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Factors Influencing the Selection of Academic Help Sources

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FACTORS INFLUENCING THE SELECTION OF ACADEMIC HELP SOURCES

by

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ABSTRACT

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This study extends the literature on academic help-seeking by identifying factors influencing undergraduate students' selection of a source of help. Learners engage in intentional decisions to seek help from human and non-human sources to resolve gaps in knowledge. Decision making heuristics provide a theoretical lens to understand these intentional decisions. Previous research in academic help-seeking assumed learners sought only human sources of assistance, resulting in a narrow understanding of how learners resolve knowledge gaps. Methodological trends in help-seeking research consistently favor quantitative, survey based tools with pre-defined options. As a result, the factors that influence the selection of a source in a real world setting with both human and online sources remains unexplored.

This mixed methods study documented actual help-seeking behavior. Participants recorded source utilization during an in-class problem solving activity and documented out-of-class activity through a survey. The survey also captured participant's perceptions of a newly proposed help source classification matrix as well as a recently proposed expectancy value model of source selection. A self-selected sample ($n = 25$) of the participants completed semi-structured follow up interviews.

Grounded theory methodology guided the qualitative phase. The results demonstrate that undergraduate students utilize online and human sources with similar intentions and confirm factors unidentified by previous research influence the source selection process. These factors include an expectation of reciprocity, relevance, domain, time, type of assignment, availability of sources and an expanded understanding of the role of faculty. The findings also demonstrate evidence of decision making heuristics.

The findings of this study support and expand on important recent work suggesting the inclusion of online sources in help-seeking models and the importance of relationships as well as underscore the need for the development of an integrated framework for understanding help-seeking in a realistic setting. Information seeking may serve as an appropriate theoretical framework to integrate academic help-seeking and information-searching behavior. The study suggests that the proposed expectancy value matrix and classification matrix may not prove robust enough to integrate human and non-human source usage behavior. This study demonstrates the value of qualitative approaches towards understanding academic help-seeking behavior.

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This thesis is dedicated to my amazing wife, Kellie, who supported my dream, and my children.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Across the country, colleges and universities seek to enhance student success by providing support services for students. Between the years 2000 to 2012, private non-profit higher education institutions doubled the amount of financial resources for student support from \$6.1 million to \$13.6 million (National Center for Education Statistics). These financial expenditures included academic support programs such as supplemental instruction and tutoring services. In addition, formal academic support is available on most campuses (Rheinheimer, Grace-Odeyleye, Francois, & Kusorgbor, 2010). However, the factors which influence how and why undergraduate students select and utilize available resources remains elusive. Help-seeking behavior occurs when learners recognize a problem in their comprehension or performance and solicit assistance. This behavior results from a series of intentional decisions, on the part of the learner (Karabenick & Berger, 2011). Earlier work on academic help-seeking began with the assumption that only human sources of assistance were available to the participants, such as a peer and a faculty member (Karabenick, 2004; Karabenick, 2003; Kitsantas & Chow, 2007). Similarly, research on information-searching behavior, defined as seeking information from static, non-human sources began with the assumption that the learner would utilize a library database or Internet search engine. (Kuhlthau, 2004; Puustinen & Rouet, 2009). These assumptions created a division in the literature between academic help-seeking and information-seeking, unintentionally resulting in a narrowly segmented understanding of the process undergraduate students utilize to resolve learning difficulties. As a result, the factors that influence a student's selection of a source, such as a faculty member, a formal tutoring center, a peer or online, remain unexplored.

Recently researchers began to bridge this divide between academic help-seeking and information-seeking, specifically focusing on the source of help (Karabenick, 2011; Puustinen & Rouet, 2009; Makara & Karabenick, 2013). Previous research in academic help-seeking largely identified individual factors without connecting these factors to the learners' decision making process (Ames & Lau, 1982; Barnard-Brak, Lan & Paton, 2010; Butler, 2006; Kitsantas & Chow, 2007). A decision making process occurs when an individual selects a choice from a variety of alternatives (Jonassen, 2012; Yates & Tschirhart, 2006). Therefore, understanding how students select from a multitude of human and non-human sources may be best viewed as a decision making process.

Self-regulated learning, rooted in Bandura's social cognitive theory, explains the self-regulatory learning behavior present in both academic help-seeking and information searching (Puustinen & Rouet, 2009). Self-regulated learning is a complex process; in it, learners construct knowledge by actively monitoring, controlling and regulating their motivation, cognition and behavior (Pintrich, 2004; Zimmerman, 2008; Zimmerman, 1990). Most important to help-seeking, self-regulated learning derives important foundational underpinnings from Bandura's social learning theory, specifically the concept of triadic reciprocity. According to this theory, behavior, personal characteristics, and environment all influence each other in a dynamic feedback loop (Zimmerman, 1989).

Integrating the help-seeking and information searching paradigms may create an opportunity for a new theoretical understanding of the process learners use to select their source of assistance. A new theoretical framework needs to account for undergraduates' decision making regarding their source of assistance, including both human and non-human sources. Applying methodological procedures not commonly used to explore this process will create

opportunities to both better understand what factors drive undergraduate decision making as well as how these factors interact with each other from the learner's perspective (Makara & Karabenick, 2013).

The focus of this study was to explore the decision making process undergraduate students engage in when selecting a source of assistance to meet a learning challenge. Learners will encounter difficulty in their academic career which they will attempt to resolve. (Ryan, Pintrich & Midgley, 2001). Previous research in academic help-seeking has explored human sources using largely survey based research designs. This research design both limited the scope of potential sources and ignored the decision making process of the learner. In addition, the field of information-searching provides strong evidence of undergraduate students utilizing online sources as well as demonstrates that these students employ decision making heuristics. Current research efforts fail both to encompass the evidence present in both fields as well as to fully explain undergraduate students' source selection process from the full range of options available in a real world context. A holistic, learner-centered approach to understanding the selection process may result in more effective instructional practices to increase student help-seeking behavior.

Literature Review

Currently, it is unclear how and why undergraduate students select their source of help in a real world setting. This ambiguity results in part from a disjointed understanding of how learners use available sources as well as a failure to explore decision making process involved. A recent attempt to create a proposed selection matrix remains untested and ignores factors based in decision making theory which may more fully account for the selection process. More robust

exploratory qualitative approaches are required to understand the factors which influence an undergraduate student's selection of their source of assistance.

When faced with learning challenges, learners may turn to multiple sources of assistance to resolve that challenge. Historically, these assistance sources have been divided into two main research areas: help-seeking, from a human source, and information seeking, from an information system. Within these two broad categories, differing lines of research have developed based in part on the differing demands each source required and the technology available. In the 1980s and early 1990s, when research on seeking help began in its current form (Keefer & Karabenick, 1988; Nelson-Legal 1985; Newman, 1990), a learner could choose from two discrete methods to resolve a gap in comprehension: ask a person, such as a teacher, or consult a book or a library information database such as a physical card catalog.

Utilizing either method results in different benefits and challenges for the learner. The benefits of face to face assistance in class include receiving customized assistance, but potential drawbacks of face to face assistance include embarrassment over revealing a lack of understanding to peers or the instructor. In contrast, privately searching for information from a book removes the drawback of embarrassment but also reduces likelihood of finding a customized answer. Recognizing these differences, researchers then assumed a source, either human or non-human, and explored the single behavior of knowledge gap resolution according to this source assumption (Nelson-Le Gall & Gumerman, 1984; Newman, 1990; Kuhlthau, 1991). Reflecting current practice at the time, Zimmerman and Pons (1986) listed the two strategies as separate in a protocol for self-regulated learning interviews; however, recent technological advances such as the development of high quality teaching material available on the internet as well as increased access to these resources has resulted in a fundamentally

different environment, bringing new options, new expectations and new behavior to undergraduate students. As a result, our understanding of how students seek to resolve learning challenges is outdated and likely inaccurate.

