] to propose a clear goal for the model. If this model is applied then we expect to see X. In my current reading of your work I take this to be ‘improved performance.’” Additionally, several times throughout his review, Reviewer 1 commented on the model lacking sufficient guiding instructions to the steps required to apply it in an educational environment. For example he stated, “The study documents the potential advantages of incorporating mindfulness, particularly when linked to both reflective practice and a situated learning environment. However, when I read the “orientation to mindfulness,” I wonder not so much about the need to do so as the “how.” It is agreed with Reviewer 3 that the expected outcome of the model would be improved performance and the consensus of Reviewer 1 that the model did not include enough examples as was addressed earlier with the addition of three new tables. However, since this is a conceptual model attempting to synthesize three areas of study, its larger aim is to identify, define, and describe the relationships between variables (Richey, 1986, 2005). Outcomes and procedural steps associated with the model will be determined within the next phase of the research when the model is applied within an instructional setting. It is agreed the reader of the model should have a clear understand of the purpose of this conceptual model. Therefore, the introductory portion of the model was expanded to describe the purpose of the model and also redefine the concept of a conceptual model to better address a wider range of readers (See Appendix B).

Barriers for implementation. As stressed by Reviewer 1 and 2, given the novelty of bringing these disciplines together, when implementing the model, instructional designers will need to ensure they have developed a level of familiarity with situated learning, reflection-in-action, and mindfulness in order to ensure adequate comprehension and successful application.

In addition, especially within an educational setting, it will be essential to adapt these new concepts to current practices as seamlessly as possible. In his expert review, Reviewer 2 explains, “I have seen this many times in my own experience, where so called innovations were introduced in schools at different levels. In some respect the highest levels (i.e., universities) are the worst. To be successful in implementing change the easiest way is to make sure the new thing can be reasonably fitted into what everyone knows to be “how it’s supposed to work. “ This is probably true even when there is broad agreement that good evidence exists showing the potential benefit of the “new thing.” Similarly, Reviewer 1 added, “But these additional benefits [of mindfulness] will (1) require additional instruction and, in most disciplines, that means time away from “content area instruction.” So the question will be: How? And, even more to the point, is it possible to integrate mindfulness instruction in such a way that it can be done seamlessly? Reviewer 1 also commented on the barriers and potential resistance that will need to be taken into account when implementing the model. These comments will be an important consideration when moving into future phases of research. It will be key to incorporate strategies within a more procedural model that will help address these barriers and potential opponents of the research.

Summary

The results of the expert review conducted in this research not only were used to appropriately validate the model, but also provided formative evaluation data to make improvements. It was evident throughout the experts’ responses that they felt the model was well-designed and incorporated best practices grounded in the literature. As part of the formative process, they offered suggestions for improvements based on their areas of expertise. Based on the major themes that emerged from the reviews, the model was adjusted to improve usability,

clarity, and adaptation for users across multiple disciplines. First, three new tables were added to the model that included examples of how to implement the strategies included within each respective phase of the model. Second, key terms across all three disciples were more clearly defined and expanded upon in order to reduce the level of required previous knowledge given the model brings together three distinct areas of research. Finally, the purpose of model, along with redefining the function of a conceptual model was added to the introductory portion of the model in effort to help readers more clearly understand the purpose and appropriate use of the model. These adjustments provide improvements to the model that help provide clarity for instructional designers and provide a foundation for application in future research efforts.

CHAPTER 6

Discussion and Conclusions

Key to designing instruction for situated learning is ensuring the ability of learners to transfer acquired knowledge to a variety of situations (Winn, 1993). However, within situated learning, the environment can often be unpredictable and inconsistent across situations. This makes it difficult for designers to develop instructional principles that can be applied across learning environments. One method to meet the demand of the ill-structured nature of situated learning and provide adaptability for instructional design is through reflection-in-action. While reflection has been identified as a key component to situated learning, there is little guidance within the literature to support reflective practice within situated learning (Brown et al., 1989; Herrington & Oliver, 1995). One strategy that holds promise for enhancing reflection is the practice of mindfulness. In effort to address this limitation within the literature, this study sought to develop a conceptual model that incorporates mindfulness strategies to promote reflection-in-action within a situated learning environment.

The model was developed using a type two model development methodology as described by Richey and Klein (2007) including model development and model validation. This study included four phases of research: an extensive literature review, model development, model validation, and model revision. Phase one, the literature review, served as the data collection and foundation for the model. Critical elements for incorporating mindfulness to enhance reflection-in-action, along with recommendations for design and implementation within a situated learning environment as evident in the educational literature were determined. Utilizing comparison methods, the literature was analyzed to identify patterns and overlap of key concepts in order to synthesize the information to build a conceptual model. The model

developed was intended to build upon Brown et al. (1989)'s instructional model and Herrington and Oliver (2000)'s framework for authentic learning environments by expanding on reflection within situated learning. As both of these emphasize the importance of reflection for situated learning, this study explored key components for reflection within situated learning, and provided guidance on how to improve reflection by incorporating mindfulness strategies. In order to validate the model and determine if it incorporated best practices and appropriate mindfulness strategies to promote reflection-in-action within situated learning, an expert review was conducted. An expert from each of the following three areas of expertise was recruited to ensure triangulation: situated learning, mindfulness, and reflection. In the final phase of the research, the model was revised to incorporate the reviewers' recommendations and revisions.

