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Engaging Undergraduate Students In Classroom Discussion: Exploring Impacts On Reflective Judgment Skills

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ENGAGING UNDERGRADUATE STUDENTS IN CLASSROOM DISCUSSION: EXPLORING IMPACTS ON REFLECTIVE JUDGMENT SKILLS

by

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ABSTRACT

Higher education institutions are to teach advanced thinking skills that help students process information, make judgments, and justify associated beliefs. Such skills are necessary for reflective judgment according to the reflective judgment model (RJM). The purpose of this study was to explore whether engaging undergraduate students in classroom discussion surrounding ill-structured problems impacted these advanced thinking skills. It implemented a quasi-experimental, posttest-only control-group design using the validated semi-structured Reflective Judgment Interview (RJI) protocol to score reflective judgment skills of sixteen undergraduate students. The RJM and its RJI protocol, developed by King and Kitchener (1994) categorizes thinking into three main areas: prereflective (Stages 1-3), quasireflective (Stages 4 & 5), and reflective thinking (Stages 6 & 7). On average, undergraduate students score within Stages 3 or 4. Although results were not significant using an independent-samples t-test between subjects, students that participated in a lecture and discussion scored higher overall than their peers did who only heard a lecture. The Openness to Diversity and Challenge Scale (ODCS) was also used to identify existing openness to diversity and challenge. A least squares regression analysis of the RJI stage and the ODCS score found that there is a significant correlation between the two. Overall, results indicated that fostering discussion of ill-structured problems in a college classroom might help students advance into higher levels of reflective thinking, thus helping to fulfill a key purpose of higher education. Further research should explore these connections using a larger sample for a longer time period.

CHAPTER 1 – INTRODUCTION

Chapter one begins with a brief description of reflective thinking and the reflective judgment model (RJM). Then, it describes how intellectual freedom, critical thinking, and social epistemology are tied to reflective judgment followed by explanations of the existing problem, study significance, research questions, and hypotheses. The chapter's second half features a thorough description of the study's theoretical and conceptual frameworks.

Reflective Thinking and Reflective Judgment – A Brief Explanation

King and Kitchener's (1994) RJM emerged as a developmental model informed by Perry's Theory of Intellectual and Ethical Development (1968), Baxter Magolda's college student reasoning concepts (1992), and Postformal Reasoning – the extension of Piaget's (1952) original work about intelligence. Postformal reasoning involves the ability to weigh available evidence competently and carefully from multiple viewpoints while making informed decisions and solving problems (Sinnott, 1998). A supportive environment needs is necessary for undergraduate students to think in ways represented in the model.

Institutions of higher education have a responsibility to nurture a democratic society through the "free exchange of ideas" (Bennett, 1992, p. 163). Thus, colleges and universities should foster exposure to diverse and new ideas – even if, or especially when they challenge a student's perspective. Researchers agree that students need exposure to different ideas to grow (Sutton, 2018) and be allowed to engage in debate (Villasenor, 2017). This debate should surround controversial, ill-structured problems for which there is no clear answer or solution as originally discussed by Dewey (1933) and King (1992).

Therefore, educators should expose college students to different perspectives on topics, help them respect conflicting ideas, and constructively debate merits of each. Students might then begin to recognize and justify their beliefs within the context of their environment through a process of reflective thought.

Role of Intellectual Freedom

Intellectual freedom, information literacy, and free speech play key roles in fostering reflective thought and debating diverse ideas. The freedom to access information on a topic's various perspectives allows students to critically explore their thinking, values, and beliefs (thus, employ information literacy skills). King and Kitchener (1994) suggest that students need to explain their values through dialog to fully process their thinking, views, and evidence – in other words, to develop and recognize new knowledge through free speech. Students should also be able to identify the significance and validity of information then to interpret and develop independent judgments of that information, which defines reflective thinking (King & Kitchener, 1994). That is, students need to understand the difference between justifying opinions or beliefs with evidence and simply stating opinions or reciting facts (Alston, 2005). Therefore, information first needs to exist in an accessible manner, then students need to access and evaluate that information. Subsequently, students need the freedom to talk about that information so that they can engage in critical thought and form independent judgments – or engage in reflective thinking.

Role of Critical Thinking

This study relies on a critical thinking definition by King and Kitchener: it is an 'individual's ability to interpret, evaluate, and make informed judgments about the

adequacy of arguments, data, and conclusions' (1994, p. 83). Meanwhile, reflective thinking is "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends" (Dewey, 1910/2011, p. 6). Based on these definitions, reflective thinking or judgment relates closely to critical thinking; in fact, King et al. (1990) first found a strong correlation between the two.

Yet, researchers diverge in their discussion of the relationship between them; they do not agree on which one is a part of the other. For example, Dwyer et al. (2014a, 2014b) described reflective judgment as a component of critical thinking that can influence how well a person applies their critical thinking skills to develop logical arguments or solutions. While Maskey (2011) also found a significant correlation between critical thinking and reflective judgment and recognizes that they are unique concepts; she considered reflective judgment to be a more advanced skill than critical thinking. Brabeck (1983) recognized the differences and similarities between reflective judgment and critical thinking by stating that they "share an 'attitude' toward thinking" (p. 25) yet suggested that critical thinking skills are necessary for reflective judgment to occur.

For the purposes of this study, critical thinking is a part of reflective thinking because it helps students to develop reflective judgment – the ability to justify beliefs and perspectives through evidence. Undergraduate students should be able to justify and articulate their beliefs after critically evaluating information and engaging in personal reflection (King & Shuford, 1996), thus defining critical thinking as a necessary part of reflective judgment like Maskey (2011) and Brabeck (1983) did.

Critical thinking skills are also necessary when applying information literacy – specifically when evaluating resources and exploring different perspectives. In fact, a defining element of reflective judgment requires students to weigh information from diverse perspectives and develop their own perspective despite "complexity and uncertainty" (King & Kitchener, 1994, p. 256). Expanding this definition is John Dewey's description of reflective judgments, which "…are initiated when an individual recognizes that there is controversy or doubt about a problem that cannot be answered by formal logic alone and involves careful consideration of one's beliefs in light of supporting evidence" (King & Kitchener, 2004, p. 6). Without first reflecting on and identifying beliefs, students will not be able to process and make judgments regarding controversial concepts (Alston, 2005). This deep reflective thinking and perspective exploration requires critical thinking skills, which is why this study places critical thinking as a key skill necessary for reflective judgment to occur.

Role of Social Epistemology

Finally, social epistemology informed this study's framework because it involves identifying knowledge, controversy, and personal beliefs that are embedded within a situation's social norms (Alston, 2005). These actions together with thinking through perspectives and developing personal judgments using evidence are a primary function of reflective thinking, all of which is grounded in beliefs and identities within a social context. Alston (2005) supports this idea by saying that one can only understand scientific knowledge or religious belief by understanding its social context; one also justifies themselves based on "institutional" (p. 16) norms and the "system of rules" (p. 15). When exploring controversial concepts, it is important that a person considers

perspectives of others present and how they might be affected by judgments made. Therefore, socially constructed identities and social epistemology are also key discussion points surrounding reflective judgment.

Summary

To summarize, undergraduate students first need to understand themselves within the context of their surroundings. Then, they should develop judgments about known truths based on their socially-constructed beliefs and by using information literacy skills (evidence from multiple perspectives) – each of which requires critical and reflective thinking. Finally, students should be able to reach higher levels of reflective judgment by first thinking critically, then engaging in reflective thinking and dialog concerning the vast and diverse marketplace of ideas that institutions of higher education offer.

Problem Statement

Since the ‘90s, the Association of American Colleges & Universities (AAC&U – [previously AAC], 2022) stipulated that “students need to learn…to be able to state why a question or argument is significant and for whom; what the difference is between developing and justifying a position and merely asserting one; and how to develop and provide warrants for their own interpretations and judgments” (King & Kitchener, 1994, p. 19). These skills represent reflective thinking and judgment. Yet, research showed that undergraduate students cannot or do not think reflectively – at least to as great an extent as researchers expect for the students to engage in a modern, complex society with many ill-structured problems. Most college students do not display high-level reflective thinking skills; many “cannot defend their response to ill-structured problems” (p. 167),

critique their own judgments, or describe the role of evidence when making judgments (King & Kitchener, 1994).

The literature also reflects a common stance that communication, specifically disagreement and debate among people (including students), supports a democratic lifestyle and a diverse society of free thought (Carson, 2014; Ceci & Williams, 2018; Schroeder, 2017). Ceci and Williams (2018) state that advancing ideas and information relies on "discord and dissent" because ideas that survive do so because they are correct, not because they are popular. If we only hear popular perspectives, we run the risk of missing the truth (Ceci & Williams, 2018). Similarly, Schroeder (2017) says that deliberations within a democratic society allow people to find commonalities and differences while learning how to support positions with evidence and gain an understanding of alternative ideas. Furthermore, Carson (2014) recognizes that people always have different ideas about what is important; it is a basic fact of humanity and "disagreement is part of being a person who has choices" (p. 110). Therefore, the root of a democratic society is to have choices in how people live, decide what is important to them, and seek truth.

Unfortunately, people isolate themselves both physically and culturally to avoid outbursts of disagreement (Carson, 2014). One can discern that undergraduate students are included in this statement – that they tend to surround themselves with like-minded people. He also believes that if you want to be relevant outside of yourself, home, neighborhood, community, state, and nation, you need to discover what is important to others within the larger levels (Carson, 2014). Therefore, information prepares students to

discover their beliefs and perspectives, then to realize how they fit within the larger society.

A lack of exposure to diverse perspectives can lead to "group polarization, extremism, and groupthink" (Lukianoff, 2014, p. 6); Schroeder (2017) agrees. Not only can a lack of deliberation negatively affect student's critical thinking skills and life preparation, but Shroeder (2017) also said that it can threaten the very existence of a society and cause civil unrest. Students could grow into unprepared adults unable to communicate respectfully about ideals that challenge their beliefs. To help them prepare, one could presume that they need to practice sharing ideas in a respectful manner – even if it creates discomfort. They should also be able to recognize reasons for opposition to fully understand both viewpoints and support opinions with evidence (Ceci & Williams, 2018). To meet these goals, students should grapple with diverse perspectives and ill-structured problems like what they might face in society.

The AAC&U still values critical thinking and charges today's institutions of higher education to expose students to diverse ideas and engage in critical thinking as preparation for a civic society (2022). Recent publications present potential answers as to why students are not thinking as critically or reflectively as they should – especially given that a purpose of higher education is to foster advanced levels of thinking. Perhaps these skill gaps occur when students surround themselves with other, like-minded people and avoid speaking out if they hold a minority opinion, belief, or value, as Lukianoff (2014) found. Avoiding or otherwise lacking exposure to perspectives different than one's own leads to a group-think mentality or blind-spot bias and limits reflective

thinking (King & Kitchener, 2004). Institutions of higher education are positioned to foster a college experience that can help students see beyond themselves.

Studies have also shown that reflective judgment scores can predict diversity tolerance (King & Kitchener, 2004). For example, King and Kitchener (2004) found that students who did not think reflectively also indicated that they are less open to new experiences and others who are different from themselves. One could presume that limited diversity exposure does not prepare undergraduate students for life after college. Thankfully, graduate students can think at more advanced stages of the RJM (described later) and are likely more open to perspectives different from their own (Kitchener et al., 1993). However, the question remains – how can college classroom experiences help undergraduate students advance toward full reflective thinking sooner? Doing so could better prepare them for engagement in a diverse and democratic society (a key function of higher education) even if they do not advance into graduate school. This study addressed the notion that teaching students to reflectively judge information, justify their beliefs, and evaluate dichotomous perspectives of ill-structured (even controversial) problems will help to prepare them for a diverse, global society.

Significance of this Study

Reflective thinking and judgment are harder to assess than critical thinking – both in measurement tools and their convenience, which could be why there is less research about and tools for measuring reflective judgment. Most research using the RJM is from the late nineties, none of which specifically looked at how exposure to information and different perspectives impact movement through the reflective judgment stages. Studies in postformal reasoning development theories address reflective judgment concepts the

closest, which “explore students’ underlying assumptions about the nature and certainty of knowledge” (Mayhew et al., 2016, p. 106).

Furthermore, there is limited research that viewed critical thinking as a component of reflective judgment, which is foundational to the current study. Since research shows a strong correlation between critical thinking and reflective judgment, results from this study could also inform strategies for improving critical thinking skills. For example, this study’s results primarily revealed latest information for faculty in institutions of higher education to use in developing and applying effective interventions that might increase undergraduate students’ reflective judgment skills. Specifically, results indicated that discussing contradictory perspectives might help undergraduate students to think reflectively when faced with ill-structured problems.

Purpose of this Study

Undergraduate students do not typically demonstrate an ability to reflectively judge the merits of diverse perspectives based on their own beliefs and stances (King & Kitchener, 1994). Yet, a primary purpose of higher education is to help students develop such skills or thought processes to be informed citizens of a democratic society (AAC&U, 2022). One might discern that potential factors hindering undergraduate students’ reflective judgment development include lack of exposure to and deep discussions of diverse (even controversial) perspectives and lack of skills in using evidence to evaluate multiple perspectives. Research shows that “curricular interventions showed the highest increase in intellectual cognitive gains, like courses with a focus on critical thinking skills” (Mayhew et al., 2016, p. 128). Therefore, the primary purpose of this study is to determine if engagement with diverse perspectives in a college classroom

will help undergraduate students increase their reflective judgment skills according to King's and Kitchener's (1994) RJM (described in later sections).

Research Questions and Hypotheses

Authors and researchers contended that discussion, debate, and other similar activities help increase college students' critical thinking skills (Hurtado, 2003; Lukianoff & Haidt, 2018; Oros, 2007). Since critical thinking is highly correlated with reflective judgment (King et al., 1990; Maskey, 2011), it stands to reason that classroom discussion would also increase reflective judgment skills. However, prior research has yet to present direct results. Therefore, the first of this study's questions is: Does discussion of contradictory perspectives affect reflective judgment scores of undergraduate students? The related hypothesis is that college students, who are guided through discussion of an ill-structured problem, will score into higher stages of the RJM than those who are not.

King and Kitchener (2004) found that RJI scores can predict a student's diversity tolerance, which is one element that the ODCS reflects. This study aimed to replicate this finding in a modern college environment by posing this second question: is there a correlation between an undergraduate student's openness to diversity and their reflective judgment skill score? The associated hypothesis is that there will be a correlation between students' scores on the ODCS and their reflective judgment stage since progression through stages can depend on how open to diversity a student is.