Self-Regulated Help-Seeking

Seeking help from a self-regulated learning perspective requires intentional metacognitive, behavioral and social-interactive decisions, all of which are influenced by a myriad of factors such as achievement goal orientation, prior achievement, motivational attributes and metacognitive skill development; this process may be demanding on the learner (Karabenick & Berger, 2011; Karabenick & Dembo, 2011, Karabenick & Newman, 2009; Newman 2002). A process model commonly used to inform research in this area identifies eight distinct steps, where each step in the process requires the learner to actively process the information available to them and make a decision as to what course of action to take (Karabenick & Dembo, 2011). The eight steps include:

- 1) detecting a problem
- 2) determining that help is needed
- 3) deciding whether to seek help
- 4) deciding what type of help to seek
- 5) selecting the source of help
- 6) soliciting the help
- 7) obtaining help
- 8) processing help (Karabenick & Newman, 2009).

Faced with an immense number of choices, learners actively select how, where and what type of help to seek as well as the source of the help. In step 4, learners can seek adaptive/instrumental or non-adaptive/executive assistance, both of which may impact the source chosen. In adaptive help-seeking, a desire to master the material motivates the learner; they

request hints and assistance in order to build competency in the domain. In executive help seeking, the student requests the answer without the desire to build competency or mastery. Educators now identify adaptive help-seeking as a beneficial strategy for learning as it positively correlates to academic achievement, even when controlling for prior achievement (Ryan & Shin, 2011).

In step five of the Karabenick & Newman (2009) process, the learner selects the source of their help. Traditional conceptualizations of help-seeking define the source of help as another individual (Puustinen & Rouet, 2009). Historically, limiting the definition of help-seeking to human sources was logical for two reasons. First, foundational works on help-seeking focused on children (Nelson-Le Gall, 1985; Nelson-Le Gall & Gumerman, 1984; Newman, 1990). Nelson-Le Gall & Gumerman's (1984) early work on sources of help studied preschooler through fifth grade participants. Due to their limited verbal and cognitive skills as well as lack of independent access to other systems, preschoolers and early elementary aged children can only access face to face assistance in most circumstances. In this study, 28 children were interviewed to determine the type of help sought when presented with short stories illustrating common occurrences. Nelson-Le Gall and Gumerman found the preferred source of assistance changed with age, but the young participants primarily relied on parents, siblings, teachers, friends or other adults.

Nelson-Le Gall and Gumerman (1984) noted non-social responses, identified as maps or books, but ignored these results as they accounted for 2.5% of the total responses. Reflecting the study's focus on children, Nelson-Le Gall and Gumerman (1984) focused solely on parents, siblings and teachers as sources of help since they "[exert] the major influences on child development" (Nelson-Le Gall, & Gumerman, 1984, p. 5). Additionally, children who lack reading ability cannot access a text based source, nor can they employ the necessary skills

required to access a video based source, which supports Nelson-Le Gall and Gumerman's decision to focus on human sources of help.

Similarly, in the 1980s, information-searching occurred primarily through key-word searches and card catalogs (Nelson-Le Gall, 1985; Nelson-Le Gall & Gumerman, 1984; Newman, 1990). As technology became more accessible, information searches took place through specialized library databases, which also required training to use. Often, elementary school aged children had not yet acquired the skills necessary to search a card catalog or information database. Information-searching required specialized skills to coax the information from rigidly structured systems. Among older elementary school students, adult assistance may have been required to utilize common information search databases during that time. During this time frame, children likely required adults to physically access the information search databases. No options, such as an online search from home, existed for children that were not at least mediated by another individual.

Over the past fifteen years, accessibility to static, non-human sources has increased dramatically with the advent of the internet, email, online remote access library resources and cloud technology, including resources designed for learning, such as Khan Academy, a popular video tutorial site. Today learners of all ages and especially those at the undergraduate level, choose from a plethora of sources when confronted with a learning challenge; however, little is known about how or why they choose their sources.

Information-Searching and Help-Seeking

Similar to academic help-seeking, research on information-searching became source, not learner, driven. Initially, the concept of information seeking, which information-searching

developed from, included both human and non-human static sources as valid options for a learner to utilize for assistance (Tricot & Boubée, 2013). As technology advanced, information-searching developed as a subset of this larger concept of information seeking. In contrast to information seeking, information searching narrows the available sources of assistance to static, non-human sources such as information systems, books or journals (Puustinen & Rouet, 2009; Tricot & Boubée, 2013).

Kuhlthau's (1991) information search process (ISP) model forms one of the foundational information search models in use today (Brand-Gruwel, Wopereis & Walraven 2009; Taylor; 2012). This model intentionally shifted the perspective of the model from the system to the user. Rather focusing on the needs of the system for optimal performance, the ISP model focused on the perspective of the user. Kuhlthau (1991) noted that the perspective shift matters, moving from a defined orderly system perspective to the user's experience of "confusion and uncertainty" due to the lack of user intuitiveness of the information systems (p. 361). Specifically noting affective component of the ISP experience, Kuhlthau (1991) recognized the difficulty of using the information search systems, the resulting affective impact on the use and its effect on the learning process.

Kuhlthau (1991) initially included 6 stages in the ISP model (Figure 1): initiation, selection, exploration, formulation, collection and presentation. Later, Kuhlthau added assessment to the model. The ISP model begins with initiation, which represents the stage where “the learner first becomes aware of the problem” (p. 366). Learners then move to the selection stage, where they “identify and select the general topic to be pursued or investigated or the approach” (p. 366). Kuhlthau’s exploration stage includes locating the information, reading, and trying to make sense of the information and the formulation stage includes increased focus and clarity from a review of the information or an emerging hypothesis. The collection stage occurs when the user can gather information on the focused topic and use the system efficiently. The presentation stage occurs when the search is completed and the findings are presented. Finally, the assessment stage occurs when students evaluate the process, process their feelings and reflect on how to improve the process for the next research project (Kuhlthau, 2004).

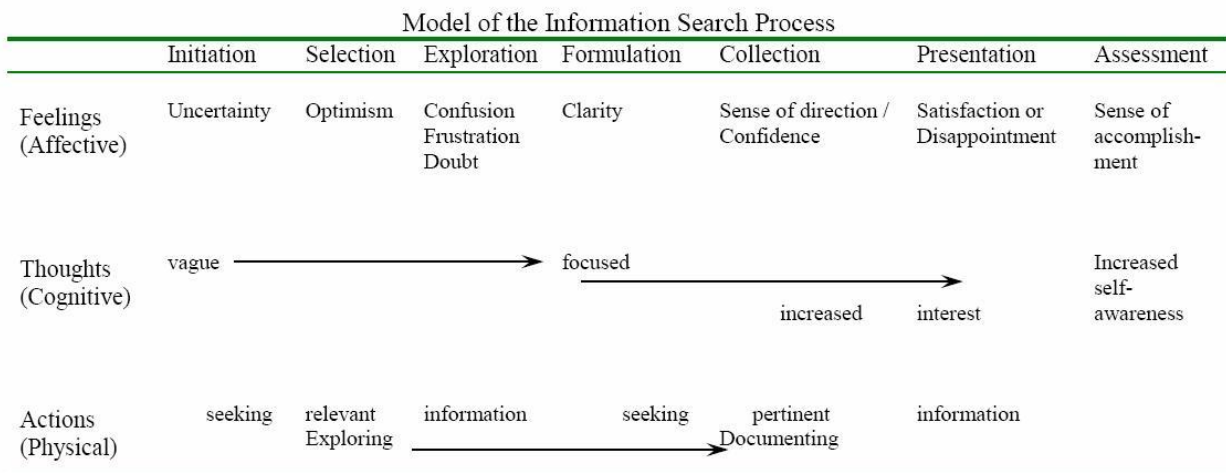


Figure 1. Information Search Process Model (Kuhlthau, 2004, p. 82)

Similar to help-seeking, seminal guiding work in information-searching developed in a technologically different era. As Taylor (2012) notes, most models of information-searching developed before the widespread and ubiquitous use of the internet. In both help-seeking and information searching, models in use today evolved based on now antiquated technology. Research became based on the source because the skills, needs, costs, benefits and strategies to find the information were different. Speaking to a faculty member may result in a different set of benefits and costs than utilizing YouTube to locate a video tutorial. The benefit of speaking to a faculty member may include specific advice tailored to the exact problem whereas this may come at a cost of immediacy.

In contrast, an online YouTube source may provide faster, more accessible results, but at a cost of customized assistance. Learners used information searching when accessing a library system for prescribed research and sought help in a classroom setting from individuals presumed to have the knowledge to provide. With current technology, the source of assistance has reemerged as source an important factor to explore and understand. Increasingly, researchers acknowledge the choices learners possess when faced with a difficulty learning situation (Kitsantas, Dabbagh & Dass, 2013; Tricot & Boubée, 2013).