Contributions of the Study

Situated learning environments provide the opportunity for learners to engage in authentic activity which provides relevance and a greater transferability of knowledge for future application (Brown et al., 1989; Winn, 1993). Designing situated learning environments can be very challenging for instructional designers due to the variability presented within each unique situation (Brown & Duguid, 1993; Winn, 1993). One design component that is key to situated learning and that can be applied across environments, is incorporating reflection to enhance the learning process (Brown et al., 1989; Herrington & Oliver, 2000). This study sought to develop a conceptual model that provides guidance on how to promote reflection in situated learning by incorporating mindfulness strategies for reflection-in-action.

The conceptual model was developed through synthesizing theories and methods from three different areas of study providing a new perspective and instructional approach for designers. Mindfulness is one area of study many are not familiar with, especially the impact it

can have within an educational environment. Reflection-in-action, is another area that has yet to be strongly considered as making an impact within situated learning. Therefore, by incorporating mindfulness and reflection-in-action with situated learning, the newly developed conceptual model in this study presents an approach that has great potential to positively impact outcomes in situated learning and provide guidance for beginning to incorporate mindfulness within other instructional environments as well. By integrating reflective practice and mindfulness for situated learners, instructional designers can use this model to address many of the issues faced when designing for the variable and uncertain environments that arise within situated learning. This work was guided by the following three questions:

1. What strategies for mindfulness practice are applicable for education?
2. How do these strategies transfer to promoting reflection-in-action during situated learning activities?
3. What features of mindfulness should be included to promote reflection-in-action within a conceptual model of reflection for a situated learning environment?

While mindfulness is not a new concept to many disciplines, it was only recently introduced as an effective instructional strategy within educational research (Langer et al., 1989; Langer, 2000). When students are mindful during the learning process, they are able to maintain a level of cognitive flexibility preventing mindless automated behavior which allows them to fully embrace the moment for future transfer of knowledge (Stewart, 2010). When mindful, learners will draw new distinctions and notice novelty within a situation with behavior guided by rules and routines but not predetermined by them (Langer, 2000). This differs a mindlessness way of learning where our thoughts and behavior are governed merely by previously

programmed knowledge blinding the learner to only one possible perspective or solution (Langer, 2000).

Mindfulness is often viewed from a spiritual perspective aligning with the more wisdom traditions (Kabat-Zinn, 1982), while others see mindfulness through a more scientific lens associated with positive learning outcomes (Ergas, 2015). As presented within this model, and argued by Ergas (2015) as the intersection between the two perspectives, is incorporating mindfulness as a means of directing attention. Mindfulness practices will vary based on the instructional environment. However, it is a cognitive skill that can be acquired and incorporated into instruction through both formal and informal mindfulness strategies as illustrated in this study (Carmody & Baer, 2008; Siegel, 2007; Shapiro, 2009). Mindfulness can also be incorporated within an instructional environment through mindful instruction or delivering content in a conditional manner that allows the learner to see a topic from more than one perspective (Langer, 2000). Being mindful within a situated learning environment will help learners increase their attention and focus with less distraction (Bush, 2011; Crumley & Schutz, 2011; Diaz, 2011), enhance their interest and engagement in the experience (Trunnell, 1996), and also enhance their self-awareness (Birnbaum, 2008; Song & Muschert, 2014). This study illustrates and supports the existing research that mindfulness as an instructional strategy has strong implications to improve learning outcomes within situated learning and other instructional environments.

This study also further supported and enhanced the evidence that incorporating mindfulness within a situated learning environment will promote reflection-in-action (Jordan et al., 2009; Pezzolesi et al., 2013). Specifically, learners will have an enhanced awareness of the present moment that enhances their cognitive flexibility to reflect-in-action, and adjust to novel

and uncertain situations (Bush, 2011, Keevers & Treleaven, 2011; Russell et al., 2011). This will allow learners to meet the demands and stresses of the situation as they will be able to limit distraction and other tensions further enhancing their ability to engage in and respond to surprises they encounter in the environment. (Birnbaum, 2008; Bohecker et al., 2014; Mapel, 2012; Ovens & Tinning, 2009). Mindfulness strategies found to enhance reflection-in-action include informal mindfulness practices, or being mindful during everyday activities (Carmody & Baer, 2008; Pezzolesi et al., 2013; Shapiro, 2009). This includes being mindful as they observe, interact, and participate in the activities of the learning environment. Practicing informal mindfulness creates a space that allows learners to attend to themselves, the surrounding environment, and to the present moment. Therefore, by directing attention through informal mindfulness, the learner will process the situation and better attend to necessary details preventing burdening cognitive load and help the learner adjust through reflection-in-action.

Finally, the model illustrates the benefits of continuous reflection within situated learning and how mindfulness can be incorporated before, during, and after the learning experience to enhance the reflective experience (Eyler, 2001). While previous research has focused on reflection-on-action for situated learning (Brown et al., 2989; Herrington & Oliver, 2000), this study emphasizes continuous reflection focusing on reflection-in-action. Within situated learning, the learners are practitioners within the environment therefore, developing skills of reflective practitioners will likely enhance their performance and learning outcomes (Jordan et al., 2009; Schön, 1983). In addition, engaging in reflection prior to the experience will help learners learn how to be observant, thoughtful, and develop strategies to address surprises or conflict they may encounter in the situated learning environment (Eyler, 2001; Stewart, 2010). As learners engage in reflection-before-action, providing an orientation to mindfulness will help

them not only develop an understanding of mindfulness and a foundation of mindfulness skills, but also helps students clear a cognitive space for reflection (Carroll, 2009) and builds the attention, attitude, and intention required to engage in mindfulness for reflection-in-action (Shapiro, 2009). This can be accomplished through mindful instruction and having the learners engage in formal mindfulness such as formal mediation, attention to breath exercises, or body scan. In addition to engaging in mindfulness during reflection-before-action and reflection-in-action, engaging in formal mindfulness while reflecting-on-action will help learners attend to the reflective process to re-evaluate the experience and improve future performance (Horton-Deutsch et al., 2012). By integrating mindfulness as an instructional strategy during each of these phases, students will acquire the necessary skills to become mindful learners and enhance the reflective process within a situated learning environment.