Definitions

Critical Thinking: In the context of this study, critical thinking refers to an 'individual's ability to interpret, evaluate, and make informed judgments about the adequacy of arguments, data, and conclusions' (King & Kitchener, 1994, p. 83) and the

"correct assessing of statements…[or] 'reasonable, reflective thinking that is focused on deciding what to believe or do' (p. 87). It is also important to recognize that critical thinking involves problem solving and finding answers to problems that have a limited number of answers/possibilities; it is a component of reflective judgment.

Information Literacy: Features critical thinking because it teaches "…integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (ALA, 2015). One needs information literacy skills for processing and evaluating information and for developing independent judgments based on diverse perspectives.

Intellectual Freedom: According to the American Library Association, "Intellectual freedom is the right of every individual to both seek and receive information from all points of view without restriction. It provides for free access to all expressions of ideas through which any and all sides of a question, cause or movement may be explored…[and] encompasses the freedom to hold, receive and disseminate ideas" (ALA, 2007). Accessing information from multiple perspectives is essential to reflective thinking and processing ill-structured problems.

Reflective Judgment Model (RJM): The RJM features a sequential, seven phase developmental process that "describes how people justify their beliefs when they are faced with complex or vexing problems" (King & Kitchener, 1994, p. 5). Reflective judgment is central to this study's theoretical framework.

Social epistemology: The "study of knowledge and epistemically valuable belief as a social phenomenon" (Alston, 2005, p. 4). That knowledge is socially constructed and

rooted in the context of social, cultural, and institutional norms offers this study a potential variable in a student's ability to progress through the reflective judgment model.

Socially Constructed Identities: Jones and Abes (2013) quote this definition of socially constructed identities as the development of a '…sense of self, and beliefs about one's social group...[that] are constructed through interactions with the broader social context' (p. 38). A student's beliefs stem from their involvement with their surroundings, and their beliefs are what inform their reflective thinking and supply the lens through which they view controversial perspectives.

Warranted Belief: People base their knowledge on their existing beliefs – a "true belief [that emerges as] knowledge" (Moser, 2002, p. 181). Based on the reflective judgment model, one must be able to justify their belief for it to become knowledge.

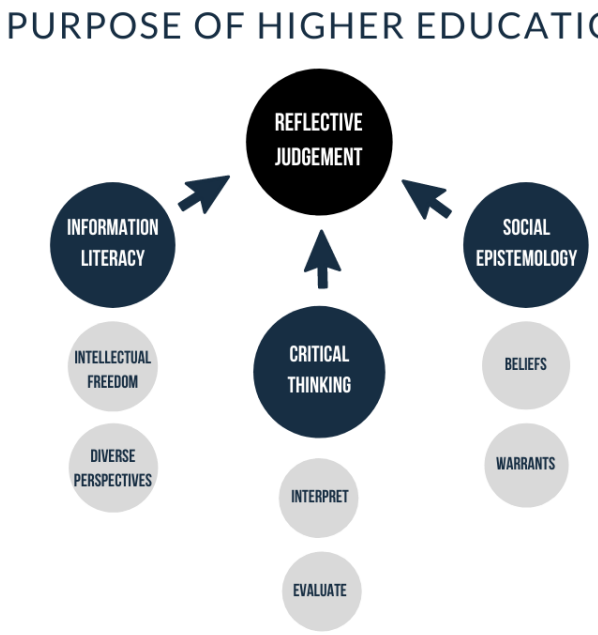
Conceptual Framework

This study's conceptual framework encompasses critical thinking, information literacy, and social epistemology as components of reflective judgment and thinking – all falling within the purpose of higher education. Institutions of higher education are to help students develop critical thinking and information literacy skills (AAC&U, 2022) while recognizing how their beliefs and greater social contexts affect their ways of knowing. Reflective judgment requires a student to identify what they know and believe – which are dependent on social context – then to evaluate perspectives and justify their arguments accordingly. Figure 1 displays the integrated elements of this study's conceptual framework. Elements represented within reflective judgment include information literacy, critical thinking, and social epistemology. Information literacy integrates concepts related to intellectual freedom, the marketplace of ideas, and

grappling with diverse ideas and controversial topics. Social epistemology involves how students develop warrants and beliefs within their surroundings (Alston, 2005). This study builds connections across and around intellectual freedom, critical thinking, and social epistemology to establish arguments for how reflective judgment is an integral purpose of higher education.

Figure 1

Conceptual Framework: Reflective Judgment - A Purpose of Higher Education



Critical Thinking and Information Literacy

Researchers and field experts discuss critical thinking, information literacy, and reflective judgment using similar language and concepts. Information literate students recognize when they need information, identify different perspectives, and think critically about that information to evaluate and use it in the creation of knowledge (ALA, 2015). Meanwhile, Brabeck (1983) states that "knowledge is the consequence of critical inquiry and evaluation of evidence" (p. 25). People engaging in reflective thinking can use

information to justify their beliefs when there are no concrete truths; meanwhile, critical thinkers logically examine their beliefs or knowledge through supporting evidence (Brabeck, 1983). While subtle differences of depth and nuance exist, discussing critical thinking and information literacy brings context to this reflective thinking exploration. Specifically, one can propose an argument that the ability of a person to think critically and use information literacy skills affects their ability to engage in reflective thinking. This study's framework considers critical thinking as a necessary piece of reflective judgment.

Social Epistemology

Social epistemology refers to people developing beliefs and perspectives based on institutional norms, social context, and on how their beliefs and perspectives impact others (Alston, 2005). Reflective thinking ties to social epistemology because a key concept of reflective thinking is consideration for how a person gathers knowledge from their surroundings. Debate and conversation are also necessary for developing beliefs and perspectives, thus discovering knowledge requires engaging with others (Moser, 2002). Furthermore, people's assumptions about knowledge "change during [their] college years" and hinge upon an "intellectual community" (King, 1992). One can see this change in assumptions about knowledge through the sequential structure of the RJM.

Theoretical Framework – Reflective Judgment Model

The reflective judgment model (RJM) developed by King and Kitchener (1994, 2004) grounds this study. The RJM represents developmental phases through seven stages of thinking – each with increasing levels of depth and complexity when faced with ambiguous, uncertain dilemmas. This model is particularly applicable when controversy

and doubt exist (King, 1992). The stages (outlined in Table 1 and described in the following paragraphs) represent three broad ways of thinking or phases: prereflective thinking found in Stages 1 – 3, quasireflective thinking in Stages 4 & 5, and reflective thinking in Stages 6 & 7 (King & Kitchener, 1994; see Table 1).

Prereflective Thinking

Students engaging in prereflective thinking believe that "single correct answers exist for all questions…usually from "authority figures" or direct observation (King & Kitchener, 2004, p. 6). Those in this phase also think that they do not need to justify their beliefs and cannot perceive that other beliefs exist (Stage 1); they have not recognized their beliefs, or that their beliefs are justified by authority figures (Stage 2); or people rely on personal beliefs as knowledge unless information comes from an authority figure and they justify beliefs with opinion when a concrete authoritative answer does not exist (Stage 3) (King & Kitchener, 2004).

Quasireflective Thinking

Within the quasireflective phase, knowledge is "uncertain", "constructed", and requires evidence to justify existing beliefs (Stage 4) or that beliefs are based on context (Stage 5) (King & Kitchener, 2004, p. 6). Those within the quasireflective phase recognize the existence of different perspectives surrounding controversial issues and that people use different forms of evidence to justify their reasonings (King & Kitchener, 2004).

Reflective Thinking

The third and final phase is true reflective thinking and includes Stages 6 and 7 of the RJM. In this phase, people can use evidence from various perspectives to develop

independent judgments about beliefs (Stage 6) or they can take their beliefs a step further to re-evaluate them when faced with new evidence or perspectives – even consider consequences of their judgments in relationship to others (Stage 7) (King & Kitchener, 2004).

King and Kitchener (1994) found that most undergraduate students fall within the third stage of the RJM, which hovers between prereflective and quasireflective thinking (Stages 3 and 4). Yet, the purpose of higher education (AAC&U, 2022) indicated that students should be able to function well within quasireflective thinking (Stages 4 and 5). One might ascertain that quasireflective and reflective thinking rely on the presence of intellectual freedom (access to information regardless of perspective) and information literacy skills (specifically, recognizing when information is required and the ability to evaluate the information). Therefore, this study applies the RJM framework as it relates to accessing and engaging with information from multiple perspectives and using critical thinking skills required of information literate people.

Conclusion

It was established here that a charge of higher education institutions is to prepare their students for a democratic society (AAC&U, 2022; Bennett, 1992; Hurtado, 2003). This charge may be accomplished by exposing students to different perspectives and opportunities to discuss their own ideas using critical thought. To do so, it could be said that students need access to information on all perspectives and the information literacy skills necessary to process what they read and hear. A key component in processing information and finding knowledge is a student's ability to digest it through their own values and beliefs (Alston, 2005; Baxter Magolda et al, 2012; Brabeck, 1983; Jones &

Abes, 2013; King & Kitchener, 1994; King & Shuford, 1996; Mayhew et al., 2016; Moser, 2002). They need to think about information critically, form personal judgments about it, then use evidence to justify those beliefs – exemplifying reflective thinking.

The RJM categorizes phases and stages of reflective thinking as, primarily, developmental milestones (King & Kitchener, 1994). Movement through the model starts with recognizing that truth comes from authority figures and knowledge is certain, to recognizing that knowledge is not certain, and truth requires evidence that does not necessarily come from authority figures (King & Kitchener, 1996). Full reflective thinking occurs when one explores evidence from varying perspectives and uses the evidence to justify beliefs (their truth); they also recognize the impact of a truth on others or society at large (King & Kitchener, 1996). Undergraduate students typically score within the middle of the model (Stage 3, prereflective thinking or Stage 4 early quasireflective thinking), wherein truth is uncertain, but thinkers do not justify beliefs after evaluating multiple perspectives (King & Kitchener, 1994). Thus, undergraduates could leave college without the ability to justify their beliefs after weighing divergent perspectives and recognizing how their beliefs may affect others, which in turn can impact their ability to participate constructively in a democratic society.

However, certain teaching methods, such as discussing controversial or ill-structured problems, can be implemented in the classroom to help propel students into more advanced stages (King & Kitchener, 2004; King & Shufford, 1996). The more reflective a student can think, the better prepared they may be for engaging in real life ill-structured problems and participating constructively in a democratic society. Therefore,

this study tested the effect of classroom discussion of an ill-structured problem on undergraduate students' ability to think and judge reflectively.

CHAPTER 2 – LITERATURE REVIEW

The literature review process uncovered resources describing a purpose of higher education that is to help prepare students for a democratic society through pedagogical practices that teach skills related to critical thinking, reflective judgment, and information literacy while also fostering self-awareness through social epistemology. For example, engaging students in discussions of diverging ideas and interacting with people from diverse backgrounds and who hold different beliefs. This review also describes how prior research used and validated this study's tools, the Reflective Judgment Interview (RJI) and the Openness to Diversity and Challenge Scale (ODCS).

A Purpose of Higher Education

A purpose of higher education is to prepare students for engaging in a democratic society – historically accomplished through teaching critical thinking. There is expansive research showing how to teach critical thinking compared to that on reflective thinking, although they are significantly correlated (King et al., 1990; Maskey, 2011). Because of this correlation and because critical thinking is a necessary skill for reflective thinking and judgment to take place, reviewing its literature is applicable to this study. Experts and stakeholders agree that skills (abilities) and dispositions (desires and motivations) toward critical thinking should be foundational aspects of a college education (AAC&U, 2022; Arum & Roksa, 2011; Deresiewicz, 2017; Jones et al., 1995; Mayhew et al., 2016). Longo and Shaffer (2019) expand on the purpose or outcome of critical thinking to include "…developing independent judgment, open-mindedness, curiosity, and reasoning" skills (p. 52), which relates to reflective thinking concepts. Furthermore, critical thinking skills and dispositions are necessary components of a democratic society

and a liberally educated workforce (Giancarlo & Facione, 2001). In fact, employers find that "critical thinking…and problem-solving skills [are] more important than a candidate's undergraduate major" (Deresiewicz, 2017, p. 151). Not only should higher education focus on critical thinking and other soft skills to prepare students for the workforce, but such skills also prepare students for the society at large (Deresiewicz, 2017) – to engage in civic activities of a democratic society. Similarly, Longo and Shaffer (2019) describe a politically polarized undergraduate student body that should discuss and deliberate on "important topics and divisive issues," thus learning the "foundation for a democratic society" (p. 16). Therefore, it is fair to say that for the last twenty-five years, teaching critical thinking has been a foundational purpose for institutions of higher education.

Critical Thinking

New research on reflective judgment and classroom-based diverse perspective exposure, specifically, is limited. However, since critical thinking is highly correlated with reflective judgment (King et al., 1990; Maskey, 2011), considering literature on impacts of diverse perspectives on critical thinking helps to bridge the research gap to an extent. Also, prior studies found that engagement with diverse peers and ideas is positively correlated with critical thinking skills (Hurtado, 2003; Loes et al., 2012; Oros, 2007), so this study functions on the premise that a similar effect might be true for reflective judgment skills. Consider also that reflective judgment skills depend on the ability to process convergent (diverse) perspectives (King & Kitchener, 1994).

Researchers have explored how exposure to diverse ideas, discussion, and debate impacts college students' critical thinking skills. For example, a University of Michigan

project found that “Positive and meaningful interactions with diverse peers and diversity in general are consistently significant predictors and promote development of cognitive, social and democratic outcomes” – and specifically, intergroup dialogue impacts student “facility with cultural differences” (Hurtado, 2003, pp iii – iv). Likewise, in his study of undergraduate students in a political science course, Oros (2007) found that structured classroom debates positively impact students’ ability to think critically. Furthermore, he recognized that debates should be designed to push students “beyond predictable, comfortable approaches” (p. 302). He also contends that students seeing their classmates express different viewpoints, providing valid evidence, and reacting to those of others’ makes a greater impact on them than if the instructor were to just talk about issues or different viewpoints (Oros, 2007). Finally, researchers using the Interactional diversity scale found that meaningful interactions with their diverse peers positively impacted college freshmen students’ ability to think critically (Loes et al., 2012). Prior studies have not explored how classroom discussion and interactions with diverse peers are related to a student’s reflective thinking abilities. Yet, findings from studies on critical thinking and debate set the stage for similar explorations of classroom debate or discussion and reflective thinking/judgment.

Various studies address the critical thinking aspect of student learning and assess how effective colleges and universities are at teaching critical thinking dispositions. For example, Huber and Kuncel (2016) conducted a meta-analysis regarding whether colleges teach critical thinking – their study suggested that colleges do help students gain critical thinking skills and dispositions. Yet, the gains show a decreasing trend over time (Huber & Kuncel, 2016), perhaps suggesting that institutions of higher education need to

increase their efforts to teach students critical thinking skills and dispositions. When exploring this decline, many experts and researchers discuss how diversity and free speech foster a critical thinking environment on college campuses as described in the next section.