Academic help-seeking and information searching. At the most basic level, both Kuhlthau's (1991) ISP model and Karabenick and Newman's (2009) general help-seeking process model begin with the recognition of a comprehension or knowledge gap and that the learner chooses how to resolve that gap. See Figure 2. Both also recognize that internal, personal characteristics, such as emotions, facilitate or hinder the process. Kuhlthau (1991) explicitly noted affective issues such as confusion, frustration, and their impact on the information search process. From a self-regulated learning perspective, which underpins academic help-seeking,

emotions are noted as part of the regulatory processes which may hinder learning. External characteristics, such as the demands of the helper or information system, may also impact self-regulated help-seeking and information searching according to both models.

Furthermore, both models explicitly or implicitly recognize that the learner makes intentional decisions. Self-regulated learning asserts that the individual has agency; their intentional and controllable actions impact their learning (Zimmerman, 2008). In addition, while it is well-established that academic help-seeking is a self-regulatory learning strategy (Karabenick & Berger, 2011, Karabenick & Dembo, 2011, Karabenick & Newman, 2009, Newman, 1994), information seeking and information searching also include a self-regulatory component as well (Puustinen & Rouet, 2009; Zimmerman & Pons, 1986).

While similarities exist between the academic help-seeking and Kuhlthau's ISP model in the beginning and concluding stages, specifically around becoming aware of the problem, deciding on a strategy and assessing the process, the middle part of both models reflect the technology available during the time they were developed. Both fields specialized according to the source used for help. Access to the Internet and the type of information available online have all shifted dramatically since the seminal work on both ISP and academic help-seeking were completed. This study examined how and why learners' select their source of assistance.

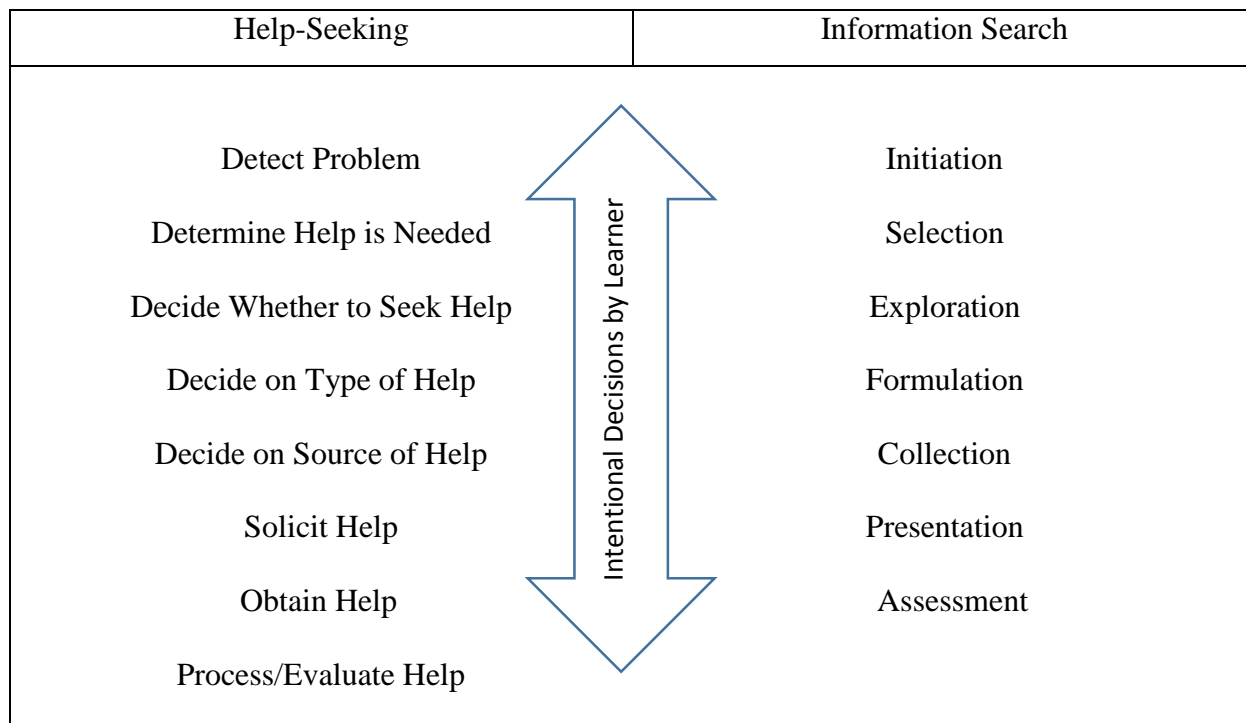


Figure 2. Comparison of Academic Help-Seeking and Information Search Processes

Learners appear aware of the diversity of resources available to them and that their preferences for sources have shifted. Wolters (1988) demonstrated that undergraduate students preferred to seek human help when faced with a difficult academic challenge. In contrast, over two decades later, Makara and Karabenick (2013) demonstrated that undergraduate students most prefer college textbooks and internet sources when facing learning difficulties. Furthermore, other studies have found that undergraduate students prefer utilizing internet sources as a resource when engaged in information-searching activities, first turning to Google, Wikipedia and finally library databases (Biddix, Chung & Park, 2011; Warwick & Rimmer, 2009). The resulting shift in source preferences appears to bring the literature back to the initial conceptualization information-seeking, in the learner seeks to gain knowledge from any available source without a binary distinction between human and non-human (Tricot & Boubee, 2013). Given today's environment, a return to this position seems appropriate.

Limited attempts to bridge the divide over the source of help between self-regulated help-seeking and information-searching began in 1988. Keefer and Karabenick (1988) noted that all sources of information, including static documents such as books, involve a degree of human interaction. They proposed that static documents represent a form of social interaction between the document creator and intended reader. Humans create documents as an intentionally curated artifact of human knowledge with the purpose of providing information to other humans; they are a form of social interaction (Keefer & Karabenick, 1998; Puustinen & Rouet, 2009). Furthermore, in 2006, Karabenick positioned information searching as an optional, potential intermediate step in help-seeking. While this represents an attempt to acknowledge information-seeking, it reinforces the perspective of two distinct behaviors.

Recent work reflects the source choice learners have at their disposal (Agosto, 2002a; Jarvela, 2011; Karabenick, 2011; Karabenick & Puustinen, 2013; Puustinen & Rouet, 2009) As a result, a number of researchers have called for converging information-seeking and academic help-seeking where appropriate (Karabenick, 2011; Kitsantas et al., 2013; Jarvela, 2011; Puustinen & Rouet, 2009). When viewed from this perspective, learners possess a wide variety of source options for resolving a knowledge gap and make an intentional decision regarding source selection. Despite this more recent work, little attention has explored how learners make their decisions regarding which source to engage.

Decision Making

Self-regulated learning recognizes the role of the learner as an active participant controlling and regulating their learning. Learners engage a variety of strategies to self-regulate, but ultimately, they chose a course of action from a multitude of options. In terms of help-seeking, researchers have demonstrated that a wide variety of factors such as personal, socio-

motivational characteristics, impact the frequency, type and source of help sought (Karabenick, 2006; Karabenick & Dembo, 2011; Makara & Karabenick, 2013; Reeves & Sperling, 2015). Despite explicit calls to understand what factors trigger help-seeking, little research has been done to understand the intentional decision making process regarding the source of help (Huet, Dupeyrat & Escribe, 2013).

Learners confronted with a gap in their knowledge may choose from a number of different options to resolve that gap which may include sources typically associated with information searching and help-seeking. Examples of sources include emailing a professor, searching online, or seeking out a classmate for face to face assistance. With advances in technology, access to the internet, email and discussion boards, blurred lines exist between help and information seeking.

Today, when confronted with an inability to either understand assigned material or solve a homework problem, college students must undergo a decision making process where the outcome is uncertain. Decision making is a type of problem solving and decision making skills and abilities underscore many other types of problems (Jonassen, 2010). Individuals make decisions using covert, internal processes to commit to an action (McFall, 2015; Jonassen, 2012; Yates & Tschirhart, 2006). A decision includes the options the individual may choose, the potential outcomes or consequences of the act and contingencies that might occur. Research literature identifies these three aspects as the “decision frame” (Tversky & Kahneman, 1974, p. 453). In addition, a commitment to action also marks decision making. Within this broad frame, different varieties of decisions exist: choices, acceptances/rejections, evaluations, constructions (Jonassen, 2012; Yates & Tschirhart, 2006). Deciding upon a source to resolve a gap in

knowledge falls into the choice category of decision making; the learner selects an option from a variety of distinct alternatives.