Study Limitations

This study is the first step in incorporating mindfulness to promote reflection-in-action within a situated learning environment. While the evidence presented here demonstrates the potential success of the model, the model needs to be tested in order to ensure its level of effectiveness. Additionally, while mindfulness has been well studied in many disciplines, it is relatively new to the field of instructional design. Therefore, there is currently a limited amount of empirical evidence that currently exists on mindfulness within educational practice. However, within the history of the concept and the current movement to create more mindful learners, this study helps further not only the research on reflective practice in situated learning, but also the application of mindfulness across educational disciplines.

Implications for Future Research

Design and development research is often an iterative process of development and evaluation for continual improvement (Richey & Klein, 2007). Therefore, future research studies should work to implement and test this model within an actual situated learning environment. Testing the model will allow for further formative evaluation and also provide guidance for the development of a more procedural model that will help designers work through a step-by-step process in designing reflection activities that incorporate mindfulness for situated learning.

Additionally, while this model was built based on addressing an instructional issue within situated learning, the concepts and relationships within the model are thought to be generalizable beyond situated learning. This study summarizes how mindfulness can be beneficial for learning outcomes within an educational environment. Within the current study, it emphasizes the potential for promoting reflection-in-action and improving performance. Exploring these concepts and relationships in other areas of educational research will be extremely beneficial in continuing the exploration of mindfulness to enhance reflective practice within education.

Conclusion

As with many other learning environments, it is clear reflection is an important component in the learning process for situated learning. Similar to difficulties in designing instruction for situated learning, designing for reflection can be challenging. Many variables can impact the process of reflection including environmental variables, individual differences, along with personal and emotion conflict that can arise (Carroll, 2009). Reflection-in-action is one type of reflection that has not been well explored within situated learning, and based on the findings of this study, would greatly benefit learners along with aid designers in improving performance. In addition, this study showed mindfulness could be a key instructional strategy to incorporate within situated learning to address promoting reflection-in-action. Situated learning provides

learners with an authentic learning experience that provides a more contextualized form of learning, helping in the transfer of knowledge to novel situations. Incorporating mindfulness to promote reflection-in-action is an effective instructional strategy and will help improve the design and development of future situated learning environments.

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Appendix A: Evaluation Questions for Expert Review

Situated Learning

1. According to your area of expertise, to what extent does this model incorporate best practices as applicable to a situated learning environment?

2. Based on your expert opinion, were instructional methods incorporated that will promote reflection in a situated learning environment? Please explain.

3. To what extent will this model assist instructional designers in improving reflection within situated learning?

Mindfulness and Reflection-in-Action

4. To what degree does this model illustrate the benefits of incorporating mindfulness and to enhance reflective practice within a situated learning environment?

5. To what degree does this model illustrate the benefits of incorporating reflection-in-action to enhance reflective practice within a situated learning environment?

6. Is mindfulness incorporated in a manner that supports reflection-in-action to improve situated learning outcomes? Please explain.

Model Usability

5. To what degree was the model organized in a logical way that made it easy to understand?

6. Will this model benefit instructional designers in incorporating mindfulness to enhance reflection-in-action in situated learning? Please explain.

7. In what ways do you suggest the model could be improved?

8. Please provide any additional comments or feedback you feel is appropriate and would be beneficial for this study.

Appendix B: Revised Model

A Conceptual Model of Situated Learning Reflection Integrating Mindfulness

Based on a synthesis of results from an extended literature review, the following is a conceptual model incorporating mindfulness to promote reflection-in-action within a situated learning environment. Conceptual models are analytic in nature and aim to identify, define, and describe the relationships between variables (Richey, 1986, 2005). The purpose of this conceptual model is to illustrate how mindfulness can be incorporated within a situated learning environment to promote reflection-in-action. By integrating enhanced reflective practice for situated learners, instructional designers will be able to address many of the issues faced when designing for the variable and uncertain environments that arise within situated learning.

This model includes key elements for promoting reflection before, during, and after the experience, particularly reflection-in-action by incorporating mindfulness strategies throughout the model as supported within the literature. It is organized based on three phases of reflection: reflection-before-action (R-B-A), reflection-in-action (R-I-A), and reflection-on-action (R-O-A). Mindfulness strategies to promote reflection-in-action, along with key characteristics to facilitate reflection in situated learning, are included for each phase of the model. Examples to incorporate each strategy are provided to aid in application and usability of the model. Additionally, associated outcomes are provided in Table A1 to illustrate the benefits for creating an environment that promotes R-I-A in a situated learning environment, and provides evidence for including mindfulness as an instructional strategy for metacognitive support in effort to enhance R-I-A.