Diverse Perspectives

For critical thinking to occur – and later, reflective thinking and judgment, students need exposure to diverse perspectives so that they can explore and develop their beliefs. Recent national leaders agree that educational experiences and preparation for a democratic society requires a willingness to listen to people with whom you disagree (Carson, 2014; Obama, 2016). Similarly, Longo and Shaffer (2019) state that working across differences is important and that "democratic engagement" requires "participatory and collaborative approaches among a diverse mix of people (p. 2). Yet, Longo and Shaffer state that the "higher education system is going in the wrong direction" (2019, p. 14) when considering how to prepare students for a democratic society. Muldoon (2017) suggests that institutions should educate students' minds through exposure to and discussion of various ideas, thus supporting higher education's role as a marketplace of ideas – Sutton (2018) agrees. Students should face situations where they must consider and evaluate evidence from many perspectives, beliefs, and values before establishing their own (Chemerinsky & Gillman, 2018; Muldoon, 2017). Such situations could include discussion of ill-structured problems, which can be uncomfortable and controversial, but are the cornerstone of the RJM.

Additional authors support this notion of open dialog and embracing uncomfortable topics (DiAngelo, 2018; Lukianoff & Haidt, 2018). One author focuses on

race and unique perspectives based on it, Robin DiAngelo. She describes how the current culture of safetyism shuts down tough conversations that challenge a person's beliefs and assumptions in her book, *White Fragility* (DiAngelo, 2018). DiAngelo (2018) describes *white fragility* as a process of not tolerating discomfort associated with racial stress and displaying defensive responses to whiteness (the white perspective and experience). This fragility is exposed when white people avoid direct racial language – they talk around the topic to maintain comfort and a perceived positive self-image. Her work is just one example of a reality conflicting with what researchers recommend – that people should engage in open dialog about difficult issues; and specifically, that students need these interactions to prepare for living in a diverse, democratic society (DiAngelo, 2018; Lukianoff & Haidt, 2018; Muldoon, 2017; Sutton, 2018). College campuses have a unique opportunity to foster open dialog surrounding ill-structured problems brought forth through lenses of race and ethnicity.

Similar to DiAngelo's (2018) "fragility" concept, Lukianoff and Haidt (2018) discuss ramifications of the coddling and protection of our youth that stretches onto college campuses. Lukianoff and Haidt (2018) contend that cultures of safetyism and the believed notion that discomfort is bad or dangerous shuts down meaningful dialog surrounding perspectives that challenge one's own beliefs and assumptions. They also agree that dissent and discussion lead to critical thinking (Lukianoff & Haidt, 2018). If critical thinking helps with reflective thinking one stands to reason that this open discussion also aids in reflective thinking. If many college students grow up within the cultures that DiAngelo (2018) and Lukianoff and Haidt (2018) describe – avoiding (or at

the very least, not fostering) dialog involving different perspectives of an issue, one might presume that students' critical and reflective thinking skills could diminish.

A foundation of the RJM features the ability to weigh diverse perspectives on ill-structured problems and justify related beliefs using evidence learned from multiple sources (and including convergent perspectives). The model's highest level, reflective thinking, is reached when one can understand their beliefs through its effects on others with different beliefs, and they can use evidence to justify a belief even when it is challenged by conflicting evidence (King & Kitchener, 1994). Therefore, fostering opportunities and the skills necessary to effectively engage with diverse perspectives is essential for student development and serves as a purpose of higher education.

Social Epistemology

Social epistemology also has a basis in reflective judgment because it applies to justification and knowledge concepts (Solomon, 2006) – categorical components of the RJM. Goldman's work on Social Epistemology explored how people come to know truth through various social elements: testimony, argumentation, communication and media, and the marketplace of ideas (1999) - all of which relates to this study's theoretical framework, discussion, and design. In this study, it is understood that students develop their beliefs and knowledge through exploration of multiple perspectives, discussion of those perspectives regarding ill-structure problems, and recognizing the effects of their beliefs on others.

Students should learn how to develop meaning from their experiences, in part through reflecting on and "weighing sources of information and insights…to decide what to believe" (Baxter Magolda et al., 2012, p. 4). Similarly, DiAngelo (2018) states that

"we [must] understand who we are by understanding who we are not" (p. 11), which requires engaging in difficult conversations about beliefs and cultural histories. When students can reflect on, evaluate, and choose from various perspectives, they are better able to develop their own identities (Nelson Laird, 2005).

Students' identities are solidified when they face and reconsider conflicting perspectives, thus requiring social interaction and dialog with people whose ideals, beliefs, and backgrounds are different (Hurtado, 2003). Additionally, exposure to "books, ideas, works of art, and thought" during the college experience will help students to develop their own philosophies during this time of personal reflection and exploration (Deresiewicz, 2017, p. 84). Students begin to separate themselves from others' views and identities while developing their own (Chickering & Reisser, 1993; Jones & Abes, 2013) and using critical thinking to avoid falling into group think situations (Deresiewicz, 2017). It is important for students to access information on conflicting perspectives and engage in conversation with others regarding it, thus socially constructing their knowledge and beliefs.

Unfortunately, there are decreased amounts of meaningful discourse and higher percentages of people that find discourse to be 'stressful and frustrating' – instead preferring to talk to those whose beliefs and views are like their own (Longo & Shaffer, 2019, p. 14). In fact, one study found that "students are likely to revert to familiar and solidified positions when encountering conflict…and are also least likely to develop the habits of mind to prepare them for a diverse and global world" (Hurtado, 2003, p. iv). Given that most peoples' tendency is to surround themselves and engage with others of similar beliefs (Lukianoff & Haidt, 2018), students could become isolated from different

perspectives and surrender to group think mentalities and blind-side bias. Fostering critical thinking is a key purpose of higher education (AAC&U, 2022) and research shows that students might better develop their identities (recognize their perspectives and beliefs) by thinking reflectively (Arnd-Caddigan et al., 2010). Therefore, institutions could help by fostering a marketplace of ideas through which students can engage in dialog regarding diverse perspectives.

Speaking, discussing, and engaging in discourse surrounding controversial topics are a few strategies as "freedom of speech is essential to freedom of thought" (Chemerinsky & Gillman, 2018, p. 23). Interacting with diverse peers and content challenges students to think critically (Nelson Laird, 2005), and students need to talk to others about diverse perspectives (Chemerinsky & Gillman, 2018; King & Shuford, 1996). Unfortunately, some students interpret challenges to their views and values as their campus not supporting them (Chemerinsky & Gillman, 2018), yet emotional responses to controversy should be welcome as a necessary aspect of learning (King & Shuford, 1996). Therefore, faculty can engage students with diverse – even controversial – content in their classrooms so that students can practice evaluating multiple perspectives and building justifications for their beliefs, views, and values (King & Shuford, 1996). It is through this exposure and discussion that students can learn to challenge others and gain new knowledge (Chemerinsky & Gillman, 2018). How students think about controversial issues that have no clear answer is the foundation of the RJM and full reflective thinking

Reflective Thinking and Reflective Judgment

Points discussed in literature regarding critical thinking, free speech, the purpose of higher education, and identity development build the core concepts of reflective thinking and, ultimately, reflective judgment. When students think reflectively, they can develop individual beliefs and views (Jones & Abes, 2013), they can evaluate information (ALA, 2015), justify perspectives with evidence (Brabeck, 1983), approach controversy with intention, and challenge others to do the same (King & Shuford, 1996). Collectively, theorists and researchers discuss reflective judgment aspects based on early works of education philosophy – namely John Dewey and Socrates. For example, Dewey (1916) held that students need to be able to discover their own knowledge and to determine the validity of information. Furthermore, Deresiewicz (2017) used original theories from Socrates, who wanted to take students "into the unfamiliar, uncomfortable, and endlessly fertile condition of doubt" (p. 81), in his argument that students need to develop critical intelligence by letting go of assumptions – to recognize ingrained opinions, question them, and "to think [their] way around it" (p. 80). Theories, prior research, and discussions regarding reflective judgment aspects began with Socrates in the late fifth century BC, to John Dewey in the early 20th century, and continues in 21st century literature.

Today, Chemerinsky and Gillman (2018) state that students should "value curiosity, discovery, skepticism, and dissenting viewpoints" (p. 51). Researchers also tie their discussions to what state leaders and other non-academics recognize that students should be able to do by the time they graduate – like to face disagreements head on and use 'logic, reason, and words' to strengthen their positions and build arguments

(Chemerinsky & Gillman, 2018, p. 74). Unfortunately, higher education lacks in helping students to judge themselves and their own knowledge (Baker & Bilbro, 2017) – perhaps because there is less focus on the liberal arts and classroom deliberation, Longo and Shaffer (2019) acknowledge. Furthermore, students also struggle with imaginative thinking because it does not involve straight answers; instead, it involves the unknown and ambiguity (Baker & Bilbro, 2017). The attributes discussed and points made by Dewey (1916), Deresiewicz (2017), Chemerinsky and Gillman (2018), Longo and Shaffer (2019), and Baker and Bilbro (2017) are echoed within the RJM.

The Reflective Judgment Model

The reflective judgment model (RJM) "describes the development of complex reasoning in late adolescents and adults, and how the epistemological assumptions people hold are related to the way they make judgments about controversial (ill-structured) issues" (King & Kitchener, 2004, p. 5). King and Kitchener developed this seven-stage model using a similar qualitative process that William Perry implemented to develop his positions of cognitive development (Jackson, 2008). The RJM focuses on prompting students to answer ill-structured questions for which there are no definitive answers (King & Kitchener, 2004), thus requiring reflective thinking to judge their beliefs and find new knowledge.

Jackson (2008) tied information literacy standards for college students to the RJM stages, which speaks to prior points of how use of and access to information is essential to the development of reflective judgment skills. The information literacy standards indicate that students should know when information is needed and what kind, access information using various strategies, assess information (evaluating the evidence) and

apply it to their existing knowledge and beliefs, ethically and legally access and use information for a specific purpose, and communicate the results of what they find (Jackson, 2008). Information literacy standards are important to note because developing and utilizing reflective judgment skills involves evaluating information from multiple perspectives to establish and justify one's own perspectives or beliefs. Table 1 lists and describes each RJM stage.

Table 1
Summary of Reflective Judgment Stages

	PreReflective Thinking
Stage 1	Knowledge dimension: Knowledge exists absolutely and concretely. It can be known with certainty by direct observation or from authority figures. Justification dimension: Beliefs need no justification since there is absolute connection between what is believed to be true and what is true. Alternate beliefs are not perceived. Example: "I know what I have seen."
Stage 2	Knowledge dimension: Knowledge certain or certain but not immediately available. Knowledge can be obtained directly through the senses (as in direct observation) or via authority figures. Justification dimension: Beliefs are unexamined and unjustified or justified by their correspondence with the beliefs of an authority figure (such as a teacher or parent). Most issues have a right or wrong answer, so there is little to no conflict in making decisions about disputed issues. Example: "If it is on the news, it has to be true."
Stage 3	Knowledge dimension: Knowledge is certain or temporarily uncertain. In areas of temporary uncertainty, only personal beliefs are known until absolute knowledge is gained. In areas of absolute certainty, knowledge comes from authorities. Justification dimension: In areas in which certain answers exist, beliefs are justified by reference to authorities' views. In areas in which answers do not exist, beliefs are defended as opinion since the link between evidence and beliefs is unclear. Example: When there is evidence that people can give to convince everybody one way or another, then it will be knowledge; until then, it's just a guess.
	QuasiReflective Thinking
Stage 4	Knowledge dimension: Knowledge is uncertain and knowledge claims are idiosyncratic to the individual since situational variables (such as incorrect reporting of data, data lost over time, or disparities in access to information) dictate that knowing always involves an element of ambiguity.

	Justification dimension: Beliefs are justified by giving reasons and using evidence, but the arguments and choice of evidence are idiosyncratic (for example, choosing evidence that fits an established belief). Example: I'd be more inclined to believe evolution if they had proof. I don't think we'll ever know. Who are you going to ask? No one was there.
Stage 5	Knowledge dimension: Knowledge is contextual and subjective since it is filtered through a person's perceptions and criteria for judgment. Only interpretations of evidence, events, or issues may be known. Justification dimension: Beliefs are justified within a particular context through inquiry for that context and by context-specific interpretations of evidence. Specific beliefs are context specific or are balanced against other interpretations, which complicates (and sometimes delays) conclusions. Example: People think differently and so they attack the problem differently. Other theories could be as true as my own but based on different evidence.
	Reflective Thinking
Stage 6	Knowledge dimension: Knowledge is constructed into individual conclusions about ill-structured problems based on information from a variety of sources. Interpretations that are based on evaluations of evidence across contexts and on the evaluated opinions of reputable others can be known. Justification dimension: Beliefs are justified by comparing evidence and opinion from different perspectives on an issue or across different contexts and by constructing solutions that are evaluated by criteria such as the weight of the evidence, the utility of the solution, or the pragmatic need for action. Example: It's very difficult in this life to be sure. There are degrees of sureness. You come to a point at which you are sure enough for a personal stance on the issue.
Stage 7	Knowledge dimension: Knowledge is the outcome of a process of reasonable inquiry in which solutions to ill-structured problems are constructed. The adequacy of those solutions is evaluated in terms of what is most reasonable or probable according to the current evidence, and it is reevaluated when relevant new evidence, perspectives, or tools of inquiry become available. Justification dimension: Beliefs are justified based on interpretive considerations, such as the weight of the evidence, the explanatory value of the interpretations, the risk of erroneous conclusions, consequences of alternative judgments, and the interrelationships of these factors. Conclusions are defended as representing the most complete, plausible, or compelling understanding of an issue based on the available evidence. Example: One can judge an argument by how well thought-out the positions are, what kinds of reasoning and evidence are used to support it, and how consistent the way one argues on this topic is as compared with other topics.

Notes: Adapted from King & Kitchener, 1994, pp. 14-16

Skills needed to access, use, evaluate, and communicate information fall within Stages 5 or 6 of King and Kitchener's RJM (1994). Unfortunately, almost two-thirds of undergraduate students fall within Stage 3 (prereflective) or 4 (beginning quasireflective) for independent function (King & Kitchener, 2004). To help college students advance to Stages 5 (advanced quasireflective) and 6 (full reflective thinking), King and Kitchener (2004) suggest exposing them to multiple perspectives regarding controversial issues in the classroom. Students should then be asked to "make and defend judgments" about controversial issues (King & Shuford, 1996, p. 159). King and Shuford (1996) also suggest that students should "recognize the role that emotions, values, and personal experiences play in the ways they interpret information" (p. 160) and be able to separate them from facts. Students' abilities to develop judgments regarding controversial topics requires, at minimum, quasireflective thinking (King & Shuford, 1996). Therefore, this study explores the influence of guided exposure to controversial issues on a student's reflective judgment skills while also attempting to quantify whether existing openness to diversity and challenge impacts responses to ill-structured problems.