Decision Theory. Decision making theory may fall into a number of schools including normative, descriptive, prescriptive, rational or choice (Holzgrefe, 2015; McFall, 2015). Jonassen (2012), working from a problem-solving instructional design approach to decision making, identified two relevant schools, normative theories, and descriptive theories. In normative decision making, researchers study how people should make decisions based on rational thought, based on achieving the most desirable result based on subjective values weighted by its probability (Holzgrefe, 2015; Kahneman, 2003; Kahneman & Tversky, 1984). According to this school, individual make decisions in accordance the subjective value of the outcome based on probability. The goal is to optimize and maximize utility.

In contrast to normative decision making, descriptive decision making theory examines how individuals make decisions. Simon (1955) challenged this normative ideal of decision making when he challenged a key assumption of normative decision making. Simon questioned the existence of an individual who could act in perfect accordance with the normative theory's expectations. In particular, Simon (1955) questioned whether any human could possess the computational and organizational abilities necessary to make perfect decisions, and observed that individuals often make decisions that did not follow the principles of utility theory. In his justification of his departure from the principles of utility theory, Simon attributed the observed regular and normal violations of the principles of utility theory to the cognitive and physical limits of humans, such as the inability to know of all possible outcomes or to calculate the probability of those outcomes. Simon (1972) described this concept as bounded rationality, acknowledging that the individual does not possess and does not need all of the information

available to make a decision. Individuals do not always seek to maximize value according to mathematical and probabilistic grounds (McFall, 2015). Human constraints on cognitive processing restrict their ability to make optimal decisions with perfect rationality (Simon, 1990).

Simon's conceptualization of bounded rationality transformed decision making research. Beyond recognizing the limits of man's inherent bounded rationality, he asserted that individuals make typically make decisions using methods to reduce the cognitive effort required to make the decision. Individuals typically simplify the decision making process where possible in order to reduce effort (Shah & Oppenheimer, 2008; Simon, 1955; Simon 1990). *Satisficing* is defined as "problem solving and decision making that sets an aspiration level, searches until an alternative is found that is satisfactory...and selects that alternative" (Simon, 1972, p. 168). According to this decision making heuristic, the individual decides a level of a satisfactory knowledge, searches for the knowledge and then stops when a good enough answer is provided. Decision makers use their past experience to predict potential good enough solutions (Simon, 1990). This solution may not represent the best or optimal solution, but instead an acceptable solution to the individual.

Interest in satisficing led to research in heuristics to understand how individuals make decisions (Simon, 1972). Heuristics reduce the challenges inherent in decisions identified by bounded rationality, such as computing probabilities and choosing from an infinite array of values, allowing individuals to make decisions within their constraints. These heuristics can also introduce biases or errors in judgment, such favoring more familiar (Tversky & Kahneman, 1974). Heuristics function as "empirically derived short cuts" utilized by individuals making decisions (Goodrich, Stirling & Boer, 2000, p. 85). Satisficing is considered one of these heuristics (Shah & Oppenheimer, 2008). Research into judgment and decision making has

yielded a large volume of heuristics aimed at reducing the effort involved in making decisions (Shah & Oppenheimer, 2008; Pleskac & Hertwig, 2014). These heuristics may be highly task or domain dependent, which may explain the proliferation of effort reducing heuristics (Shah & Oppenheimer, 2008). Heuristics such as satisficing, however, has been shown to be helpful across many domains (Simon, 1990). Heuristics may be especially important in understand learners' decision making around the selection of the source of help when considering the role that prior experience and expectations plays in decision making.

Decision Making in Information Searching. The satisficing framework has been used to explore undergraduate decision making in areas outside of seeking help, from test taking to information-searching to college choice to survey behavior (Agosto, 2002; Barge & Gehlbach, 2011; Hadsell & MacDermott, 2010; Perna, 2000; Wilkinson, 2010). In two qualitative studies, Agosto (2002a; 2002b) found satisficing behavior explained student information-searching behavior. In one of these studies, the author (Agosto, 2002b) found support for satisficing as well as added constraints of physical discomfort or boredom. In this case, the physical discomfort caused the decision making process to cease before the best available option was found. This finding demonstrates that the decision making event is not a single temporally bound instance of decision making, such as a web session. The decision making culminates when a final decision has been reached.

Factors other than temporal or physical limitations may also play a role in decisions regarding information sources. Lu and Yuan (2011) based their study on the relation of information need to tradeoffs between accessibility and quality on satisficing and the sufficiency principle to explain how extension educators utilized information. They found that low and high

information needs reflected increased value in quality while medium needs reflected an increase in value in the accessibility of information

Context may represent an additional factor influencing decisions regarding information sources. One study of college students found that the context of the need for information impacted their selected source (Biddix et al., 2011). In this study, 282 undergraduates replied to 5 open ended questions designed to explore internet usage and academic work. They found that participants most frequently used internet search engines to find academic information, but that library resources were most frequently used for specific projects such as writing a research paper. Participants also indicated they valued the immediacy and accessibility of Internet based sources.

In addition, a longitudinal study of undergraduate information searching found that growing expertise led to strategic satisficing. Strategic satisficing is defined as using growing skills in a tactical fashion to achieve results with the least amount of effort possible. In this study, participants utilized their newly acquired information-search skills to scan assignments for key words to use during internet searches, which they had demonstrated prior comfort with using. The participants did not apply their skills in new areas; rather, they became more efficient with their preferred strategy (Warwick & Rimmer, 2009).

Evidence suggests that both undergraduate and secondary students utilize a satisficing heuristic to make decisions regarding their information searching needs (Hadar, 2011). The emphasis on past experience in descriptive decision making, coupled with demonstrated evidence of this behavior, suggests that this may be a key element in understanding how learners make decisions regarding their source of assistance when faced with a learning problem.

Decision Making in Academic Help-Seeking. Self-regulated learning asserts that the individual has agency in the outcome, meaning the individual acts in intentional and controllable ways to impact their learning (Zimmerman, 2008). The help-seeking process model explicitly states the role of the learner in making intentional decisions (Karabenick & Dembo, 2011; Karabenick & Newman, 2009; Newman, 1994). Help-seeking research has long focused on the threats and costs to seeking help, mostly in the form of personal characteristics (Newman, 2002). Suggested threats include embarrassment, threats to self-esteem/ego, and those related to achievement orientation, such as desire to look better than others. Known personal factors which influence source selection include achievement orientation, gender, self-regulation ability, value for school, type of problem and emphasis on peer relations (Karabenick, 2004; Makara & Karabenick, 2013; Nelson-Le Gall & Gumerman, 1994; Newman & Goldin, 1990). Other researchers, however, has examined external, controllable influences on help-seeking (Karabenick, 1988; Karabenick, 1994; Kitsantas & Chow, 2007; Magnussen & Perry, 1992; Makitalo-Siegl, Kohnle & Fischer, 2011; Ryan, Pintrich & Midgely, 2001).

Instructor influence. Given that academic help seeking is rooted in social-cognitive self-regulated learning, the learning environment affects student intent to seek academic assistance (Karabenick, 2004; Karabenick, 1994; Karabenick & Newman, 2009; Kozanitis, Desbiens & Chouinard, 2007). Classrooms can be perceived by students as either mastery - or performance-based. Mastery-based classrooms emphasize learning whereas performance-based classrooms emphasize ability or grades. In one study of over 850 students, Karabenick (2004) demonstrated that student perceptions of the classroom achievement goals impacted their reported intentions to seek help, even while controlling for the learner's individual goal orientations. Students in environments perceived as performance-based structure, where comparisons to peers and

emphasis on grades and ability are emphasized, were more like to avoid seeking help, regardless of personal achievement goal orientation (Karabenick, 2004; Kozanitis et al., 2007).