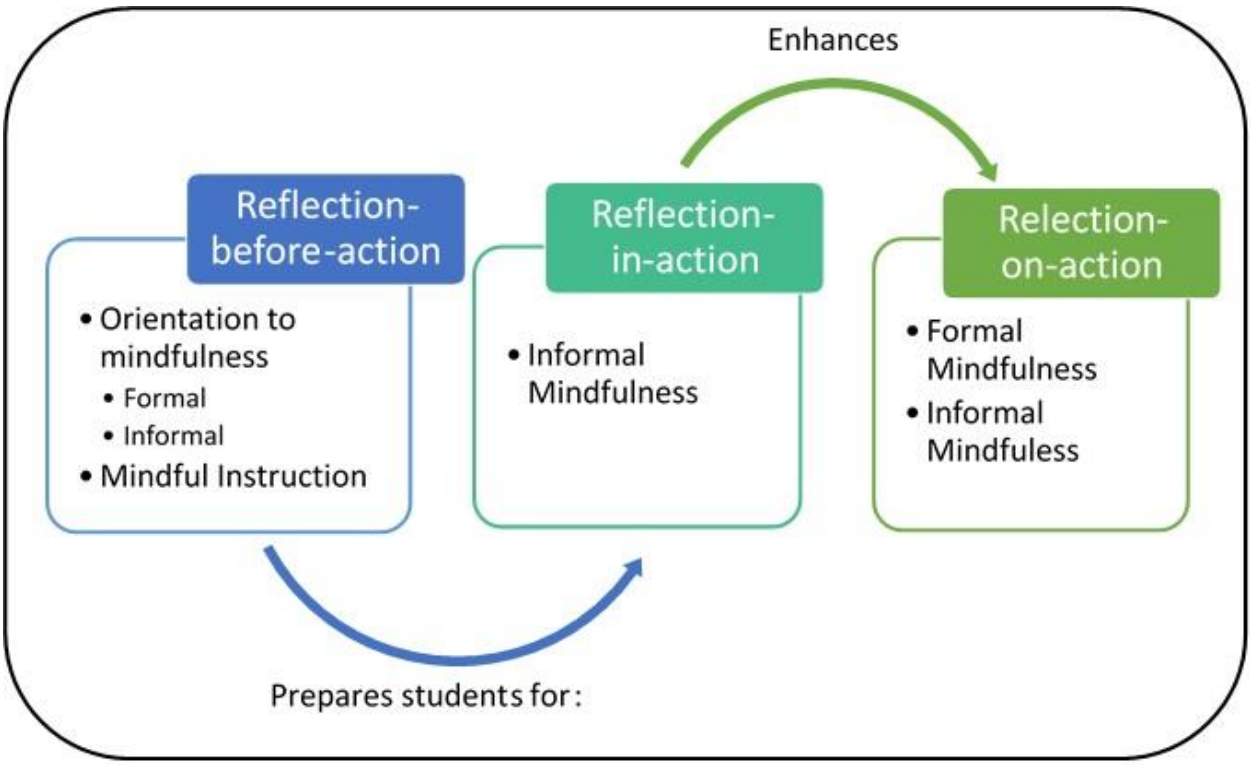

Figure A1. A conceptual model of reflection incorporating mindfulness in a situated learning environment.

Table A1

Conceptual Model of Situated Learning Reflection Integrating Mindfulness Including Associated Outcomes

Phase 1 – Reflection-Before-Action	
Strategies	**Outcomes**
• **Create a reflective environment**	• Encourages reflection early and often for the learners (Carroll, 2009; Granville & Dison, 2005) • Brings out students' awareness of personal assumptions and beliefs that may impede cognitive flexibility (Eyler, 2001; Stewart, 2010) • Prepares students to be observant, thoughtful, and address surprises (Carroll, 2009; Eyler, 2001) • Creates a culture that allows a student to learn to reflect spontaneously (Boudreau et al., 2014; Herrington, Parker, et al., 2014)
• **Utilize mindful instruction**	• Increases cognitive flexibility (Langer & Piper, 1987; Ryu & Lee, 2015) • Increases creativity within a learning situation (Langer et al., 1989; Langer & Piper, 1987) • Creates more balanced attitudes towards content and situations (Anglin et al., 2008)
• **Provide an orientation to mindfulness** o Formal mindfulness o Informal mindfulness	• Clears cognitive space for reflection (Carroll, 2009) • Provides s foundation for learners to engage in informal mindfulness practices (Carmody & Baer, 2008) • Prepares students to become present within an experience • Builds the attention, attitude, and intention required for mindfulness practice (Shapiro, 2009)

(Table Continued)

Table A1 (Continued)

Phase 2 – Reflection-in-Action	
Strategies	**Outcomes**
• **Create a learning environment to enhance reflection-in-action**	• Enhances the quality and level of reflection (Croker et al., 1998; Granville & Dison, 2005; Huisman & Edwards, 2011; Ovens & Tinning, 2009; Stalmeijer et al., 2009) • Provides an authentic situation in which students can relate (Croker et al., 1998; Granville & Dison, 2005) • Helps learners reflect spontaneously and independently (Boudreau et al., 2014; Herrington, Parker, et al., 2014)
• **Create an environment that allows for social interaction with others to promote reflection-in-action**	• Allows for personal comparison and immediate reflection (Croker et al., 1998; Eick et al., 2003; Russell et al., 2011) • Facilitates reflection-in-action through personal comparison and adjustment in practice (Bell & Mladenovic, 2015; Edwards, 2010) • Promotes interactive and innovative reflective practitioners (Jordan, 2010; Seibert, 1999)
• **Engage in informal mindfulness to promote reflection-in-action**	• Helps manage stressful and unfamiliar situations in a more productive manner (Birnbaum, 2008; Bohecker et al., 2014; Mapel, 2012) • Increases attention and focus with less distraction for the learner (Bush, 2011; Crumley & Schutz, 2011; Diaz, 2011) • Enhances interest, engagement, and involvement from the learner (Trunnell, 1996) • Enhances self-awareness (Birnbaum, 2008; Song & Muschert, 2014) • Allows for a sustained cognitive flexibility (Bush, 2011) • Helps meet demands of situation (Ovens & Tinning, 2009) • Meets demands of situation by limiting distractions or other tensions (Mishna & Bogo, 2007)