The Reflective Judgment Model in Research

Most research using the RJM represents college students from the 1990s and early 2000s. While the extensive validity and reliability work then follow-up model usage set valuable groundwork for understanding this model within the college environment, it warrants a new round of attention. After establishing that critical thinking is a part of reflective judgment in the prior chapter, one could declare that researchers and practitioners of higher education should avoid reliance on the newer research that is solely focused on critical thinking. Reflective thinking takes critical thinking a step

further to help students understand and justify their beliefs using evidence within a broader societal context that is filled with polarized perspectives surrounding ill-structured problems. The concern remains that students will be unprepared for productive engagement in this modern environment. Thus, exploring teaching strategies that can help students build reflective thinking skills is important for those working in institutions of higher education.

Since its development nearly thirty years ago, researchers used the RJM to study student learning and development (Dwyer et al., 2014a; Friedman, 2004; Jackson, 2008; Kajanne, 2003; King et al., 1993; Kitchener et al., 1993; Love & Guthrie, 1999; Roex et al., 2009). King et al. (1993) studied reflective judgment's relationship to two other measurement tools in a pre/post-test design with a control group. Researchers focused on the effects of contextual support by hypothesizing that young adults would score higher on both measurement tools when provided with opportunities to practice and further understand the context within which the ill-structured problem exists (King et al., 1993). Their study sample included high school students, traditional undergraduates, and graduate students that were separated into three respective age groups. Those in ages 19-20 should be able to use abstract reasoning – reflective judgment Stage 6, "…and the ability to construct single principles or systems of abstract systems should emerge at about age 24 to 25 [a typical graduate student]" – reflective judgment Stage 7 (King et al., 1993, p. 895). Findings showed that students within the traditional undergraduate age bracket can experience a jump in developmental ability within the RJM in environments that foster thinking through ill-structured problems. Specifically, researchers found that college students retain a maximum level of performance regardless of their environment;

yet their scores are significantly higher when an environment of contextual support and practice are present (King et al., 1993). Their findings help to justify the proposed study's work to create an environment that might increase a student's reflective judgment skills – specifically by fostering reflective thought on ill-structured, controversial issues presented through diverse perspectives.

Furthermore, Morin and Howells (2003) studied law students' ability resolve the ill-structured problems their clients faced using the idea of "stuckness" – how students move past a stalemate when problem-solving toward reflective judgment. They also tied the effects of heuristics and emotional intelligence to their "stuckness" concept. Heuristics are biases that evoke quick reaction or judgments based on experiences or irrational sticking points that prevent one from moving beyond initial decisions (Morin & Howells, 2003). Emotional intelligence refers to a person's ability to know themselves and others in such a way that they are cognizant of emotional impacts and connections (Salovey & Mayer, 1990). Morin and Howells (2003) concluded that heuristics and emotional intelligence impact a student's ability to seek information and explore multiple perspectives – their movement toward reflective judgment. Furthermore, students with higher critical thinking dispositions rate higher on reflective judgment scale if exposed to supportive environments (such as college classrooms) in which to practice responding to ill-structure problems (Dwyer et al., 2014b). Therefore, considering how students understand themselves and their biases, how these factors affect others, and that their interests and abilities to learn about diverse perspectives are all key components of reflective judgment.

Finally, in a 1996 article, King and Shuford used the RJM to discuss research on how multicultural experiences impact student reasoning skills. The researchers found that students relied on their experiences and exposure to others when forming opinions, thus they relied on first-hand evidence, which should be expected of college students (King & Shuford, 1996). Yet, such reliance on others can also create ambiguity and prevent students from building judgments based on factors beyond themselves – indicative of Stage 4 thinking (King & Shuford, 1996). When students reach Stage 5 thinking, they begin to see the complexity of issues from multiple perspectives; then they can interpret and evaluate the merits of each depending on context (King & Shuford, 1996). It is also important to acknowledge King and Shuford's (1996) claim that reflective thinking occurs within developmental stages, yet levels of education seem to affect an individual's reflective thinking skills. Findings from King et al. (1993) indicate that specific kinds of educational environments support reflective thinking – those that foster contextual support and practice.

Overall, prior research indicated that students follow developmental stages of reflective thinking with some degree of prediction (King & Kitchener, 1994; King & Shuford, 1996). Nonetheless, students can stretch beyond their developmental level (according to reflective judgment stages) when curricula challenge their assumptions and beliefs. Helping students engage with ill-structured problems through pedagogical activities such as writing, discussing, and reflecting could be effective additions (Dwyer et al., 2014a; Friedman, 2004; Jackson, 2008; Kajanne, 2003; King et al., 1993; King & Kitchener, 2004; Kitchener et al., 1993; Love & Guthrie, 1999; Roex et al., 2009). More

current research using the RJM is limited, likely due to shifting focus on critical thinking and the few complex measurement tools available.

However, living and learning in a conflicted, polarized, modern society requires reflective thinking. This advanced skill is especially important when examining multiple perspectives, applying authoritative evidence to support claims, and justifying beliefs – even in the face of adversity or challenge. Given what prior research discovered about how reflective judgment skills progress, this study used a quasi-experimental design to examine whether students score higher in reflective judgment skills after hearing about and discussing controversial topics. The selected tools helped to identify student reflective judgment skills while controlling for attitudes toward diversity and challenge.

Tools

A review of the literature revealed several tools and models used for testing students' ability to think. Most studies also applied secondary tools along with a primary tool to control for or identify confounding variables; a few common tools are described later in this section. Considering the core purpose and research interest in how students process conflicting perspectives, the RJM fit the current study best. The Reasoning about Current Issues Test (RCI) (King & Kitchener, 1994) was first considered to explore reflective judgment, but the tool was later discovered as invalidated. Today, the most widely accepted and used tool is the Reflective Judgment Interview (RJI) protocol (King & Kitchener, 1994). Tools used along with the RJI included those that measure critical thinking, personality, academic ability, demographics, college experience, and openness to experiences. Given these options and the study purpose, this review looks closely at the Openness to Diversity and Challenge Scale (ODCS) to explore students' exiting

attitudes about diverse people and perspectives. The following sections describe key research using three tools: RCI, RJI and the ODCS.

Reasoning About Current Issues Test

The Reasoning About Current Issues Test (RCI) was developed using the reflective judgment framework by King and Kitchener (1994). It is a quantitative questionnaire that gauges a person's responses to various current issues for which simple, straight-forward answers do not exist. How a person responds represents a "reflection of their assumptions about knowledge and the certainty with which knowledge claims can be made" (King, n.d. 1). This tool was relevant for looking at complex social problems and tended to correlate with student dispositions toward reflective thinking or "motivation to be active thinkers" (Hurtado, 2003, p. 27). It "measures students' thinking across a variety of issues in a series of problem-solving situations in which the nature of knowledge is uncertain – situations similar to many important social problems today" (Hurtado, 2003, p. 56). The RCI was most used during the late 1990s and early 2000s, including many dissertations (Linvill & Mazer, 2012; Milner, 2009; Nelson Laird et al, 2008; Owen, 2011; Pittman, 2006). Since early uses of the tool, other researchers found the RCI's validity to be lacking; they encourage further testing and state that the tool would not be useful in small samples or with variable statistical analyses (Linvill & Mazer, 2012). Due to findings such as these, one of the tool's creators recommends using their Reflective Judgment Interview protocol to study reflective judgment (P. King, personal communication, March 2020).

Reflective Judgment Interview

The Reflective Judgment Interview (RJI) "is a semi-structured interview protocol designed to elicit ratable data about individuals' epistemological assumptions" (King, n.d. 2). RJI problems feature those that are ill-structured – meaning that there are no clear right or wrong answers. Prior research used this tool with various other quantitative tools to control for unique variances. Brabeck (1983) used the RJI along with the Watson Glaser Critical Thinking Appraisal (WGCTA) and a simple questionnaire to gather demographic data to explore connections between critical thinking and reflective judgment. Brabeck's original study used the WGCTA to identify study participants from whom she would gather data using the RJI; she also gathered SAT scores of the participants to analyze any correlations (1983). Her sample (n = 119) was made up of participants scoring high and low on critical thinking skills based on the WGCTA. Another study used standard dilemmas of the RCI, WGCTA, SAT scores, and a personality questionnaire – the NEO-Five Factor Inventory (NEO-FFI), which looks at a person's neuroticism, extroversion, agreeableness, conscientiousness, and openness to experiences (Bauer, 2001). Similarly, Friedman (2004) utilized the Omnibus Personality Inventory to look at how personality traits and reflective judgment skills relate. Finally, Dale (2005) used the RJI along with a demographic data form, a researcher-designed Impact of Faith Questionnaire, and the Wechsler Adult Intelligence Scale – revised to control for verbal ability all to look at how seminarians use their assumptions to solve ministry and other ill-structured life issues. To date, research using the RJI has not used a scale that measures a participant's openness to diverse perspectives or specifically, the ODCS.

Openness to Diversity and Challenge Scale

The ODCS was developed by the Center of Inquiry in the Liberal Arts at Wabash College (n.d.). The ODCS features seven questions to which participants respond based on a Likert scale to gauge how open they are to perspectives and beliefs different from their own. According to findings of one large study (n = 2,290), college freshmen's social and other non-academic experiences (drawn from the College Student Experiences Questionnaire (CSEQ) had the greatest impact on ODCS scores (Pascarella et al., 1996). Such experiences included participation in a racial or cultural awareness workshop and close relationships with peers from different ethnic backgrounds – and specifically, their conversations surrounding diverse topics (Pascarella et al., 1996). One key generalization that researchers made is that "the more students interact with diverse peers and the greater the extent to which such interactions focus on controversial or value-laden issues that may engender a change in perspective or opinion, the greater one's development of openness to diversity and challenge" (Pascarella et al., 1996, p.188). This finding represents a primary justification for using the ODCS to explore its factors as potential confounding variables impacting a student's reflective judgment skills.

Conclusion

Institutions of higher education are to prepare students for engaging in a democratic society. Teaching critical thinking skills has been seen as a primary strategy for fulfilling this purpose and much research is based on exploring effective ways in which to teach critical thinking skills. Unfortunately, reflective thinking did not receive equal attention. Because of their significant correlations, relying on critical thinking literature in discussions of reflective thinking helps to bridge the research gap to an

extent. However, there is a limit to what the body of research on critical thinking can inform about reflective thinking.

This study theorizes that critical thinking is a component and requirement of reflective thinking, but reflective thinking is more complex and developmentally based on postformal reasonings skills. Such skills are treated differently, thus necessitating a unique approach in both research design and in pedagogical techniques. Most undergraduate students score within the pre- and early quasireflective stages of the RJM. Yet the purpose of higher education indicates that students should be able to process converging evidence and build justifications for their beliefs well within the quasireflective stages and up to full reflective thinking. As described in this chapter, research suggests that fostering reflective thinking skills in the classroom by discussing ill-structure problems might help students advance past their developmental stage and into more advanced stages of the RJM, thus justifying this study's design.

CHAPTER 3 – METHODS

This chapter details the research-based methods decisions made for this study starting with the overall design. It then relays the selection and use of two instruments – the Reflective Judgment Interview (RJI) protocol and Openness to Diversity and Challenge Scale (ODCS) along with demographic questions, followed by a description of materials used. It also describes the research sites and participants plus the recruitment and data collection process – phases which took place during the COVID-19 pandemic and an international relocation. The chapter concludes by outlining data analysis decisions based on each research question.

The primary purpose of this study was to examine whether engagement with diverse perspectives in a classroom environment helped the participating undergraduate students to think critically, use information literacy skills (evidence), examine their own beliefs, and thus increase their reflective judgment skills according to King and Kitchener's (1994) RJM. Two research questions framed this study: 1) Does discussion of contradictory perspectives affect reflective judgment scores of undergraduate students? 2) Is there a correlation between an undergraduate student's openness to diversity and their reflective judgment skill score? Data analyses addressed these two hypotheses respectively: 1) College students who are guided through discussion of an ill-structured problem will score into higher stages of the RJM than those who are not. 2) There will be a correlation between student's scores on the ODCS and their reflective judgment stage. The study also attempted to replicate results of prior study results which concluded that, on average, college seniors score higher on the RJM than do freshmen (King & Kitchener, 2004).

Research Design

Prior studies used a quasi- or experimental design with control groups to explore reflective judgment skills among students (Dwyer et al., 2014b; King et al., 1993; Zeidler et al., 2009). To avoid the Dunning Kruger effect – priming participants for responses leading to inflated score differences, this study did not use a pretest element (All et al., 2017; Willson & Kim, 2010). Using a quasi-experimental, posttest-only control-group design, this study involved an experimental undergraduate student group in a facilitated discussion about an ill-structured problem after a short lecture, collected their responses to the ODCS, then engaged them in semi-structured interviews using the RJI protocol. Meanwhile, the control group did not participate in a facilitated discussion, instead these students only heard the short lecture about a topic with opposing perspectives. This lecture-only group also responded to the RJI protocol and ODCS. Responses to the RJI protocol were qualitatively analyzed using the validated rubric (King & Kitchener, 1996). Scores in the knowledge and justification categories were noted separately, then averaged to find the total RJM score. These three scores were used in various analyses.

A posttest-only control-group design (Creswell & Creswell, 2018) was used whereby participants were divided into a control group and an experimental group with a single point in time measurement of reflective judgment skills. Methodological decisions were based on designs of similar studies using the RJI or others that measure reflective judgment skills (Dale, 2005; Friedman, 2004; Milner, 2009; Pascarella et al., 1996; Zeidler et al., 2009). The following sections describe this study's instruments, materials, research sites, participants, procedure, and analyses in more detail.

Instruments

Tools were selected based on prior research examples for effectively utilizing the RJI in conjunction with other quantitative tools to apply the RJM. The primary tool (RJI) yields qualitative data scored according to a rubric that underwent extensive validity and reliability tests, thus transforming interview responses into quantitative data. The secondary tool, the ODCS, helped to control for potential confounding variables. Demographic information matched data collected in studies using the ODCS or RJI – sex, class year, age, and race (Pascarella et al., 1996; Ryder et al., 2016).