The learner's perception of instructor support for questions also impact help-seeking behavior. In one study, Karabenick (1994) surveyed over 100 undergraduate students and found that when learners believed that the instructor attributed positive qualities to their questions, the learners indicated an intent to seek help more frequently. When learners believed that their questions signaled a "desire to learn" to their instructor rather than their inability to comprehend the material, they were more likely to view their classroom as mastery oriented (Karabenick, 1994, p. 199). Other studies provide similar results. Kozanitis and colleagues (2007) measured self-reported help-seeking behavior and found that learners' perception of the instructor positively influenced help-seeking. The researchers theorized that the instructor's verbal and non-verbal communication can support help-seeking behavior. In addition, Whipp and Lorentz (2008) demonstrated that students who had high numbers of interactions with instructors who the students perceived as providing academic and social support sought help most frequently in an online environment.

Furthermore, with the exception of Whipp and Lorentz (2008), the researchers provided a menu of help options to participants as their only choices for assistance (Karabenick, 2004; Karabenick, 1994; Kozanitis et al., 2007). None of the options provided including information searching options such as an internet search engine or explored how or why students selected their support in a holistic manner. Little, if any, published research exists regarding what factors into the decisions for the selection of source in a real world setting.

Proposed decision making framework. Recently, Makara and Karabenick (2013) proposed the first decision making framework for the source of help, which rests on an

expectancy-value theoretical foundation. This framework includes both information searching and help-seeking sources. Makara and Karabenick (2013) propose that learners have both expectations of and values for the source upon the learner makes the decision to solicit and use the source of help. The two expectations of the source are perceived accessibility/availability of the source and the expectation the source will provide help. The two values for the source are the match in type of help provided by the source and the perceived quality and accuracy of the source. All inputs are subjective in nature, relying on the learners' perception. Their model can be seen in Figure 3.

Expectations	X	Value	=	Outcome
Accessibility/Availability		Help Type Match		Solicitation of Source
Expectation help provided		Quality/Accuracy		Use

Figure 3. Expectancy-value model for source selection

Makara and Karabenick's (2013) proposed framework evaluates the selection of the source as an isolated event, indicating how individuals should make decisions around the source of help. From a decision making perspective however, the ability to arrive at an optimal decision likely requires computational abilities beyond abilities of most individual. As an example, one recent study identified 18 discrete options in a "not meant to be comprehensive list" of options available to college students today (Makara & Karabenick, 2013, p. 46). From the list of eighteen or more sources provided in the study, the learner must then predict and compute other attributes identified by the model such as the type of help they are searching for against the type of help they believe the source will provide. Therefore, it appears that the importance of prior knowledge and experience and decision making heuristics such as satisficing likely play a role in the

individual's subjective perceptions. Other factors, such as the immediacy of the results, may also represent significant importance to the learner (Kitsantas et al., 2013). Understanding how these factors interact may provide future directions for instructors seeking to facilitate help-seeking in their classroom. However, these factors and interactions have not been explored.

Over a decade ago, young teenagers demonstrated ease and familiarity utilizing the web to find information (Agosto, 2002). These individuals were well versed in searching for information on the internet to close gaps in their knowledge. These young participants in studies have since become college aged. Therefore, it is unsurprising that Internet search engines are the preferred mode of choice among undergraduate students in a number of studies on information searching (Biddix et al., 2011; Tricot & Boubée, 2013; Warwick & Rimmer, 2009). Very few novice information searchers exist in undergraduate education today (Jarvela, 2011; Warwick & Rimmer, 2009). Based on decision making theory's understanding of heuristics, this familiarity and previous use of internet searches likely play a large role in the decision making mechanisms at play.

Sources of Help

In response to recent calls for converging the paradigms in information-searching and help-seeking, Makara and Karabenick (2013) proposed a framework for source classification which encompasses traditional academic help-seeking sources and information-searching sources such as google. This section will outline Makara & Karabenick's (2013) framework.

The proposed framework includes four dimensions, formal/informal, personal/impersonal, mediated/face to face (F2F), and static/dynamic. These dimensions represent a continuum despite the appearance of binary polarity. The proposed framework is

meant “to represent learners’ appraisals of how they categorize sources” (p.47). In other word, the proposed dimensions of the framework rest on the learners’ subjective understanding.

Formal/Informal. In the help-seeking literature, traditional definitions have included formal and informal sources. Formal sources represent authority sources such as teachers and university based tutoring programs. These sources likely have more expertise and credibility (Karabenick, 2011). Informal sources include classmates or friends (Karabenick, 2004). However, current undergraduate students may not make a distinction in the authority and credibility of internet sources when using internet based sources due to their failure to evaluate these sources (Taylor, 2012). Whether undergraduate students consider internet based sources as formal or informal has yet to be established (Makara & Karabenick, 2013).

Personal/Impersonal. A personal relationship differentiates personal sources from impersonal sources. Personal sources carry different threats, such as embarrassment or anxiety stemming from threats to self-esteem than impersonal, anonymous sources. Impersonal sources are likely more accessible, but personal sources are likely considered higher quality. It is irrelevant whether the source is mediated by technology. Emailing a friend would likely be considered a personal source.

Mediated/F2F. Mediated refers to communication facilitated by technological tool whereas face to face refers to literal face to face communication. Makara and Karabenick (2013) propose that learners likely prefer mediated to face to face communication. Again, similar to the impersonal/personal distinction, face to face is proposed to be of higher quality. Using the previous example of emailing a friend, the learner would likely consider the source to be personal and mediated.

Dynamic/Static. Building off of Puustinen and Rouet (2009)'s proposed integrative framework, the dynamic and static dimensions refer to learners' perception of the source's adaptability to the request. A journal article or a website is likely considered static whereas an intelligent tutoring system or an instructor may be considered very dynamic as an instructor can tailor their response to the learner's inquiry.

Makara and Karabenick (2013) explored the relationship between certain characteristics and source preference. In a large survey of over 1,000 undergraduates, participants reported "referring to class material," such as textbooks or notes, searching through an online search engine or encyclopedia (e.g. Google, Wikipedia) and searching online resources specific to your class as the three top source choices. The undergraduate participants chose impersonal, static and mostly formal sources. Overall, the results from Makara and Karabenick (2013) support previous research suggesting that privacy ameliorates help-seeking threats (Jarvela, 2011; Knapp & Karabenick, 1988; Kitsantas & Chow, 2007). As the learner's perception of Google and Wikipedia in terms of authoritativeness has not been established, it is difficult to categorize these sources as either formal or informal. More investigation into how learners and scholars perceive these sources would provide clarity.

Methodological Patterns in Help-Seeking Research

In the more than three decades of research since Nelson-Le Gall's (1985) reconceptualization of help-seeking as a positive learning strategy, methodological patterns have emerged in the research designs. These patterns shape our understanding of source selection. These trends include pre-defining the source of assistance, an overwhelming preference for quantitative studies, failure to consistently define the context of the study and a reliance on self-reported data.

Pre-defined source. Across nearly all studies of undergraduate help-seeking behavior, researchers pre-determine and pre-define the source of assistance, either as an inflexible part of the study design or as a list of options. Nelson-Le Gall & Gumerman (1984) noted this issue over three decades ago and noted that children may prefer a source not presented to them. In the intervening decades, little has changed. Typically, researchers provide a menu of sources, with no opportunity for participant input. This practice may result in a lack of understanding of what sources learners actually utilize as well bias the results of these surveys. The predominance of this research design extends across learning mediums, participant groups and methodologies.

In one example, Kitsantas and Chow (2007) compared learner's help-seeking preferences across web based traditional classes and surveyed 472 undergraduate students to determine if the instructional medium impacted help-seeking. Students in the web based sections sought help more frequently and felt less threatened. In addition, they found that students preferred electronic means to seek help. However, this study defined the medium through which help sought (i.e. by phone, F2F or chat) as well as the source (peers, teachers) and did not seek to understand why learners preferred using electronic mediums to solicit assistance.