(Table Continued)

Table A1 (Continued)

Strategies	Outcomes
	• Allows one to detects thoughts and behaviors in order to better engage in and respond to a situation (Goh, 2012; Keevers & Treleaven, 2011) • Enhances ability to become reflective practitioners (Keevers & Treleaven, 2011; Russell et al., 2011)

• **Provide Feedback**
  ○ Instructor identifies strengths and weaknesses
  ○ Students ask questions throughout the experience
  ○ Provide results of performance from peers and instructor
	• Helps students see the value in reflection (Stalmeijer et al., 2009)
	• Gives students support when struggling with difficult situations (Herrington, Parker, et al., 2014)
	• Identifies alternative procedures and perspectives exposing areas in need of improvement (Jordan, 2010)
	• Provides immediate information that helps one reflect-in-action (Seibert, 1999)

Phase 3 – Reflection-on-action	
Strategies	**Outcomes**
• **Provide the opportunity for learners to reflect on the practice**	• Students re-evaluate the situation and begin to integrate new knowledge for future application (Herrington & Oliver, 2000) • Helps process new information gained from the experience (Seibert, 1999)
• **Learners engage in formal mindfulness**	• Learners attend to the reflective process to re-evaluate and improve future performance (Horton-Deutsch et al., 2012)

Reflection-Before-Action

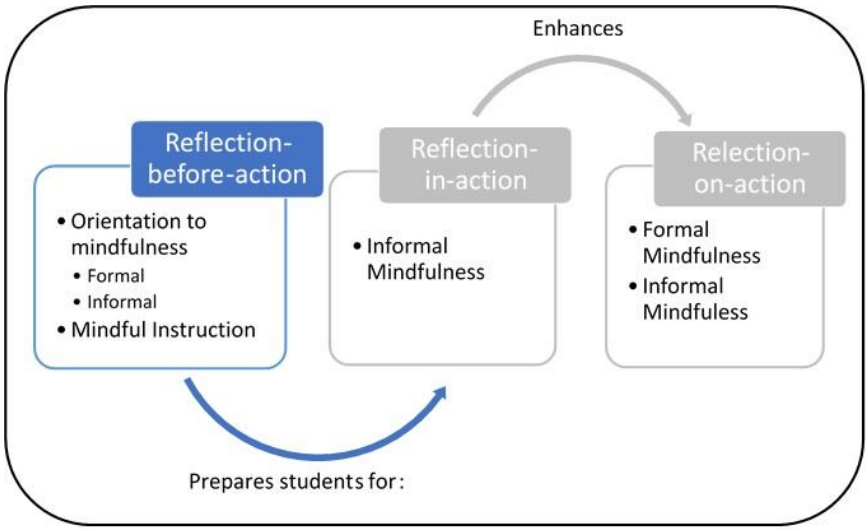

Figure A2. A conceptual model of reflection in situated learning highlighting reflection-before-action.

While R-I-A and R-O-A are important within a situated learning environment, engaging in R-B-A is also important. Prior to engaging in the learning experience, reflection can help students learn to be observant, thoughtful, and develop strategies to address surprises or conflict they may encounter (Eyler, 2001; Stewart, 2010). These are essential skills in being able to reflect-in-action within practice. In order to facilitate R-B-A, several strategies can be incorporated into the instructional design. These strategies are described below along with examples of how to apply to these strategies (see Table A2).

Create a reflective environment. The first strategy addresses the learning context and environment. Learners are not always naturally reflective and often need guidance to initially promote reflection. Therefore, prior to engaging in situated learning, it is important to build a reflective environment: an environment that incorporates and encourages reflection throughout the learning experience. Creating a reflective environment will help learners incorporate many strategies that result in outcomes important for situated learning. When learners are encouraged

to engage in reflection and feel comfortable within the learning environment, the instructor can aid them in engaging in reflection earlier and more frequently throughout the learning process (Carroll, 2009; Granville & Dison, 2005). While students often need guidance to become effective reflective practitioners, the ultimate goal is for them to reflect spontaneously. Creating this type of environment will help reflection become part of a student's normal routine within the learning experience. As a result, the student will be more likely to engage in spontaneous reflection (Boudreau et al., 2014; Herrington, Parker, et al., 2014). Additionally, as will be important in engaging in mindfulness, learners are able to reflect-in-action when they maintain a level of cognitive flexibility (a cognitive ability that "involves the selective use of knowledge to adaptively fit the needs of understanding and decision making in a particular situation") (Spiro, 1988, p. 5). Creating a reflective environment in which the learners feel comfortable engaging in discussion allows them to become aware of personal assumptions and beliefs that may impede their ability to remain open, aware, and creative within the learning situation (Eyler, 2001). In order to create a reflective environment, instructors could provide regular encouragement to engage in reflection, ensure they are providing guidance for reflection, create an open and safe environment for student reflection, and aid students in becoming aware of personal assumptions and beliefs (Table A2).