Reflective Judgment Interview Protocol

Since research showed that the Reasoning about Current Issues test is no longer a valid and reliable measure of reflective judgment skills, this study used the semi-structured Reflective Judgment Interview (RJI) protocol. King and Kitchener developed the RJI in 1994; they and other researchers validated it through studies since then (Dale, 2005; Friedman, 2004). "Interrater reliability and agreement [>.70], test-retest reliability [71 - .87 between short intervals], and internal consistency [alpha coefficients in the high .70s - .87] indicate that the RJI is a reliable measure of reflective thinking…and suitable for decision making about groups of people" (King & Kitchener, 1994, pp. 114-115). The RJI is designed to discern participants' "assumptions about knowledge, how it is gained, and the basis for the certainty (or uncertainty) of their knowledge" (King & Kitchener, 1994, p.115). Current study participants responded to two ill-structured problems from the RJI using standard probe questions. The RJM rubric (King & Kitchener, 1996) maps the probe questions into two dimensions – Nature of Knowledge and Nature of Justification then further divides them into three subcategories each (Table 2).

1. Some people believe that news stories represent unbiased, objective reporting of news events. Others say that there is no such thing as unbiased, objective reporting, and that even in reporting the facts, the news reporters project their own interpretations into what they write.
2. Many religions of the world have creation stories. These stories suggest that a divine being created the earth and its people. Scientists claim, however, that people evolved from lower animal forms (some of which are similar to apes) into the human forms known today. (King, n. d. 2).

Table 2

RJI Standard Probe Questions and Reflective Judgment Rubric Subcategory

Probe Question	Subcategory
Nature of Knowledge	
Q4. Can you ever know for sure that your position on this issue is correct? How or why not?	View of Knowledge (1a)
Q5. When two people differ about matters such as this, is it the case that one opinion is right, and one is wrong? If "yes," what do you mean by "right"? If "no," can you say that one opinion is in some way better than the other? What do you mean by "better"?	Right vs. Wrong Knowledge (1b)
Q6. How is it possible that people have such different views about this subject?	Legitimacy of Differences in Viewpoints (1c)
Nature of Justification	
Q1. What do you think about these statements?	Concept of Justification (2a), Use of Evidence (2b)
Q2. How did you come to hold that point of view?	Concept of Justification (2a), Use of Evidence (2b)
Q3. On what do you base that point of view?	Concept of Justification (2a), Use of Evidence (2b)
Q7. How is it possible that experts in the field disagree about this subject?	Role of Authorities in Making Judgments – (2c)

Note: (King, n. d. 2)

Many studies using the RJI protocol also applied secondary tools to learn more about the participants, identify confounding factors, or to compare similar tendencies in participant data (Bauer, 2001; Brabeck, 1983; Dale, 2005; Friedman, 2004). Since one primary goal of this study was to explore the impacts of exposure to diverse perspectives on reflective judgment skills, it is important to discern to what extent a participant is open to diverse perspectives. Whether or not a participant is willing to consider others' perspectives might present as a confounding factor in this study. Therefore, the ODCS was administered in addition to the RJI.

Openness to Diversity and Challenge Scale (ODCS)

The ODCS survey was developed through factor analysis by Pascarella et al. in 1994 to gauge how open people are toward diversity and to what extent they enjoy being challenged (Pascarella et al., 1996). Their definition of openness and challenge lays the foundation for this tool: "…an orientation toward enjoyment from being intellectually challenged by different ideas, values, and perspectives as well as an appreciation of racial, cultural and value diversity" (Pascarella et al., 1996, p. 179). Prior studies report high reliability in the ODCS with alpha levels of .87 (Loes et al., 2018) and .84 (Pascarella et al., 1996 & Sanner et al., 2010). The ODCS consists of seven questions to which participants respond according to a five-point Likert scale (1 = strongly disagree; 5 = strongly agree) – the higher the score, the more openness to diversity the respondent has:

1. I enjoy having discussions with people whose ideas and values are different from my own.
2. The real value of a college education lies in being introduced to different values.

3. I enjoy talking with people who have values different from mine because it helps me better understand myself and my values
4. Learning about people from different cultures is a very important part of my college education.
5. I enjoy taking courses that challenge my beliefs and values.
6. The courses I enjoy most are those that make me think about things from a different perspective.
7. Contact with individuals whose backgrounds (e.g., race, national origin, sexual orientation) are different from my own is an essential part of my college education.

   (Center, n.d.)

Demographic Questions

Additional demographic categories in the survey included: Sex (Female, Male, Nonbinary); Identity – multiple answers possible (Black or African American; Asian American; Caucasian; Hispanic, Latino, or Spanish origin; Native American, Other); and Year in College (Freshman, Sophomore, Junior, Senior), which matches demographic data gathered in studies that used the RJI or ODCS (Brabeck, 1983; Dale, 2005; King & Kitchener, 1994; Pascarella et al., 1996, & Summers et al., 2002).

Materials

This study used researcher-created materials to complete the lecture and discussion components. She designed them to emulate typical classroom activities and pedagogical approaches in a college setting. The lecture presented an unsolved debate regarding what college curricula should include: liberal arts-based (soft) skills/content or

just vocational (hard) skills/content related to a field or major. The researcher spoke for approximately ten minutes on the definitions of each curricula type and cited arguments for teaching each. This topic served as ill-structured because there is no agreed-upon universal answer to the problem.

Follow-up questions prompted students to think about their own views on the topic, identify the problem, and suggest a solution. These prompts included:

- What do “technical skills” mean to you”?
- Can you think of any necessary tech skills for your chosen field of work?
- What do “soft skills” mean to you”?
- Can you think of any necessary soft skills for your chosen field of work?
- What is the issue or problem at hand?
- What is the root cause of this issue or problem?
- How can we solve the issue?
- Why do you think this is the solution?

Students paired up with a classmate to talk about these prompts one by one for twenty minutes.

Research Sites and Recruitment Process

The researcher emailed information about the study to department chairs and teaching faculty at three universities: The University of North Dakota (UND), researcher’s degree-granting institution; Mayville State University (MSU), the researcher’s employer at the time of the proposed study; and North Dakota State University (NDSU), a neutral institution that was also covered under the same IRB as MSU. UND and NDSU are public research institutions with student populations of

13,615 (Indiana, 2020d) and 12,846 (Indiana, 2020b) respectively and have many programs at all academic levels. MSU is a four-year public university of 1,168 students (Indiana, 2020a) in primarily undergraduate degree programs. The email asked the chairs and faculty to relay the study information and participation invitation to their enrolled students.

Unfortunately, this first recruitment phase was not sufficient. In some cases, departmental policy did not allow emails to go out to students in this manner. Moreover, attempting to recruit participants amidst the continued effects of the COVID-19 global pandemic (fall 2020 – spring 2021) was a presumed barrier. The lack of participation was also in large part due to the researcher's relocation to a Central American country for employment at a U.S.-based university located there. Therefore, a fourth university system (at two sites) became a primary source of participants; recruitment there began during the latter half of the spring 2021 semester and continued through the summer. Texas Tech University – Lubbock (TTU) and Costa Rica (TTU-CR), the researcher's current employer, is a public research institution with a student population of 40,322 (Indiana, 2020c) with a variety of majors at all levels of study. The TTU-CR campus includes 130 of the total TTU student body. Most students at TTU-CR are native to Costa Rica, and Spanish is their first language; although, they also communicate with English language fluency.

Because the researcher was employed previously at MSU and currently at TTU-CR, she knew many students in an instructional or advisory capacity. These relationships could have created undesirable power dynamics for study participants (Glesne, 2016). For example, participants might not have authentically responded to interview questions,

or the researcher might have failed to look at data objectively (Creswell & Creswell, 2018). Such backyard research concepts were considered, yet the sites remained justified since participation was voluntary, the researcher might not have worked directly with the participants at these sites, and because blinded interview transcripts were scored by a second, un-related scorer. Furthermore, prior research using the RJI to apply the RJM also used a form of convenience sampling to advance local practices and understandings (Dale, 2005; Sanner et al., 2010; Zeidler et al., 2009). Expanding the participation invitation to two larger universities where the researcher had no direct ties to potential participants, further attempted to alleviate ethical dilemmas from backyard research while expanding the sample pool. Forty undergraduate students were the study's target sample – a decision supported by two other small studies using the RJI that also enlisted samples near this size (Dale, 2005; Friedman, 2004).

Included participants were full-time enrolled or degree-seeking undergraduate students at two of the five recruitment sites (n = 1 from MSU, n = 3 from TTU, n = 12 from TTU-CR). Each participant indicated their agreement to participate by signing the consent form, completing the ODCS, and identifying their availability to participate in the presentation, discussion, and interview components. Participants were excluded from the study if they did not complete each required component for which they committed or if they were not full-time enrolled or degree-seeking undergraduate students at one of the identified institutions. Enrollment was verified by the instructor who helped to connect the student to the study.

Procedure

Recruitment

A convenience sample of sixteen undergraduate students were recruited from two of the four universities. Approval to recruit and collect data was sought through the respective site IRB offices and conducted within practices at each to communicate with potential participants. To announce the study and invite participation, the researcher sent emails to undergraduate professors and program/departmental chairs at each research site during the Spring and Summer 2021 semesters after exploring and talking to potential gatekeepers during the Fall 2020 semester. The message made an appeal to share the study information and participation invitation with their students. The email supplied a brief description of the study's purpose, a copy of the consent form, and notice that participants could earn a small gift card or may receive course credit (according to their professor's discretion) upon successfully completing the study. It asked interested students to complete the consent form and return it to the researcher through email then complete the ODCS survey.

One faculty member offered access to their English composition classes. Because of the low rate at which students volunteered otherwise, accessing these classes was a welcome option. Students could have opted out, yet everyone chose to participate and completed the consent form. One class had eight students; they participated in the discussion group for the sake of convenience. Three students from the second class plus other volunteers from various classes and locations participated in the lecture-only group, bringing the sample to sixteen (eight in each group).

After receiving signed consent forms from the participant, students received the Qualtrics questionnaire, which first asked whether they were a full-time enrolled or degree-seeking undergraduate student. If this first response was yes, they continued by supplying their name, email address, and demographic information, then completed the Openness to Diversity & Challenge Scale (ODCS). Since the researcher did not have complete control over which participant fell into each group, this study followed a quasi-experimental design (Creswell & Creswell, 2018). Every participant completed the ODCS with added demographic questions via a Qualtrics survey. They also selected days and times when they would be available for an online interview during which they would respond to ill-structured problems provided in the RJI protocol. See details of these procedures and tools in the following sections.

Table 3

Participant Make-up

	n	Year	Gender	Ethnicity
Lecture-only (Control) Group	8	3 Freshmen 1 Sophomore 0 Juniors 4 Seniors	3 women 5 men	2 Black/Afr. Amer. 6 Hispanic/Latino
Discussion (Experimental) Group	8	3 Freshmen 3 Sophomores 1 Junior 1 Senior	8 men	7 Hispanic/Latino 1 White

Discussion (Experimental) Group

The discussion-based, experimental group consisted of eight students identifying as men, more lower classmen than upper classmen, and all but one participant was of Hispanic or Latino descent (Table 3). Requirements for participating in this group included: full-time enrolled or degree-seeking undergraduate student taking the

designated English composition class, consent form completion, ODCS completion, class attendance during the scheduled short lecture and in-class discussion, plus the willingness to be interviewed after the discussion. If a participant did not meet one of these requirements, they would have been excluded from further participation and any data collected to that point would have been excluded from the analyses. However, every participant completed all requirements.

Procedure

The researcher emailed the consent form and ODCS (including demographic details and requests for interview availability options) to students enrolled in one English composition class. After completing the ODCS and signing the consent form, the discussion group participants met with the researcher during their scheduled class time to hear a 10-minute lecture that outlined different perspectives about liberal education and the debate between fostering soft skills or liberal arts curricula versus hard skills or career-focused curricula. During the remaining forty minutes, participants engaged in a facilitated discussion based on the prompts listed in the prior materials section. During the week following this group session, each participant completed the RJI one-on-one with the researcher via Zoom.

Lecture (Control) Group

The remaining participants were balanced between upper and lower classmen in the lecture-only group. There were slightly more men, and all were from minority races and ethnicities (Table 3). Requirements for participating in this group included enrollment in one of the research sites as a full-time or degree-seeking undergraduate student, consent form completion, ODCS completion, and willingness to be interviewed

following a ten-minute presentation. If a participant did not meet one of these requirements, they and any collected data would have been excluded from further participation and analysis. Just one participant did not continue past the ODCS survey and did not respond to follow-up correspondence.

Procedure

Consistent with the discussion group and upon consent to participate, lecture-only group participants completed the ODCS Qualtrics survey with the additional demographic questions. They also selected times when they could be interviewed after hearing the short presentation. This lecture-only group did not participate in a facilitated discussion about an ill-structured or complex problem – instead, they heard information on the polarized perspectives then advanced to the RJI protocol one-on-one with the researcher/interviewer. The synchronous presentation and the interviews were conducted using secure Zoom meetings.

Reflective Judgment Interview Procedure

RJI developers estimated the protocol would last approximately 30-60 minutes to complete the interview sequence for two ill-structured problems (King & Kitchener, 1994). Consequently, this study's interview sessions for participants in both the lecture only and discussion-based group were scheduled for fifty minutes, which matched a typical class period and helped to accommodate student schedules. Due to logistical challenges from the COVID-19 virus, all interviews occurred virtually using secure Zoom rooms set up using the researcher's password-protected account. The researcher used Zoom's built-in recording tool for initial transcription then reviewed and edited them for accuracy prior to scoring. Recordings and their transcriptions were stored on a

password protected network, which was accessible by the researcher for the study's duration. Blind transcriptions were shared with the second rater for scoring. Additional working copies of these transcripts and recordings (including the original files in the Zoom cloud account) were destroyed after scoring.

Because of the nature of data collection, the researcher knew who each participant was throughout the data-collection phase. However, each participant was assigned a number code during transcription review (with a matching number code on the ODCS), thus creating anonymity during the analysis and scoring phases. The original participant list with assigned codes were stored on a secured network housed through the researcher's enrolled institution through the study's duration.

Analysis

In his internal consistency analysis, Wood (1997) recommended that two raters score each interview according to the reflective judgment rubric and re-rate any scores that differ by one or more stage. Studies employing the RJI used two raters to score each participant response, then compared ratings for discrepancies – re-scoring when needed, thus ensuring interrater reliability (Dale, 2005; Friedman, 2004). Therefore, the researcher and a second, neutral party (who was blind to which group a participant belonged) scored each interview transcript, which also counteracted any backyard research concerns (Creswell & Creswell, 2018). To validate this study's interrater reliability, a Pearson product-moment correlation between the two raters' scores was performed (Dale, 2005) and revealed a significant correlation (.997) at the .01 level (2-tailed). Contradicting scores would have prompted a second scoring and discussion regarding the score discrepancies. However, this analysis did not result in scores that

differed by one or more stage, so more discussion or scoring was unnecessary. Additionally, the ODCS Cronbach's alpha score revealed significant internal consistency (.708).