A recent example of this trend utilized Makara and Karabenick's (2013) proposed taxonomy classification to explore learner preferences for technology mediated or face to face sources (Reeves & Sperling, 2015). Reeves & Sperling (2015) examined associations between traditionally researched threats to help-seeking such as threats to ego (Ryan, Patrick & Shim, 2005) and achievement goal orientations (Ryan & Pintrich, 1997). 272 participants responded to an online survey recording their preference for frequency and source of help, as well as scales measuring help-seeking threat, tendencies, intentions and self-reported grade. The survey contained pre-defined sources of traditional (i.e. human based) sources of help, divided into a

technology mediated source, such as emailing a professor, and a face to face source, such as stopping by before or after class. Only six sources were provided and the results found that stopping by before/after class and email were the most desirable (Reeves & Sperling, 2015). Consistent with prior research, Reeves and Sperling (2015) found that threat was inversely related to face to face preferences (Kitsantas, et al., 2013; Ryan et al. 2005) as well as that higher achieving students preferred non-technology mediated sources (Makara & Karabenick, 2013).

Additionally, while experimental studies also exist, most limit sources of assistance. In one study of the effect of classroom scripts and collaborative inquiry on adolescent help-seeking, participants engaged in academic work in groups with access to a computer based help module while researchers recorded their activity (Makitalo-Siegl, Kohnle & Fisher, 2011). Participants could access four sources of help, their dyad partner, another student or the computer module. In both conditions, participants most preferred their dyad partner. In addition, in laboratory type settings, the researchers provide the source as part of the experiment (Karabenick & Knapp, 1988; Magnussen & Perry, 1992; Mercier & Frederiksen, 2007).

Even in the few existing qualitative studies, the source of help is typically pre-defined or limited. In one example of this pattern, middle school learners in France sought assistance with their math homework through an online free discussion forum mediated by volunteer teachers (Puustinen, Volckaert-Legrier, Coquin, Bernicot, 2009). These assistance seeking bids relied on human interaction, but that interaction was separated by time and physical space as well as the anonymity provided by a discussion board. They did not receive assistance similar to a face to face communication. However, the scope of this study was confined to the chat board utilized by the students.

Survey based research. Survey based research is the most frequently utilized methodological approach. Despite recent calls for qualitative research studies, very few exist. Researchers believe that qualitative designs will provide a richer understanding of the behavior and uncover variables missed in the quantitative designs (Makitalo-Siegl et al., 2011; Puustinen & Karabenick, 2013). Most past designs utilized questionnaires distributed either in class (Ames & Lau, 1982; Karabenick, 2004; Karabenick, 2003; Kozanitis et al., 2007; Makara & Karabenick, 2013; Newman & Goldin, 1990; Schworm & Gruber, 2012) or embedded within a larger survey (Pellegrino, 2012). In general, recent help-seeking research tended to be quantitative in nature, seeking to connect motivational variables, personal characteristics or perceived environmental characteristics to frequency or type of help-seeking (Karabenick, 2011). However, there is evidence that college students “satisfice” when completing surveys. Undergraduate students terminate early, rush, skip items or engage in non-differentiation when completing surveys. One study found that 81% of US college students engaged in this behavior, calling into question the accuracy of the responses that have primarily constituted the help-seeking research foundation, underscoring the need for research to employ more robust methodologies (Barge & Gehlbach, 2012).

In another example, Karabenick and Knapp (1988) examined whether undergraduate students would prefer help from a computer based or technology mediated human source. The researchers assured participants in both conditions anonymity, however, participants significantly preferred computer based help. In the post-performance assessment, designed to ascertain, in part, “the importance of reasons for obtaining... [or] not obtaining help”, participants indicated their agreement with statements on a nine-point rating scale (p.466). These statements included items such as necessity for help in solving the task, their desire to

independently solve problems and their concern for the length of time on task. The authors do not provide justification for these items in the article. Additional variables may have been uncovered in a qualitative setting.

Quantitative designs often also predefine the source with a goal to determine the relationships between variables. However, this presents an incomplete picture of how and why participants decided to seek help. In the most recent study, Reeves and Sperling (2015) restricted their source to six options via a quantitative survey research design. This does not reflect the variety of choices readily available to college students today, as evidenced by the “not meant to be comprehensive list” of the 18 sources offered by Makara and Karabenick (2013, p. 46).

The qualitative studies which do exist provide a deeper understanding of variables which may impact help-seeking behavior (Makara & Karabenick, 2013). Newman and Schwager (1995) uncovered relationships between process-related questions, adaptive help-seeking and performance. However, these studies typically focus on online environments (Hsu, Ching, Mathews and Carr-Chellman, 2009; Puustinen et al., 2009; Whipp & Lorentz, 2009). In another example, a phenomenological study of five undergraduate students found that while students may not post to an online help forum, they still found the interaction valuable; learners who did not post often were unaware of the resource. (Hsu et al., 2009). In another example, Whipp and Lorentz (2008) interviewed students, finding that instructors perceived as supportive positively influence formal help-seeking behavior. During these interviews an additional important factor emerged: the hidden, unobservable, assistance that classmates provided to each other through private channels such as private phone calls or emails. Uncovering additional variables through spontaneous participant generations of sources may move the field forward in understanding how

learners make source selection decisions. To the author's knowledge, no study has been conducted among undergraduates in traditional face to face based classes.

Domain/Context. The domain or context of the problem has received little attention in academic help-seeking. As a result, a consistent application does not exist in the research methodology. This general approach may create confounding variables. For example, a student who is weak in writing but strong in mathematics may seek help very differently in a process oriented writing class than in a Calculus class. Support for the importance of the context of the problem may be found in the nuances in the information searching process models. In contrast to Kuhlthau's (1991) ISP model, the research process model is designed for individuals conducting research for writing a paper. The research model differs from the more general ISP model, in part due to its differing context (Brand-Gruwel et al., 2009).

Previous research on academic help-seeking may have resulted in confounding variables as well. Kitsantas & Chow (2007) examined help-seeking behavior among different delivery mediums and found that students in web based sections felt less threatened and sought help more frequently. However, this study utilized 11 different instructors and three distinct content areas which aligned with the instructional medium, perhaps confounding the results. In this study, educational psychology classes were delivered face to face, geography classes were delivered in a distributed environment (face to face with a web element), introductory information studies were delivered online with asynchronous and synchronous elements and information studies were delivered online asynchronously. The problems represented in these distinct disciplines may have been enough to cause differing help-seeking strategies independent of the instructional medium.

In a more recent study, participants were requested to “Imagine a time you had a problem understanding something in your typical college classes” (Makara & Karabenick, 2013 p.53). A typical college class can range from arts to science to language classes, creating very different types of help needed. These differing types of problems may confound the results and obfuscate the salient factors in the source selection process. Crossing between domains has existed for at least a decade when Karabenick’s 2004 study examined the results of help seeking in an organic chemistry, introduction to chemistry and introduction to psychology class.

Purpose

The distinction between the theoretical positions of academic help-seeking and information-searching grew in part based on the technology available at the time as well as the distinct skills and abilities needed to engage in each behavior; however, the need to resolve a gap in knowledge or comprehension drives the learner into either or both processes. Both processes represent self-regulatory behavior on the part of the learner to solve a knowledge or comprehension gap. Current calls to create an integrative or convergent paradigm between the two fields supports this assertion (Karabenick, 2011; Kitsantas et al., 2013; Puustinen & Karabenick, 2013; Puustinen & Rouet, 2009). When considered from this perspective, the learner engages in an intentional decision making process to select a source of assistance.

The rich literature base of decision theory may illuminate how learners make these intentional decisions between sources. In particular, the descriptive school of decision making, bounded rationality, heuristics and satisficing may shed light on the mechanisms in the decision making process which may be vulnerable to influence on the part of the instructor (Kahneman & Tversky, 1984; Simon, 1955, Simon, 1972; Simon 1990). Satisficing in particular and heuristics more generally heavily weight prior experience in creating decision making short cuts. Evidence

suggests both that college students arrive at college well versed in resolving gaps in knowledge through internet based sources and that satisficing occurs in a wide variety of related venues, including survey responses (Barge & Gehlbach, 2012). Furthermore, the recently proposed nascent taxonomy of sources and theory of source selection should be explored through a decision making lens (Makara & Karabenick, 2013).

Addressing this gap in the research requires a new methodological approach (Karabenick, 2011; Kitsantas et al., 2013; Puustinen & Karabenick, 2013; Puustinen & Rouet, 2009). Methodological trends in help-seeking research consistently favor quantitative, survey based tools which have thus far failed to explicitly take into account the domain in which help may be sought. New qualitative approaches may uncover new variables valuable to moving the field forward towards an integrative paradigm (Makara & Karabenick, 2013).