Utilize mindful instruction. Another strategy to incorporate during R-B-A is delivering instruction in a mindful versus a mindless manner. Mindful instruction involves presenting content in a conditional manner that allows learners to see a topic or situation from many different perspectives rather than only understanding it from one perspective or for one purpose. In addition to using conditional language and presenting material from multiple perspectives Ritchhart and Perkins (2000) have suggested three additional instructional methods for

cultivating mindful learners: developing sensitivity by giving learners opportunity for exploration with an expectation of finding results of value, exploring additional possibilities, and introducing ambiguity that require additional processing by the leaner. These strategies prevent a mindlessness way of learning where our thoughts and behavior are governed merely by previously programmed knowledge blinding the learner to only one possible perspective or solution (Langer, 2000). Using mindful instruction will help learners in the reflection-in-action process as it increases cognitive flexibility (Langer & Piper, 1987; Ryu & Lee, 2015), increases creativity within a learning situation (Langer et al., 1989; Langer & Piper, 1987), and creates more balanced attitudes towards content and situations (Anglin et al., 2008).

Orientation to mindfulness. In order for learners to become mindful during the situated learning experience, they must have an orientation to mindfulness that can be incorporated by engaging in R-B-A within the instructional setting. As with reflection, it is likely learners will not have the ability to naturally engage in mindfulness practices. Therefore, providing an introduction to what constitutes mindfulness and how it can benefit learners will be an important first step in building the foundation for mindful practice. Incorporating opportunities for learners to actually engage in mindful practice, as they will within the situated learning environment, will enhance their ability to practice mindfulness regularly. Especially for students, first introducing and practicing formal mindfulness and then expanding to engage in informal mindfulness will help them develop the basic skills that they will carry forward into the situated learning experience. Formal practices include activities such as sitting meditation, body scan, yoga, or breathing exercises. Informal practices which are more consistent with what would be utilized in situated learning, includes applying mindfulness skills to any routine activity in which one is engaging and attempting to become aware of all sensations one is experience. This can include

eating, walking, doing chores, or engaging with others (Carmody & Baer, 2008; Pezzolesi et al., 2013; Shapiro, 2009).

Table A2
Examples to Incorporate Strategies within Phase 1: Reflection-Before-Action

• Create a reflective environment	• Encourage learners to engage in reflection • Provide guidance for reflection • Create an open and safe environment for student reflection • Help students become aware of personal assumptions and beliefs
• Utilize mindful instruction	• Deliver instruction in a conditional manner • Utilize conditional language • Present material from multiple perspectives • Developing sensitivity by giving learners opportunity for exploration • Provide learners opportunities to explore additional possibilities • Introduce ambiguity that requires additional processing by the leaner

• Provide an orientation to mindfulness	• Introduce what constitutes mindfulness and methods how to become mindful learners
	• Begin with formal mindfulness exercises:
	  ○ Body scan
	  ○ Sitting meditation
	  ○ Yoga
	  ○ Breathing exercises
	• Expand to informal mindfulness exercises:
	  ○ Engage in mindfulness during any routine activity

Reflection-in-Action

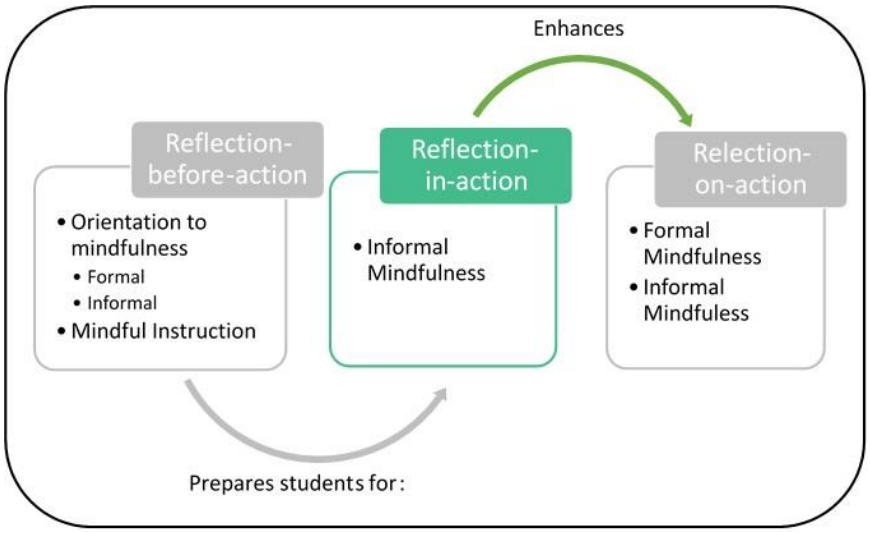

Figure A3. A conceptual model of reflection in situated learning highlighting reflection-in-action.