Reflective Judgment Scoring Rubric

Each interview was transcribed then qualitatively analyzed and scored according to the reflective judgment scoring rubric, which found the stage within which the participant's level of thinking falls. Each interview response was rated according to the rubric's six scoring prompts or categories within two dimensions (Table 2). The first dimension, named *Nature of Knowledge,* included these scoring categories: 1) View of Knowledge: What can we know and how certain can we be, 2) Right vs Wrong Knowledge: How concretely can we know, 3) Legitimacy of Differences in Viewpoints: How does the individual understand why people claim to know differently? The second dimension, *Nature of Justification*, included these three prompts: 1) Concept of Justification: How may beliefs be justified, 2) Use of Evidence: Through what process can we justify beliefs or claims to know? 3) Role of Authorities in Making Judgments. Interview transcripts were scored according to each dimension (assigned an RJI stage based on how the question was addressed), then their aggregated scores were averaged and analyzed.

The quantitative scores (stages) were then analyzed in conjunction with the ODCS and demographic parameters to answer the research questions: 1) Does discussion of contradictory perspectives affect reflective judgment scores of undergraduate students? 2) Is there a correlation between an undergraduate student's openness to diversity and

their reflective judgment skill score? Table 4 outlines the analyses performed according to each hypothesis.

Hypothesis One

To answer the first research question, this hypothesis was tested: College students who are guided through discussion of an ill-structured problem will score into higher stages of the RJM than those who are not. To accomplish this test, a simple independent-samples t-test between subjects with a 95% confidence interval using the RJI scores as the test variable and the lecture (control) and discussion (experimental) designation as the grouping variable while adding ODCS items as covariate factors. This analysis revealed the mean difference and whether any difference was significant while controlling for confounding factors (Dale, 2005; Wagner, 2020).

Hypothesis Two

Addressing the second research question, this hypothesis was tested: reflective judgment skills can depend on how open to diversity a student is – there will be a correlation between student's scores on the ODCS and their reflective judgment stage. First, a Cronbach's alpha score was calculated on the ODCS data to analyze internal consistency of these scores. Then, a least squares regression analysis was performed using the overall RJI score as the dependent variable and ODCS score as the independent variable while controlling for demographic data (Pascarella et al., 1996; Ryder et al., 2016; Wagner, 2020; Whitt et al., 2001). This analysis included RJI scores across all participants regardless of group designation.

Table 4

Outline of Hypothesis with Analysis

Question	Hypothesis	Analysis

1. Does discussion of contradictory perspectives affect reflective judgment scores of undergraduate students?	1. College students who are guided through discussion of an ill-structured problem will score into higher stages of the RJM than those who are not.	• Independent-samples t-test between subjects
		  ○ 95% confidence interval
		  ○ Test variable: RJI scores
		  ○ Grouping variable: control or experimental designation
		• Chi-square scores

2. Is there a correlation between an undergraduate student's openness to diversity and their reflective judgment skill score?	2. There will be a correlation between student's scores on the ODCS and their reflective judgment stage since progression through stages can depend on how open to diversity a student is.	• Least squares regression analysis
		  ○ Dependent variable: RJI score
		  ○ Independent variable: ODCS score

Conclusion

A quasi-experimental post-test design drove this study's methodology to help identify any effects of discussing ill-structured problems on undergraduate students. RJI transcripts were quantified into RJM stages using a tested and validated reflective judgment rubric (King & Kitchener, 1996). Meanwhile, the Openness to Diversity and Challenge Scale helped to pinpoint correlating or confounding factors (Center, n.d.). Extenuating circumstances added complexity to the data collection phase and limited the participants available to the researcher. However, the analysis plan held merit. By chance and circumstance, participants fell into the lecture-only (n = 8) and discussion groups (n = 8). These balanced groups allowed the analyses to carry forward.

CHAPTER 4 – RESULTS

Narrative details and accompanying tables 5 & 6 present data that compares score (Stage) differences between the lecture-only group and the discussion group based on overall Reflective Judgment Interview (RJI) scores and the justification and knowledge dimension scores. Results also describe differences between lower- and upper- classmen scores and present correlations between RJI scores and the Openness to Diversity and Challenge Scale (ODCS) scores.

Descriptive and inferential statistical analyses using the RJI and ODCS scores effectively addressed this study's two hypotheses (Table 4).

Question 1. Does discussion of contradictory perspectives affect reflective judgment scores of undergraduate students?

Hypothesis 1. College students who are guided through discussion of an ill-structured problem will score into higher stages of the reflective judgment model (RJM) than those who are not.

Question 2. Is there a correlation between an undergraduate student's openness to diversity and their reflective judgment skill score?

Hypothesis 2. There will be a correlation between student's scores on the ODCS and their reflective judgment stage.

Hypothesis One

Reflective Judgment

An independent-samples t-test between subjects was run to gauge the stage differences among groups according to the two RJI dimensions (justification and knowledge) and total RJI scores. While these results support the hypothesis that students

in the discussion group would score higher than those in the lecture-only group, the differences were not significant at the .05 level and the effect sizes were low (Table 5).

Table 5

Reflective Judgment Interview Scores

	Lecture-only Group			Discussion Group					
Dimension	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*(14)	*p*	Cohen's *d*
Justification	4.33	1.51	8	4.13	0.97	8	1.96	.184	0.164
Knowledge	4.58	1.41	8	5.04	0.74	8	2.17	.163	0.408
Total RJI	4.46	1.41	8	4.58	0.78	8	2.02	.178	0.108

Note: Equal variances assumed.

Knowledge Dimension

The knowledge dimension was primarily scored using probe questions 4 – 6 (Table 2) then averaged across the two scenarios. These three questions represent thinking about how a person can know something to be true and with what amount of certainty, whether a person's view of knowledge can be right or wrong, and how it is possible for people to have different viewpoints. The discussion group (M = 5.04, SD = 0.74) scored one stage higher than the lecture-only group (M=4.58, SD=1.41) in the knowledge dimension; $t(14) = 2.17$, $p = 0.163$, CI [-1.67, 0.75] (Table 5). Scores of students in the discussion group ranged from 3.67 (prereflective thinking, (n = 1) to 6.00 (reflective thinking, n = 2). Representing scores within this range were students in Stage 4 (n = 1) and Stage 5 (n = 4) (Table 6). The lecture-only group ranges were 2.00 (also prereflective thinking, n = 1) to 6.33 (reflective thinking, n = 1). Representing scores within the range were students in Stage 3 (n = 1), Stage 4 (n = 3), Stage 5 (n = 1), and Stage 6 (n = 1) (Table 6).

While the results were not significant at the .05 level and ranges represented prereflective to reflective thinking in both groups, there was a stage difference in mean

and in the lowest score. Students in the discussion group scored into Stage 5 on average, meaning that they recognize knowledge as a personal belief based on context and interpretation – there are no universal right or wrong answers (King & Kitchener, 1996). Meanwhile, students in the lecture-only group remained in the middle of Stage 4, whereby they were "unwilling to make judgments about others' behavior or ideas" (King & Kitchener, 1996, sec. 4.3).

Justification Dimension

The Justification dimension was scored using probe questions 1 – 3 and 7 (Table 2) then averaged across the two scenarios. This dimension involves thinking through how beliefs are justified (as a concept), the process through which beliefs or claims are justified (using evidence), and the role authorities have in making judgments. Within this scored dimension, the discussion group mean was slightly lower than that of the lecture-only group: $M = 4.13$, $SD = 0.97$ compared to $M = 4.33$, $SD = 1.51$ respectively. This difference was not significant at the .05 level, $t(14) = 1.96$, $p = 0.184$, CI [-1.16, 1.57] (Table 5).

However, individual score differences were widespread. Scores of students in the discussion group ranged from 3.00 (prereflective thinking, $n = 2$) to 5.33 (quasireflective thinking, $n = 1$). Representing scores within this range were students in Stage 3 ($n = 2$), Stage 4 ($n = 1$) and Stage 5 ($n = 2$) (Table 6). The lecture-only group ranges were 2.00 (also prereflective thinking, $n = 1$) to 6.00 (reflective thinking, $n = 1$). Representing scores within the range, were students in Stage 2 ($n = 1$), Stage 3 ($n = 1$), Stage 4 ($n = 1$), and Stage 5 ($n = 3$) (Table 6).

A slightly lower mean of discussion group scores compared to the lecture-only group mean was not significant and each group represented Stage 4 thinking. The lowest discussion group score was one stage higher (Stage 3) than that of the lecture-only group (Stage 2). Meanwhile, one student in the lecture-only group scored into Stage 6, signifying full reflective thinking.

Table 6

Individual Reflective Judgment Interview Scores by Dimension and Group

Lecture-only (n = 8)			Discussion (n = 8)		
Knowledge	Justification	Average	Knowledge	Justification	Average
6.33	5.67	6.00	6.00	5.00	5.50
6.00	6.00	6.00	5.00	3.00	4.00
4.67	5.33	5.00	6.00	5.00	5.50
4.33	5.00	4.67	5.00	4.67	4.83
3.33	2.00	2.67	3.67	3.33	3.50
5.33	4.67	5.00	5.00	5.33	5.17
4.67	3.67	4.17	4.67	3.00	3.83
2.00	2.33	2.17	5.00	3.67	4.33

Overall RJI Scores

An average of scores in the justification and knowledge categories make up each participant's overall or total RJI score. The discussion group (M = 4.58, SD = 0.78) scored higher than the lecture-only group (M = 4.46, SD = 1.41) in total RJI scores; $t(14) = 2.02$, $p = 0.178$, 95% CI [-1.34, 1.10] (Table 5). However, both groups scored within Stage 4 and the slight difference between groups was not significant at the .05 level. Stage 4 is within quasireflective thinking; whereby different perspectives exist because evidence used is different. Interview transcripts indicated that students recognize that knowledge is not certain – what is true for one is not necessarily true for all. Discussion group students also performed higher in the Knowledge dimension (one stage difference) than they did in the Justification dimension. These score increases offer some indication

that discussion of contradictory perspectives may have helped students in the discussion group to think reflectively when faced with ill-structured problems, yet the level at which they did was not significant in this study.

Hypothesis Two

Openness to Diversity and Challenge and Reflective Judgment

A least squares regression analysis investigated whether ODCS scores significantly predicted the overall RJI score. The ODCS scores were similar for the discussion (M = 4.02) and lecture-only groups (M = 4.07). Overall, on a scale of 1 (strongly disagree) to 5 (strongly agree), students agree that they are open to diversity and challenge. The correlation between the overall RJI scores and the ODCS scores (n = 16) was statistically significant at .05 confidence interval (p = .027, R^2 = .303, 95% CI [0.075, 0.822], r = .550). While there was a positive significant relationship between these two scores and the R score was relatively strong (r = .550), a correlation greater than 0.7 would have signified a stronger relationship. Regardless, the correlation is meaningful because it shows that when students are more open to diversity and challenge, the more capable they are of thinking reflectively.

Furthermore, a significant regression equation was found ($F(1,14) = 6.07$, $p <$ .01); thus. the Openness to Diversity and Challenge Scale (ODCS) scores significantly predicted the overall RJM stage. Therefore, a student's openness to diversity and challenge correlates to their reflective judgment skills at a significant level, which supports the second hypothesis. RJI scores increased 1.24 for every point on the ODCS.

Year in School

A partial correlation analysis was run between year in college and RJI scores and again between year in college and ODCS scores. The year in college (independent variable) was separated into two categories prior to analyzing – freshmen and sophomores, then juniors and seniors. The first analysis revealed a significant partial correlation between RJI scores and year in college ($r(16) = .580$, $p < .05$). The second analysis showed that there is no significant correlation between ODCS scores and year in college ($r(16) = .196$, $p > .05$). Therefore, the participant's year in college could predict their RJI scores, but not their ODCS scores.

To further analyze these relationships and try to determine a predictive model, a bivariate regression was calculated to examine whether a student's year in college (freshman/sophomore or junior/senior) predicted their RJI score. As stated in the prior paragraph, the correlation between these variables was significant. The significant r^2 equation was ($F(1,14) = 7.082$, $p = .019$, $R^2 = .336$); 34% of variability in RJI scores are explained by the year in school. The equation shows that for an advancement in year of college, the RJI score actually decreases. However, the same analysis of year and ODCS average scores showed no significant correlation and resulted in this equation: ($F(1,14) = .561$, $p = .466$, $R^2 = .039$); just 4% of variability in ODCS scores are explained by the year in school. These results show again that a student's year in college is a greater predictor of their RJI score than their ODCS score.

Furthermore, when controlling for year in college – freshmen and sophomores ($n = 10$) and juniors and-seniors ($n = 6$), a partial correlation between the total RJI (dependent variable) and ODCS scores remained significant ($p = .035$) at the .05

confidence interval. The students' openness to diversity and challenge is associated with their reflective judgment skills at a significant level regardless of their year in college. This finding can indicate that there is more behind reflective judgment than basic human development and progressing through college. A student's existing ability to see issues from other's perspectives and a willingness to do so makes a significant difference.

Conclusion

Overall, the results of this study revealed that facilitating discussion of an ill-structured problem had a slight positive impact on a student's ability to think reflectively. Students in the discussion group scored higher in the knowledge dimension and overall. Therefore, one may discern that discussion is a viable teaching strategy to foster reflective judgment skills overall and to recognize how there could be different versions of truth or knowledge. Although the mean increase was not statistically significant, the analytical structure is sound and warrants repeating with a larger sample and/or across a longer period of time. The Openness to Diversity and Challenge Scale revealed meaningful findings that a student's existing attitudes toward differences affected their reflective judgment stage more than the brief classroom intervention did.

CHAPTER 5 – DISCUSSION

Introduction

This last chapter reintroduces foundational elements – the study's purpose, framework, key literature, and methods. Then it integrates a detailed discussion of its findings and possible explanations as they relate to the literature and the current study's limitations. The chapter concludes by thoroughly explaining pedagogical implications and recommending future research.

The purpose of this study was to determine whether classroom discussion of ill-structured problems impacts a modern undergraduate student's reflective judgment skills. Research from over fifteen years ago showed that, on average, most undergraduate students process information in accordance with Stage 3 and 4 level thinking of the Reflective Judgment Model (RJM) (King & Kitchener, 1994). However, the purpose of higher education is to help students develop advanced thinking skills (AAC&U, 2022) – those which are reflective of Stages 5 & 6. Since pedagogical practices or interventions can help students think in more advanced ways (King & Kitchener, 2004; King & Shufford, 1996; Mayhew et al., 2016), this study used classroom discussion as an intervention to see whether it impacted student thinking.