The purpose of this study was to extend the current literature on academic help-seeking by identifying the factors driving the decision making process of undergraduate students' selection of a source of help. This study was guided by the following research questions:

1. What sources of assistance do undergraduate learners prefer to utilize?
2. How do participants describe their decision making process regarding the source of assistance?
3. What factors influence participants' source selection process?

CHAPTER II

METHOD

This mixed methods study explored the decision making process undergraduate learners utilize to select a source of assistance as well as identified the influences on the selection process. The researcher examined the intentional decision making process undergraduate learners undertake when deciding where to seek assistance. Reflecting recent trends in academic help-seeking literature, this study specifically included both human and static/non-human sources of help (Karabenick & Puustinen, 2013; Puustinen & Rouet, 2009).

Research Design

An inductive qualitative approach, specifically grounded theory, guided the approach to data collection. Previous work in this field relied heavily pre-defining the source in order to collect data quantitatively. Pre-defining the sources may have created a missed opportunity to identify the learners' changing source preference. Utilizing grounded theory research methodologies, previously unused in academic help-seeking research, allowed the learner's experience to inform the generation of theory regarding the selection of a source for assistance. In contrast to previous studies in this area, the qualitatively collected data in this study was analyzed without preconceived notions as compared to testing a set of assumed sources and presumptions in order to generate theory (Charmaz, 2012; Creswell, 2013; Strauss & Corbin, 1998).

Participants

Participants were full time undergraduate students enrolled in a small university in the Northeast. All participants were in their third or fourth year of study at the university, between

18 and 24 years of age, enrolled in a STEM major and registered for an upper level mathematics class. These classes cover complex calculations required for use in their major classes. Male students represented over 85% of the population. Junior and senior undergraduate students have completed their transition into the higher education environment and are likely familiar both with the resources available as well as the nature of undergraduate work. New students and transfer students were excluded from the study due to the potential for unfamiliarity with resources. In addition, students re-enrolling in course were excluded from the study. As self-regulatory behavior develops with age, non-traditional aged students older than 24 years of age were also excluded from this study (Zimmerman, 1990).

Procedure

This study involved two phases. In the first phase, all data collection occurred during a class problem-solving activity. The researcher presented participants with an informed consent form. Then the researcher provided participants with a log sheet. The researcher instructed the participants to log each source of assistance they utilized during the problem solving session. Following the completion of the activity, participants then responded to two surveys assessing their perceptions of the class achievement goal structure and the instructor's support of questions. This phase occurred first in order avoid an explanatory effect which may be present after the verbal probing in the second qualitative phase (Ericsson, 2006).

The second phase consisted of semi-structured interviews. Participants who completed both the log sheet and the surveys in first phase signed up to participate in the interviews during the second phase. Following the grounded theory methodology, the researcher utilized the data from the first phase as guidance for the development of the questions in the qualitative second phase (Birks & Mills, 2012; Charmaz, 2014). In the second phase, constant comparison informed

the development of additional research questions as the semi-structured interviews continued (Birks & Mills, 2012; Charmaz, 2014; Charmaz, 2008b; Hallberg, 2006). In the semi-structured interviews, the researcher informed the participants again of the confidentiality of their responses and encouraged them to think about their mathematics class. 25 interviews were conducted, falling within the expected number of 20-30 interviews (Creswell, 2013).

Instruments

Log sheets. The researcher provided participants with an electronic log sheet (Appendix A) where they noted each source consulted during the in-class activity. The researcher provided participants with instructions similar to those utilized in a think out loud protocol, specifically requesting that participants note where they looked for help with no accompanying explanations. (Ericsson, 2006). The log sheet captured the sources preferred by students in realistic context. The researcher used the data collected to partially answer research question.

Perception of Class Goal Structure scale. Following the completion of time for the in-class activity, participants completed the Perception of Class Goal Structure instrument (Appendix B) (Karabenick 2004). This 9 question assessment uses a seven point anchored rating scale to assess students' perception of the goal orientation of a classroom environment. The alpha coefficients for this scale ranged from .60 to .89 which are all within the acceptable range (Karabenick, 2004).

Perceived Teacher Support of Questioning scale. This 12 question instrument (Appendix C) utilizes a 5-point rating scale to assess learners' perceptions of their instructor's receptiveness to questions (Karabenick & Sharma, 1994). The survey instructs participants to recall a time when the instructor in this class was actively teaching or explaining something. The alpha coefficients value for this scale was .84 (Karabenick & Sharma, 1994).

Classification Survey. The final part of the survey included a text box where the participants indicated their most preferred source of assistance for this class. Then, participants utilized a four-point scale to rate their source according to Makara and Karabenick's (2013) proposed dimensions. Participants were provided with an explanation of the anchors at either end of the scales as well as a concrete example. For the channel dimension, one end of the scale defined technology based as *This source does not require me to interact face to face with any individual*. Examples of technology based sources include emails, internet searches and books or magazines. Participants chose from Likert-type item ratings. The data from these surveys partially answered research question three, which seeks to identify the factors involved in the decision making process, as well as to inform the semi-structured interviews. See Appendix D.

Semi-structured interviews. The second qualitative phase of the study sought to explore research questions one, two and three to gain an understanding of the sources used by undergraduate students to resolve learning challenges as well as the factors which influence these decisions. See Appendix E. The researcher utilized the data from the first quantitative phase to inform the interviews, but remained committed to rigorously interrogating her own biases and assumptions during the inductive analysis phase. The researcher utilized a constant comparative approach to data analysis and collection and the interviews shifted as necessary to clarify or investigate concepts as they become apparent in the data collection and analysis process (Birks & Mills, 2012; Charmaz, 2014).

In accordance with grounded theory methodology, the data from the first phase informed the qualitative second phase. In qualitative phase, interviews were conducted on a first come first served basis. During the interview the researcher prompted the participant to reflect on and explore their decision making process regarding their selection of a source of assistance in this

class. Probing questions clarified the participants' internal decision making processes as well as to elicited examples of sources.

Later interviews utilized the "flip flop technique," an analytic coding tool identified by Strauss and Corbin (1998, p.94). This technique typically is during coding to identify the opposite of a concept to illuminate significant properties. While the flip flop technique was introduced as an analytic coding technique leading to use in theoretical sampling procedures, the flexibility of a grounded theory approach allows it to be utilized as an interviewing technique as well (Charmaz, 2014). See Table 1.

Table 1

Research Design

Research Question	Data Collection Tool	Analysis
RQ ₁ : What sources of assistance do undergraduates prefer to utilize	Written Logs, Classification Survey, Semi-Structured Interview	Frequency Analysis, Inductive, Grounded Methodology based Coding/Analysis
RQ ₂ : How do participants describe their source selection process	Semi-Structured Interview	Inductive, Grounded Methodology Coding/Analysis
RQ ₃ : What factors influence this process?	Perceived Classroom Achievement Goal Structure Survey, Perceived Teacher Support for Questions Survey, Classification Survey, Semi- Structured Interviews	Frequency Analysis, Chi- Square test, Inductive, Grounded Methodology based Coding/Analysis

Data Confidentiality

The researcher used a paper based OMR form to conduct the quantitative phase, Participants' first and last name as well as email will be collected with the log sheets and surveys

to identify participation. The researcher kept the surveys and informed consent forms in a locked cabinet within a locked private office. A list of names and emails were provided to the faculty members of the classes to confirm participation. The name and email list was maintained separately from survey responses in two separate files and did not contain any identifiable references to each other. The list of names and emails was destroyed at the end of the semester. The survey responses data will be destroyed upon the publication of all manuscripts associated with this data.

Upon arrival to the interview, participants identified their name, email and the date. This information was provided to the faculty member for verification of participation. Upon the beginning of the recorded interview, the researcher informed the participant of confidentiality again then conducted the interview.

Data Analysis

Data from the quantitative phase was analyzed through Chi squared test to test the association between the factors identified on the surveys and the type of source preferred identified by the written logs. The researcher also conducted a frequency analysis.