Once learners have had an orientation to mindfulness and have been immersed in a reflective environment which incorporates aspects of mindful instruction, they have the foundation to help them succeed as reflective practitioners when engaging in the situated learning experience. Several key design features regarding the context and environment are important to include for R-I-A in situated learning as illustrated within the empirical evidence (Granville & Dison, 2005; Ovens & Tinning, 2009). These elements include: creating an authentic learning environment (Boudreau et al., 2014; Croker et al., 1998; Herrington & Oliver, 2000; Herrington, Parker, et al., 2014), creating an experience that is longer in duration (Boudreau et al., 2014; Croker et al., 1998; Granville & Dison, 2005; Huisman & Edwards, 2011; Stalmeijer et al., 2009), and allowing for ample social interaction between the learner and his or her peers along with experts in the field (Bell & Mladenovic, 2015; Croker et al., 1998; Edwards, 2010; Eick et al., 2003; Herrington & Oliver, 2000; Jordan, 2010; Russell et al., 2011;

Seibert, 1999). These strategies are further discussed and examples of how to apply them in an instructional environment are included in Table A3.

Create a learning environment to enhance reflection-in-action. There are several environmental variables that can be included to enhance reflection-in-action during situated learning. Creating an authentic experience is the heart of situated learning and provides the foundation on which the theory is based. Authentic learning environments are those in which learners are provided contexts and activities utilizing knowledge as it would be applied in real-life situations outside of a traditional classroom environment (Herrington & Oliver, 2000). In regards to reflection, when learners are able to identify and connect to an authentic activity, the quality and level of reflection is enhanced. Additionally, the longer the situated learning experience, the greater involvement and engagement the student has with many of the challenges and issues faced within practice. Therefore, learners acquire the ability to reflect spontaneously and independently within the situation.

Provide social interaction with others. Social interaction is also key in facilitating R-I-A. While reflection is often considered a personal introspective activity, within situated learning, it is very much a social process. When learners interact with peers in activities, R-I-A is facilitated as they develop their own personal awareness through comparison and critical analysis of their actions, allowing for adjustments in the present moment. Social interaction can occur through many examples as listed in Table A3 such as, through peer observation, group work, and group discussion during the experience. Also, interacting and engaging in self-comparison to expert performance facilitates immediate reflection, helping learners to adjust to surprises through innovative and interactive methods.

Engage in informal mindfulness exercises. Mindfulness practices will vary based on the purpose and environment in which one is practicing. R-I-A occurs as one is engaged in an activity or experience. Therefore, to enhance R-I-A, one needs to engage in mindfulness during this activity. Informal mindfulness, or being mindful during everyday activities, creates a space that allows learners to attend to themselves, the surrounding environment, and to the present moment. Directing attention through informal mindfulness helps the learner process the situation and better attend to necessary details preventing burdening cognitive load and help the learner adjust through R-I-A. Several informal mindfulness strategies can be incorporated during the experience to promote reflection-in-action among the learners. When mindfulness strategies are incorporated into a situated learning environment that includes the above design considerations, an ideal instructional environment is created for R-I-A and promoting reflective practitioners.

Informal mindfulness practices, as developed in the mindfulness orientation and over the course of the experience, should be coupled with engaging in R-I-A for learners to experience the optimal learning benefits. This includes being mindful as they observe, interact, and participate in the activities of the learning environment. Mindfulness strategies will help the learner meet the demands of the situation (Ovens & Tinning, 2009) by allowing the learner to manage stressful and unfamiliar situations in a more productive manner; this will allow them to reflect in the moment and adjust to conflict that arises (Birnbaum, 2008; Bohecker et al., 2014; Mapel, 2012). The learners' attention to the present is greatly enhanced, increasing his or her level of focus while decreasing cognitive distractions away from the learning situation (Bush, 2011; Crumley & Schutz, 2011; Diaz, 2011; Mishna & Bogo, 2007). Interest, engagement, and involvement from the learner will also be enhanced as practicing mindfulness brings an attitude and intention that is positive towards learning (Trunnell, 1996). Finally, mindful learners will

have a deeper self-awareness and sustained cognitive flexibility that will allow them to reflect-in-action with a heighten awareness of the surroundings and a greater level of innovation and creativity to improve performance within the present moment (Birnbaum, 2008; Bush, 2011; Song & Muschert, 2014). The learners will have the ability to perform as reflective practitioners, detecting their own thoughts and behaviors in order to better engage in and respond to a new situation (Goh, 2012; Keevers & Treleaven, 2011; Russell et al., 2011). Examples of incorporating informal mindfulness are included in Table A3.

Provide feedback. The final element designers should include to enhance R-I-A during the learning experience, is feedback. Feedback strategies that have been shown to enhance reflection in situated learning include: the instructor or expert providing real time feedback by identifying strengths and areas of improvement, the opportunity for students to ask questions throughout the situation, and the students receiving the results of their performance from their peers and instructor immediately. When incorporating mindfulness strategies to support R-I-A during the learning situation, these feedback strategies help the students see the value in reflection (Stalmeijer et al., 2009), and provide support to students when struggling with difficult situations (Herrington, Parker, et al., 2014). Feedback provides immediate information that helps one R-I-A (Seibert, 1999) and identify alternative procedures and perspectives, exposing areas in need of improvement (Jordan, 2010).