This study conceptualized reflective judgment as a key purpose of higher education, which requires high-level thinking processes involving information literacy and critical thinking skills. Reflective judgment also incorporates social epistemology – or a person's understanding of their socially constructed knowledge through their warrants and beliefs (see the visual representation of these ties in Figure 1). Skills across this conceptual framework are represented within the RJM's Stage 5 thinking; however,

many undergraduate students can only think within Stage 3 (King & Kitchener, 2004) (see Table 1). While the RJM is developmentally based, certain classroom practices can foster necessary skills in undergraduate students so they may think within more advanced stages – specifically, Stage 6 (King & Kitchener, 2004; King & Shuford, 1996). Therefore, this study addressed two questions (see Table 4): Does discussion of contradictory perspectives affect reflective judgment scores of undergraduate students? And is there a correlation between an undergraduate student's openness to diversity and their reflective judgment skill score?

Summary of Prior Research

Prior research indicated that undergraduate students' reflective judgment skills may depend on factors such as age, ethnicity, educational level, college experiences, pedagogical methods, and/or personality (Dwyer et al., 2014a; Friedman, 2004; Jackson, 2008; Kajanne, 2003; King et al., 1993; King & Kitchener, 1994, 2004; King & Shuford, 1996; Love & Guthrie, 1999; Morin & Howells, 2003; Roex et al., 2009). This study focused on the pedagogical method, classroom discussion, and how it might help students to think beyond their primary reflective judgment stage using the RJM's three phases of reflective thinking. Students functioning within Stage 3 assume that knowledge is true when it is stated from a source of authority; these students would also justify their beliefs based on other authorities; and when no answer is known, they defend beliefs based on opinion (King & Kitchener, 1994). Students functioning within Stage 4 recognize that knowledge or truth depends on the situation and that it can be ambiguous; they also justify their beliefs with only supporting evidence (King & Kitchener, 1994).

This study also looked at how scores change based on a student's year in college. King and Kitchener (2004) reviewed mean Reflective Judgment Interview (RJI) scores across 25 studies and found that freshmen scored $M = 3.6$ (Stage 3, prereflective thinking) and seniors scored $M = 4.6$ (Stage 4, quasireflective thinking) based on the RJM. Yet, people ages 19–20 should be able to use abstract reasoning as described in reflective judgment Stage 6 (reflective thinking) (King et al., 1993). Stage 6 thinking signifies that some judgments or beliefs can be more rational than others or have fewer negative consequences (King, & Kitchener, 1996). Unfortunately, on average, undergraduate students – even seniors – do not show evidence of full reflective thinking (Stage 6). Research also suggested that students might be able to stretch beyond their functional reflective judgment stage if their learning environment supports contextualizing ill-structured problems (King et al., 1993 & King & Kitchener, 2004). Students should also be able to advance past Stage 4 after exploring multiple perspectives on controversial issues in the classroom (King & Kitchener, 1994).

Furthermore, college students who engage with diverse peers and discuss unique perspectives outside of the classroom tend to be more open to diversity (Loes et al., 2018; Ryder et al., 2016; Whitt et al., 2001). However, studies have yet to directly address whether students' RJI scores are higher if they engage with ill-structure problems through classroom-based discussion than those who do not. Neither have studies combined the Openness to Diversity and Challenge Scale (ODCS) with the RJI to control for a students' existing openness to diversity, which is what this study achieved. This study examined RJI scores by educational levels (year in school) and whether classroom

discussion of ill-structured problems affected scores while also exploring correlations between RJI and ODCS scores.

King and Kitchener (1994) designed and tested the RJM as a seven-stage developmental process through which people conceptualize and think through ill-structured problems. The RJM represents three phases: prereflective (Stages 1 – 3), quasireflective (Stages 4 and 5), and reflective thinking (Stages 6 and 7) (King & Kitchener, 1994). When a person processes through ill-structured problems – those for which there is no straightforward solution or answer, they are engaging reflective judgment skills (King & Kitchener, 2002). Such skills require a person to explore their assumptions about knowledge and how they came to know it – thus, justifying their beliefs (King & Kitchener, 2002). The sixth and seventh stages of the RJM signify that a person can fully engage in reflective thinking.

Methods

Its developers consider the RJM to be a stage model based on a person's development but is not solely reliant on it (King & Kitchener, 2004). This consideration is due in part to their suggestion that undergraduate students can think beyond their typical abilities and into more advanced stages if proper supports are in place (King & Kitchener, 2004; King & Shuford, 1996). Stages also help to signify progressive thinking, and it is important to note that people might think within various stages when in different contexts (King & Kitchener, 1994). Therefore, data collected in this study represent scored thinking at one point in time and does not fully reflect the participant's entire ability to think about information and make judgments based on evidence. Still, implementing a quasiexperimental, post-test only design to gauge students' abilities using

the RJI protocol was a justified method based on the literature and sound design (Creswell & Creswell, 2018; Dale, 2005; Dwyer et al., 2014b; Friedman, 2004; King et al., 1993; Milner, 2009; Pascarella et al., 1996; Zeidler et al., 2009).

Findings

When participants of this quasi-experimental study responded to interview questions regarding ill-structured problems, their thought processes revealed multiple levels of reflective thinking. Lecture-only group participants scored into Stages 2 through 6, and the discussion group scored in Stages 3 through 6 according to the RJM. On average, scores of students in this study were slightly higher (Stage 4, beginning quasireflective) than King and Kitchener's (2004) review of reflective judgment studies of similar populations (Stage 3, prereflective). These score increases offer some indication that discussion of contradictory perspectives may have helped students in the discussion group to think reflectively when faced with ill-structured problems, yet the level at which they did was not significant in this study. Perhaps a deeper look into individual scores will broaden the discussion scope of each stage.

Individual Reflective Judgment Stages

Prereflective Thinking

In the current study, two students in each group scored within the prereflective thinking stages (1 – 3). Students thinking within Stage 2 find that beliefs can be right or wrong and are based on views of authority figures or one's own observation; but such thinkers are unable to analyze, interpret, or evaluate evidence (King & Kitchener, 1996, sec. 2.2 & 2.4). Stage 2 thinking represents two students in the lecture-only group but no students in the discussion group. Thinkers advance to Stage 3 when they recognize that

they cannot always rely on authorities to adopt beliefs. However, they have trouble with making judgments by confusing judgment with belief and they are unable to utilize evidence – their view of knowledge defaults to what feels right in a situation or what they want to believe (King & Kitchener, 1996, sec. 3.1, 3.3, & 3.4). Overall, two students in the discussion group and no students in the lecture-only group scored within Stage 3.

A key finding of King and Kitchener's 2004 work was that most undergraduate students score into Stage 3. However, this stage (specifically or the prereflective phase in general) does not represent the majority of this study's participants. The four students showing evidence of prereflective thinking make up just 25% of this study's sample size. Exactly why is still unclear. It could be that modern students have access to many more information sources than they did in the early 2000's, given internet access and social media. Therefore, students can access more perspectives and sources of knowledge – including those that are not experts. However, according to this study's findings, participants still lacked the ability to judge this knowledge when faced with perspectives surrounding ill-structured problems. Perhaps they are more inclined to follow the beliefs of their peers and others across social networks without questioning them (effects of groupthink or blind spot bias).

Quasireflective Thinking

Four students in the lecture-only group and six in the discussion group showed evidence of quasireflective thinking (Stages 4 or 5). More specifically, two students in the lecture-only group and three in the discussion group scored into Stage 4. Based on the rubric (King & Kitchener, 1996, sec. 4.1 – 4.5), they were able to recognize that people can have different views or beliefs than their own, but they were unable to effectively use

evidence to justify their beliefs; they also expressed skepticism of authority or expert opinion. Two students in the lecture-only group and three in the discussion group also scored into Stage 5. They displayed the ability to see problems through multiple perspectives and within a larger context, evaluate evidence, and recognize that authorities also have preferences and biases that warrant evaluation (King & Kitchener, 1996, sec. 5.4 – 5.5).

Recall that the kind of thinking undergraduate college students should be able to perform is represented in Stage 5 – a level which also represents this study's framework. These five students represent about 30% of the study's sample – 5% more than the students in prereflective thinking stages. Together, students showing evidence of quasireflective thinking (n = 10) represent about 63% of the sample, which is promising. Continuing the thought process of the internet and social media's potential impact, students might be better able to find issues with authority figures because voices of others who might not be experts or authority figures are also heard. Students can see discussion and debate occur on many online platforms – even join in on the discussion at will.

Reflective Thinking

Finally, two students in the lecture-only group displayed thinking processes within Stage 6, the first stage of full reflective thinking – Stage 7 is the highest (no students showed evidence of Stage 7 thinking). Signs of Stage 6 thinking include evaluating evidence of multiple viewpoints, developing one's own point of view "based on the evaluated opinions of experts, pragmatics, rules of inquiry… or on claims that a view is more compelling" within a context or for themselves (King & Kitchener, 1996, sec. 6.2 - 6.3). A key factor of Stage 6 thinking is that a "better" opinion can exist when

negative effects are less drastic or dire (King & Kitchener, 1996, sec. 6.1). Study participants thinking at this level processed scenarios by considering broader societal impacts of one view versus another; they also recognized that context has a notable impact on knowledge and its justification.

Just 13% of this study's participants showed signs of full reflective thinking. Overall, their scores were low on the 6.0 scale, and one participant scored in Stage 5 for the justification dimension. Therefore, work toward helping students to think reflectively is still needed – especially helping them to use evidence to justify their beliefs.

Potential Explanations for Overall Scores

Participant Demographics, Experiences, and Openness to Diversity

In sum, this study's participants scored within Stage 4, on average, whereas most undergraduate students across prior studies scored into Stage 3 (King & Kitchener, 2004). This difference might not seem large, but the stage change from prereflective to quasireflective is meaningful. The reasons for this full stage difference are not immediately clear. Perhaps the demographic make-up, experiences, and information access of this small participant pool affected their RJI scores.

The RJM primarily considered Euro-Americans in its development (King & Kitchener, 2002). However, many of the current study's participants were Latino students from Central and South America. A prior study presenting findings on this demographic found that these students scored higher than freshmen but not significantly so (Samson, 2000). Perhaps the factor is not homogenous communities of similar (yet minority) races, genders, or ethnicities; rather, it could be truly diverse communities with different life experiences from one another related to factors such as socio-economic status, political

views, religion, race, gender, and ethnicity. Students surrounded by people who are like themselves (according to these listed factors) are limited in reflective thinking (King & Kitchener, 2004). Therefore, the opposite should be true – students engaging with others who are different from themselves are better able to think reflectively, such as the students in this study's population. The notion remains that classroom experiences should foster opportunities for students to interact with diverse peers and content that challenge their thinking and beliefs (King & Kitchener, 2004; King & Shufford, 1996; Oros, 2007).

Based on the researcher's conversations with others at the primary source of participants, students at this location tend to be more globally minded, have travelled and some even lived internationally, they speak at least two languages, are more in tune with the world around them, and live in a diverse community. This anecdotal observation is consistent with research alluding to the idea that students can think more critically or reflectively when they interact with those who are different from themselves (Hurtado, 2003; King & Kitchener, 2004; Lukianoff, 2014; Oros, 2007; Pascarella et al., 2014). Recall that the current study conceptualized critical thinking as a component of reflective judgment and research shows a significant correlation between the two (King et al., 1990; Maskey, 2011), so discussing them together is appropriate. Not only could these experiences and world awareness have affected these participants' RJ stage, but it could have also affected their openness to diversity and challenge.

Participants in the current study scored an average of 4.00 (based on 1 – 5) on the Openness to Diversity and Challenge Scale (ODCS), showing that they were open to challenges and see value in diversity. Findings of another study using the ODCS showed that freshmen scored an average of 3.78 (Loes et al., 2018); freshmen in the current study

scored 4.19 on average. In another study (Summers et al., 2002), college students scored an average of 3.93 (data not differentiated according to year in college). ODCS scores of participants in all three studies were very close, although they were slightly higher in the current study. Regardless of how the means compare across studies, the scores were high on the 1 – 5 scale, meaning that students were open to diversity and challenge. The high correlation between ODCS and the RJI and the participants' diverse nature could explain the increased RJ stage of students in this study compared to those in other studies.

Also, consider the plethora of information that is now available to students through the internet that was not available to students in the original studies. Modern students have more opportunities to hear multiple perspectives about impacts of issues, events, and topics. They can engage with more information and have many unique experiences through social media (Chen & Marcus, 2012). Stakeholders voice a multitude of perspectives through official news outlets online plus blogs, podcasts, and videos hosted by experts and laypersons. Social media sites and commenting features allow students to hear more voices – even take part in the discussion. Therefore, the average stage difference (from 3 in prior studies to 4 in the current study) could be due to these students' interactions online and because modern students can access a plethora of information through the internet and social media.

Knowledge Dimension

Reflective judgment's knowledge dimension showed the greatest difference in scores between groups. Participants in the discussion group scored half a stage higher than those in the lecture-only group – several scoring into Stages 5 and 6 in the knowledge dimension. Specifically, three lecture-only group students scored into Stage 5

or 6, while six discussion group students scored into Stages 5 (advanced quasireflective) or 6 (full reflective thinking), representing 56% of all participants. This result supports King and Kitchener's suggestion that fostering environments for encountering ill-structured problems can increase reflective judgment scores into Stages 5 and 6 (2004).

Considering that this study's participants grew up in a generation with unlimited information access, one can presume that they are accustomed to knowing much more about the world around them than participants of earlier studies. They might also be more used to hearing multiple (even less popular or less represented) perspectives on these issues and topics because of open comment features, independent publishing, and online debate. Then, when asked to process through ill-structured problems such as those in the RJI protocol, they might be more open to considering multiple perspectives than students were 20 years ago. Therefore, this higher score average is not surprising.

Justification Dimension

In the justification dimension, three students in each group scored into Stages 5 and 6 (38%), while the remaining participants scored between Stages 2 and 4. Since the overall means and those in the justification dimension were so similar or slightly greater in the lecture-only group, it is difficult to claim a clear and consistent benefit of classroom discussion on the reflective thinking model's justification dimension based on this study's results. However, results showed that students in both groups were better able to see knowledge through multiple perspectives and accept that people think in diverse ways (knowledge dimension) than they were in trying to justify their beliefs with evidence (justification dimension) overall. Prior studies did not separately present findings according to the two dimensions. However, King and Kitchener (1994) found

that students fell short when using elements of reflective thinking that involve a critique of their own beliefs and using evidence, which captures the justification dimension elements. Their finding coincides with that of the current study since participants scored lower in the justification dimension overall and thus is not surprising.

Stage 4 thinking in the justification dimension means that one cannot separate their beliefs from evidence; they might use these concepts interchangeably or be unable to change their opinion even when evidence contradicts it (King & Kitchener, 1996, sec. 4.5). These thinkers do not understand how evidence can or should be used in the justification process; they might not even understand where to find evidence since they do not trust experts to provide it (King & Kitchener, 1996, sec. 4.5). The majority of the current study's participants scored into Stage 4 or lower, and therefore struggle to think reflectively in the justification dimension. The goal is to help students think at least into Stage 5, in which they can start to place their beliefs within the context of a bigger picture because of evidence instead of forming a belief without this consideration.

Reasons that participants were less able to find authoritative evidence and justify their beliefs could be due to a lack of practice with processing opposing viewpoints and limited analytical skills, they might even avoid conflict or lack the skills for engaging in such situations. Since over 60% of this study's participants were in years one or two of college, it is possible that these skills would increase by the time they graduate. Still, the RJM is not strictly developmental, so their college environment should actively teach the skills and foster environments in which students can practice the skills. Specific implications for such practices are presented in the final section.

Year in College

The current study attempted to replicate results of prior studies which concluded that, on average, college seniors scored higher on the RJI than did freshmen (King & Kitchener, 2004). Interestingly, juniors and seniors in this study scored lower on average (Stage 3, $n = 6$) than their freshmen and sophomore peers (Stage 4 or 5, $n = 10$) in both groups. This finding is opposite of what prior studies found and what the RJM predicts – that upper-classmen will score higher (Stage 4) than lower classmen (Stage 3) (King & Kitchener, 2004). Therefore, in this study, college level did not predict reflective judgment scores in a manner consistent with prior studies.

One of several factors could explain this discrepancy between studies. A primary factor could simply be the low sample size, making cross comparisons difficult when split into even smaller numbers based on the participant's year in college. Other potential factors include age, major, and life experiences, which were not collected in this study.

Limitations

This study faced limitations related to time, participant numbers, and their demographic make-up. Reflective judgment is primarily a developmental Stage model, so the greatest changes in RJI scores could naturally be seen in students according to age differences (King & Kitchener, 1994, 2004). For example, a typical undergraduate student aged 19-20 should be able to think within RJM Stage 6; then by age 25, they should be able to think within Stage 7 (King et al, 1993). Yet, the age demographic was not collected in the current study, so results cannot show how this factor affected the score differences. One can only estimate age based on the year in school and the common age of most undergraduate students.

Furthermore, and perhaps most meaningful – many studies using the RJI were administered after longer time spans and incorporated pretest and posttest scores. King and Kitchener (2002) discovered that studies that lasted at least a year and used a pretest-posttest design yielded significant increases in stages. Unfortunately, the current study's abbreviated time span and absence of a pretest measurement reduced its impact factor. Finally, the time commitment required of participants, lack of greater incentives, and the researcher's limited consistent access to potential participants negatively impacted the sample size.

The overall low participant number also impacted the affect sizes – even the ability to utilize more powerful analyses that require higher participant numbers. The participants also lacked racial diversity amongst themselves, which could have also impacted results and made the conclusions even harder to generalize since the sample does not relate to broader student body demographics. Originally, a white Caucasian homogenous sample was anticipated. While the change in location and primary participant source drew a small homogenous sample, the ethnic make-up fell into minority categories (according to a U.S. white majority perspective) instead. This participant make-up was not an anticipated factor and there is limited research available for setting a precedence or foundation for discussion. A second review of the literature revealed limited prior research using the RJI that discussed factors of race, ethnicity, or other cultural-related elements. Still, a few studies that King and Kitchener (2002) reviewed found that ethnicity did not significantly impact reflective judgment.

Implications for Practice and Future Research

Purpose of Higher Education

Recall that a purpose of higher education is to prepare students for a democratic society filled with ill-structured problems (AAC&U, 2022). Participating in a democratic society requires information literacy skills – specifically exploring content from multiple perspectives and evaluating it in order to gain knowledge and inform beliefs. Such participation also requires that students can communicate what they know, learn, and believe and to support it all with evidence. Unfortunately, prior research (King & Kitchener, 1994) and the current study showed that students were still unable to think at levels high enough to be ready for a modern democratic society. Therefore, it is necessary to foster reflective judgment skills in colleges and universities. The following sections describe specific ways in which students may learn to think more reflectively.

Pedagogical Practices

Studies consistently showed that age is a predictor of reflective judgment scores, which is why the RJM was seen as a developmental model. Still, other factors help students process information with higher levels of reflective thought, such as classroom discussion of ill-structure problems. This study was the first to use the Openness to Diversity and Challenge Scale as a controlling factor and present separate results for the *knowledge* and *judgment* RJM dimensions. It also incorporated information literacy and social epistemology concepts plus critical thinking as essential components of and toward reflective judgment skills. While this study's total RJI scores were within Stage 4, some students scored into Stage 6 (n = 2 overall; n = 3 in knowledge and n = 1 in justification), which is what King and Lynch et al. (1993) say that undergraduate students should be

able to do. The remaining students in this study were not consistently where they should have been in their reflective thinking; so, the question remains: what can instructors do to help students improve?

Findings of this study suggest pedagogical actions similar to those that other research recommended, such as fostering the discussion of ill-structured problems, accessing information from multiple perspectives, analyzing others' points of view and defending their own, plus gathering, assessing relevance, evaluating, and interpreting data (Dwyer et al., 2014a; Friedman, 2004; Jackson, 2008; Kajanne, 2003; King et al., 1993; King & Kitchener, 2004; Kitchener et al., 1993; Love & Guthrie, 1999; Roex et al., 2009). Many of these skills or pedagogical strategies are addressed within the information literacy framework developed by the Association for College and Research Libraries (ALA, 2015). Therefore, concepts from this framework should be embedded throughout the curriculum and at all stages of learning. Academic librarians often lead in teaching these concepts, but classroom faculty should also carry these concepts through each course. They can adjust rubrics to reflect student skills in using evidence when building arguments, incorporate data literacy, and introduce discipline-specific ill-structured problems, then foster classroom discussion of these problems.

Information Literacy Across the Curriculum

Course instructors can integrate information literacy standards (ALA, 2015) to foster reflective judgment across the curriculum. Jackson (2008) suggests several strategies such as: having students locate and discuss diverging perspectives on a topic from several types of sources and formats, summarize what they learned from their sources then synthesize information across sources to uncover new concepts, and apply

what they learned to existing knowledge and beliefs (even develop new knowledge and beliefs). Furthermore, when students discover diverging viewpoints across their sources, they should also investigate evidence that supports the views or talk to others about the unique perspectives (engage in discussion) (Jackson, 2008). The reflective and evaluative components of these strategies can especially foster the higher-level reflective judgment skills needed for reflective thinking. Reflective thinkers can see impacts of information or beliefs on broader society (King & Kitchener, 1994).

Classroom Debate Using Structured Academic Controversy

Structured Academic Controversy (SAC) is one teaching and learning strategy that instructors can employ in the college classroom. It is designed to help students grapple with society's ill-defined problems by asking them to consider multiple perspectives and build persuasive arguments using evidence then challenge the position of others and work to find consensus in judgments based on evidence (Bruen et al., 2016). These elements are reminiscent of skills described in the RJM that are necessary for reflective thinking within its knowledge and justification dimensions (King & Kitchener, 1994). Bruen et al. (2016) designed a SAC activity to help students with these skills. They divided students into two groups – each investigated a perspective on an ill-defined problem. After each group presented arguments for and against the divergent perspectives, the groups combined to define a compromising position regarding the problem. In this process, students researched different perspectives to find evidence for and against each side so that they could defend their stance (Bruen et al., 2016). Instructors could replicate this activity across many different college courses to foster

student skills in making judgments based on evidence and for building openness to diversity and challenge.

Public Displays and Open Dialog Featuring Ill-Structured Problems

Science versus religion was one scenario that students processed through in this study's interview protocol. Participants visibly wrestled with the logic, tradition, and family influences that this heavy topic induced. A prior case study considered the value of teaching religion in the classroom – specifically learning about new religious movements and how the media portrays them (Neal, 2013). Her students researched various movements and their ties to traditional religion, then constructed displays to educate others on what they found. These displays induced complaints among the university community. She and her students responded to complaints with more evidence and explanations for their reasonings. Neal contended that allowing controversial teachings in the classroom through research, discussion, and public displays helped students build critical thinking skills (2013). She also made points referencing Bain's (2004) key work about college teaching in that students need to be able to 'grapple with ideas and information to construct their [own] understanding' and to incorporate course objectives that represent life outside of college (Neal, 2013, p. 67). These notions support literature presented earlier that institutions of higher education need to prepare students to thrive in a democratic society (Carson, 2014; Deresiewicz, 2017; Giancarlo & Facione, 2001; Hurtado, 2003; Longo & Shaffer, 2019; Muldoon, 2017; Obama, 2016; Oros, 2007; Sutton, 2018).

While students in Neal's (2013) case study embraced their research project and were seemingly open to diversity and challenge – given the nature of their topics, other

members of the campus community found the displays to be inappropriate. Others were not open to seeing the unique perspectives that students brought forward. From this experience, students learned the importance of avoiding ill-placed judgment on ideas without full knowledge of the perspectives at hand – which is how their audience reacted. They also learned that "intolerance and fear" still exist (Neal, 2013, p. 70), religion is a very personal topic and ideas that contradict the associated belief can be perceived as a personal attack, and that "prejudices and biases are extremely difficult to break" (Neal, 2013, p. 71). Students learned much more than the professor originally intended because they had to defend their research and educate an audience who was challenged by the content.

Therefore, pedagogical practices should not stop with asking students to investigate an ill-structured problem or one that challenges their own views, they should also engage in authentic experiences where they need to defend their position using evidence. One example is public displays of information designed to educate others on perspectives about ill-structured problems or controversial topics. This extra step could help students improve in the justification dimension of reflective thinking – using authoritative evidence to justify their beliefs or arguments. Repeated opportunities to practice engaging with conflict could help ease their aversion to conflict and be better apt to stand up for their beliefs. These pedagogical practices and information literacy content expansions help to fulfill recommendations from the literature that students need to be able to talk to others about diverging perspectives on ill-structured or controversial topics (Chemerinsky & Gillman, 2018; King & Shuford, 1996; Nelson Laird, 2005). The hope remains that continued engagement with challenge and controversy through research and

projects such as these can foster new generations to be more open to learning about and discussing ill-structured, controversial topics.

Self-authorship and Social Epistemology in the Classroom

Self-authorship and social epistemology concepts also suit this discussion because engaging in discussions and defending beliefs with evidence first requires the person to know their beliefs and how the beliefs situate within broader societies and communities. Diverse experiences in college are crucial for student identity development. (Baxter Magolda & King, 2004). Specifically, classroom environments can help students develop self-authorship through advanced thinking, such as: challenging courses with high academic rigor that require students to "[delve] into ideas in meaningful [ways]", "[explore] new and multiple perspectives", and "support ideas with evidence" (Seifert et al., 2010, p. 262). Instructors should support students in finding significance in their knowledge and to support them in defining and sharing their points of view – a suggestion based on student feedback captured in the Baxter Magolda and King (2004) work the Learning Partnerships Model.

Other researchers applied reflective judgment concepts in their classrooms to identify effective teaching methods for helping students build personal epistemology (Arnd-Caddigan et al., 2010). They found that exercises incorporating discussion of theories during which students could question the truth of authorities (theorists and the instructor) gave them freedom to explore and share their own perspectives (Arnd-Caddigan et al., 2010). Students experienced discomfort when they realized that knowledge is contextually based and changes accordingly. The instructor then prompted students to examine evidence that can explain consequences or strengths of the theories

presented. By continually guiding students through reflective judgment stages in classroom discussions, the hope is that they will be better able to apply reflective judgment on their own (Arnd-Caddigan et al., 2010).

These practices should help students build skills that will help them face ill-structured problems outside of the classroom – those for which there is not a clear right or wrong answer. It makes sense to say that fostering classroom environments that allow students to safely explore and debate difficult topics will help them to build on their belief systems. Then they apply these belief systems when facing ill-structured problems and engaging in reflective thinking to evaluate their judgments with evidence.

Research Methodologies

The reflective judgment model deserves a new round of research to reflect modern society – one in which undergraduate students can access and engage with a plethora of information online. Studies should test impacts of factors such as age, year in school, exposure to diverse people and ideas, study abroad experiences, political views, and the like. It will also be important for future studies to consider participant dispositions, experiences, and their openness to diversity and challenge when applying the Reflective Judgment Interview (RJI) Protocol.

Results of this study are not easily generalized due to the low sample size, its overall demographic homogeneity, and short time span for intervention. Conducting studies with more participants should help to increase the sample power and yield more meaningful results regarding reflective judgment skills among students in different college years. Wood and Conner (1999) recommend conducting studies with forty participants, which was this study's original goal.

Follow-up studies should also involve longer timespans (six – twelve months), larger sample sizes (forty or more), and a pretest-posttest, quasi-experimental designs. Prior studies successfully implemented these design elements (Dwyer et al., 2014b; King et al., 1993; King & Kitchener, 1994) and deserve repeating along with the interventions and impact factors previously discussed. Specifically, King and Kitchener saw the greatest reflective judgment increases in studies that lasted at least one year (2004). Therefore, this study should be replicated across an academic year (at least), further test research-based pedagogical practices that can affect reflective judgment skills, and use of a pretest-posttest design for more effective comparisons.

Modern students are quite different than those of the ‘90s and early 2000s when many reflective judgment studies occurred. The development and ever-increasing use of social media tools among today’s college students provides them with platforms through which they can create identities (Torres et al., 2009). Given the limited amount of new research overall and specific studies looking at cultural factors, future research should look at how reflective judgment skills differ according to geographic location, global experience, and racial or ethnic factors. Like King and Kitchener (2002), the recommendation based on this study is also to design research that looks at how cultural differences might impact reflective thinking. Since skills captured throughout the RJM appear within the charges of higher education institutions (AAC&U, 2022) and of the Framework for Information Literacy (ALA, 2015), studying pedagogical impacts on student progression through the stages is important.

Conclusion

This study placed reflective judgment in a unique perspective – as a central purpose of higher education that includes critical thinking, information literacy, and social epistemology concepts. Although the results were primarily not significant and faced some limitations, they add value to the conversation surrounding how to teach students to be reflective thinkers. Pedagogical practices should include discussing ill-structure problems, asking students to justify or defend their stances or beliefs, and asking them to use evidence in doing so. Future research should consider the RJM within an international context, engage participants for an academic year, and incorporate a pretest-posttest design. Today's polarized and hyper-connected, global society further justifies teaching students how to face ill-structured problems by considering multiple perspectives that challenge their beliefs, realizing their truth through newfound knowledge, and evaluating their judgments with evidence.

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