Table A3
Examples to incorporate strategies within Phase 2: Reflection-in-Action

• Create a learning environment to enhance reflection-in-action	• Include authentic activities • Expose learners to a variety of experiences • Provide learners autonomy • Extend the learning experience over an appropriate length of time • Incorporate multiple forms of reflection before, during, and after the experience
• Create an environment that allows for social interaction with others to promote reflection-in-action	• Observe peers in practice • Observe experts in practice • Collaborate in groups
• Engage in informal mindfulness exercises to promote reflection-in-action	• Being mindful while engaging in all activities • Focusing attention within the environment • Maintaining a personal awareness
• Provide feedback	• Instructor identifies strengths and weaknesses • Students ask questions throughout the experience • Provide results of performance from peers and instructor

Reflection-on-Action

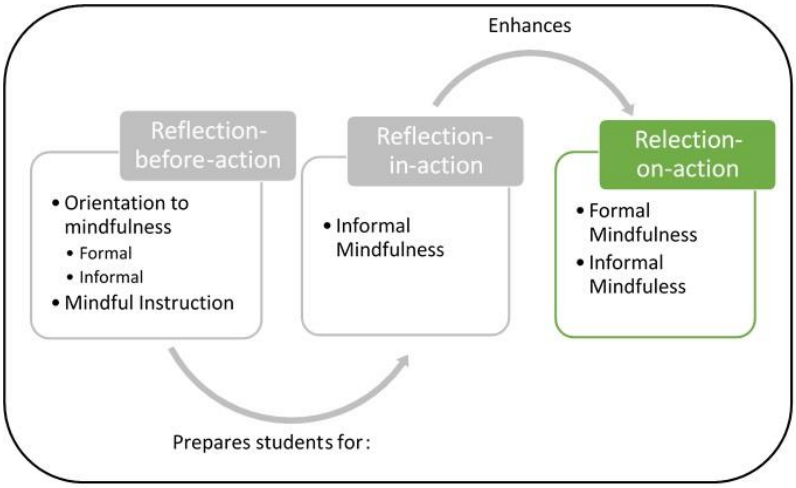

Figure A4. A conceptual model of reflection in situated learning highlighting reflection-on-action

R-O-A is an important design element for reflection in situated learning. Most models and frameworks of situated learning reflection have focused on R-O-A. Students should have the opportunity to re-evaluate the situation, and through the reflective process, will begin to integrate new knowledge for future use (Herrington & Oliver, 2000). As multiple forms of reflection are important to the reflective process, R-O-A provides an additional means to develop reflective practitioners. R-O-A allows the student to process and critically analyze new information and strategies gained from the learning experience (Seibert, 1999). Depending on the learning environment, R-O-A can be accomplished in many ways including but not limited to, journaling, group discussion, blogging, and if possible non-linear navigation or the ability to return to sections of the experience through methods such as reviewing recorded observations work back through previous section a computer mediated module.

Engage in informal mindfulness. Reflection-on-action is directly related to mindfulness practices and enhanced by R-I-A. Practitioners, or in this case students, who learn to effectively reflect-in-action and critically reflect-on-action, have the ability to improve their tacit knowledge and further improve everyday performance. When learners engage in R-I-A supported by mindfulness, they are able to find more meaning in the present moment, which in turn, enhances the meaning making process when they engage in R-O-A (Horton-Deutsch et al., 2012). Additionally, as included in the first two phases of this model, mindfulness strategies should be included in the R-O-A phase. For R-O-A, formal mindfulness practice is appropriate as it creates a cognitive space that allows the learner to direct all attention to the moment of thinking and processing the previous learning experience. Formal mindfulness will assist the learner in centering his or her thoughts and feelings on one specific event or topic to prevent outside distractions within and outside of the cognitive space. Formal mindfulness practices can be used

to bring the learner to the present moment, reducing distraction and focusing attention. Through informal practices, while reflecting on the learning experience, they will have stronger attention and metacognitive abilities to evaluate their thoughts, perceptions, and outcomes in order to reassess and improve future performance. Examples of formal mindfulness for R-O-A are listed in Table A4.

Table A4
Examples to incorporate strategies within Phase 3: Reflection-on-Action

• Provide the opportunity for learners to reflect on the practice	• Journaling, • Group discussion, • Returning to sections of the experience through reviewing recorded observations or non-linear navigation.
• Learners engage in formal mindfulness	• Mindfulness of sound or "listening out" to help reflect on work in relation to a broader perspective • Breath-focused mindful attention, mindful listening • Sitting meditation • Body scan

Appendix C: IRB Memo

VirginiaTech
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Alexis Stoner <marinoa2@vt.edu

IRB #15-979: Revision(s) to Protocol Requested

VT IRB Administrator <irbadmin@vt.edu> Mon, Oct 12, 2015 at 10:37 A
To: Katherine S Cennamo <cennamo@vt.edu>, Alexis Marino Stoner <marinoa2@vt.edu>

Dear Investigators:

Thank you for your New Application for the research protocol titled "A Conceptual Model for Reflection in a Situated Learning Environment: A Mindful Approach".

The IRB requires a revision/response to the following items:
1. According to the Research Protocol, the expert reviewers will only be reviewing theoretical model, which will provide guidance for the development of the model. However, unless the dissertation is about expert review of your model (and not actually about the model itself and how mindfulness impacts structured learning), they are not considered subjects and their review is not considered human subjects research.

Therefore, please cancel this application and proceed with the expert review without further IRB oversight.

If this is not accurate, please email the IRB protocol reviewer at kasmith7@vt.edu for further discussion.

Respond to the above items and incorporate the changes into your online protocol, as appropriate using the IRB Protocol Management System link below:

<https://secure.research.vt.edu/irb?EOIkNXkGU1M>

Note: the use of IRB Protocol Management to submit your response is required (in other words, please do not send the revised documents directly to the IRB office).

Once the IRB receives a response to the above and approves the project application, you will receive an approval letter via email.

If you have any questions about this email, please contact the IRB Administrator at irbadmin@vt.edu.

IRB office

Interested in keeping up-to-date with the Virginia Tech IRB? Click the link below to learn more:

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