The researcher analyzed data from the qualitative phase through the use of coding, memos, and diagrams. At the end of every interview and prior to transcription, the researcher created a memo summarizing and reflecting on the interview. The researcher's reflexivity at this point was examined to avoid forcing preconceptions into the data analysis. Coding took place using Charmaz's (2014) constant comparative coding framework, using initial and focused codes as well as theoretical codes if warranted. The constant comparative framework requires constantly comparing "incidents to incidents, incidents to codes, codes to codes, codes to

categories and categories to codes” (Birks & Mills, 2012, p. 10). Data analysis was a recursive process and followed a flexible, not rigidly linear, approach to data analysis. The goal of the data analysis and collection was to reach saturation of the data. The list of items discussed below represents a synopsis of the analytic tools which were used, not a temporal schedule of their use.

Member Checking. To ensure the accuracy of the data collected, the researcher emailed a copy of the transcript of the interview to the participants. Participants were thanked again for their participation and invited to clarify, expand upon or comment on the transcript (Hayes & Singh, 2012). 72 hours or more elapsed between member checking and initial coding to allow for participant responses.

Initial Coding. Initial coding represents the first attempt by the researcher to understand the data by comparing it with collected data to construct initial codes or labels for the actions and processes described by participants. Initial coding took place following a minimum of 72 hours after member checking. The unit of analysis was line by line, utilizing gerund based codes whenever feasible and appropriate (Charmaz, 2012). The researcher sought to code actions and processes present in the data. The researcher sought to understand stated actions and reasons, unsaid assumptions and significance of words, actions and thoughts described by the participants (Charmaz, 2014). As with all data analysis tools outlined in this section, the coding process took place in a constant comparative process.

Focused Coding. Focused coding involves identifying the most significant initial codes and using these codes to investigate a large amount of data. Identifying the most significant codes was done by comparing and assessing initial codes for analytic direction and returning to the data to test the codes. Focused codes are typically more conceptual in nature (Charmaz, 2014).

Memo Writing. During the entire research process, the researcher will engage in memo-writing. Specifically, the researcher will create memos to engage in constant comparative analysis, to record apparent boundary conditions of codes, to define codes, to record antecedent actions and consequences and to record future interview questions or gaps in understanding (Charmaz, 2008b). In addition to recording a memo at the end of every interview, the researcher will also engage in memo-writing to reflect upon codes, analytically sort memos, facilitate the comparison process as well as reflect upon and analyzed the data as appropriate.

Theoretical Sampling. Theoretical sampling took place after initial coding categories and concepts are constructed from the data (Charmaz, 2014). The researcher conducted additional interviews and data analysis in a constant comparative model to follow leads and cues, investigate gaps, test assumptions, and potentially explore negative cases. Theoretical sampling occurred until saturation is achieved. Saturation occurs when no new insights occur, the properties of the theoretical categories are robust and account for the data, no new codes are developed for the categories, the categories are defined and no further collection or analysis is likely to yield more explanations for the categories (Birks & Mills, 2012; Charmaz, 2014; Strauss & Corbin, 1998).

CHAPTER III

RESULTS

This study explored the intentional decision-making process undergraduate students utilized to select their source of help. Previous studies largely employed quantitative research designs consisting of surveys with pre-defined choices restricted to human sources. This mixed methods study implemented a grounded theory methodological approach to data collection and analysis. The results demonstrate that undergraduate students utilize online and human sources with similar intentions. This study also demonstrates that undergraduate students intentionally made decisions during their source selection process based on a number of factors previously unexplored in the literature.

Research Question One: What Sources Do Undergraduate Students Utilize?

The first research question explored the preferred sources of undergraduate learners. Source preference varied upon context, dependent upon whether the assignment was completed in or out of class. A total of six sections of a math class participated in the study, resulting in 99 total participants. During the in-class problem solving activity, participants tracked their source utilization on a log sheet. Of the 99 total participants in this study, 74 returned log sheets. One section of the class ($n = 16$) conducted the in-class activity substantially differently leading to the elimination of their log sheets from the study. The researcher examined 58 log sheets where participants recorded their source utilization during the in-class problem solving activities. At the end of the in-class activity, participants completed the survey instrument that instructed them to recall their out-of-class help-seeking behavior. Participants wrote in their most preferred sources when completing homework for the class as part of the survey. A total of 99 participants returned surveys. Women returned 17% of the surveys ($n = 17$).

Participants freely wrote the name of their preferred sources on both instruments. The sources were consolidated into the following categories for analysis: classmates/friends, online sources, textbooks, notes, faculty and other. These categories were developed according to similarities in how participants accessed and utilized the sources. The semi-structured interviews informed the delineation of the categories, particularly the textbook category. Classmates/friends are human peers with whom the participants interacted for help. Online sources were accessed through the internet and required evaluation prior to accessing a source. The textbook category consisted of material required or assigned to the class. For the notes category, participants produced these artifacts themselves. The faculty category consisted of an individual whose relationship to the participant was defined by the institution as a faculty member and interacted with the participant in this capacity. The other category represented miscellaneous sources that were infrequently referenced and provided support rather than problem solving assistance. See Table 2 for examples.

Table 2

Categories and Examples

	Definition	Examples
Classmates/Friends	Peer currently or previously involved in class	Person sitting next to them in class, friend in class, friend who completed same class in prior semesters
Online	Internet based, involving additional search/evaluation process	Google searches, Chegg, StackExchange
Textbooks	Text required for class by faculty member	Paper textbook purchased in bookstore or Amazon. E-text purchased through publisher. PDF version bookmarked online.
Notes	Artifacts created by the participant to help them learn the material	Paper based note on lecture. Notes annotating a PowerPoint.
Faculty	Individuals who interact with participants as instructors, teachers and graders	Faculty teaching the current class. Faculty at the Institution participants have previously taken classes from.
Other	Support sources which do not help participants learn the process or material.	Calculators, online calculators, excel, rstudio

Frequency analysis. A frequency analysis of the log sheets, tracking in-class activity, revealed that 43% of participants first turned to a classmate for assistance. A total 17% of participants first utilized their notes and 14% looked online first. A total of 12% indicated they first utilized their text or another miscellaneous source, such as a calculator and 2% first turned to the faculty. A similar pattern for participants' top preferences emerged for their second and third choices. Most turned to their classmates for their second (29%) and third (30%) choices and then online for their second (18%) and third (30%) choices. See Table 3.

The surveys directed participants to report their source usage while completing out of class work. These surveys revealed a different pattern of source usage. Outside of class, participants most preferred online options as their first (39%), second (31%) and third (26%) most preferred source. Classmates represented the second most preferred choice as their first (29%), second (27%) and third (17%) sources. The third most preferred option was notes (14%) followed by textbooks (14%). Faculty were the least favorite preferred source, with 3% indicating the faculty as the first source they reached out to for assistance with homework. See Table 3.

Table 3

Comparison of In-class and Out-of-Class Source Usage

	<u>Log Sheets</u> (n = 58) (in-class)		<u>Survey</u> (n = 99) (homework)	
Most Preferred				
First Choice	Classmate/friend	43%	Online	39%
Second Choice	Notes	17%	Classmate/friend	29%
Third Choice	Online	14%	Notes	14%
Second Most Preferred				
First Choice	Classmate/friend	29%	Online	31%
Second Choice	Online	18%	Classmate/friend	27%
Third Choice	Faculty	16%	Textbook	14%
Third Most Preferred				
First Choice	Classmate/friend	30%	Online	26%
Second Choice	Online	27%	Classmate/friend	20%
Third Choice	Notes	14%	Textbook	19%

In addition, 25 semi-structured interviews took place with a self-selected sample of participants. Women made up 20% of the semi-structured interviews ($n = 5$). In these interviews, a distinction between in-class and out-of-class source utilization patterns emerged. Participants clearly delineated how they used sources differently depending on whether they were seeking help in-class or out-of-class. For example, one participant stated “*because in-class I go to the professor more and out of class I go on the internet more*” (J. Giblin, personal interview, July 19, 2016). Participants in the semi-structured interviews reported being more likely to utilize their faculty in class for reasons such as convenience as well as due to social norms such as feeling rude opening their computer.

Research Question Two: How do Participants Describe their Help-Seeking Process?

The second research question examined how participants described their decision making process for selecting sources. Several themes emerged from the data regarding how participants described their decision-making process. A source utilization pattern similar to the survey data emerged from the qualitative data. Participants generally described their process in very straightforward terms and in great detail. General patterns emerged from the data. The main elements of this process include starting the homework, the initial approach to the homework, engaging in a categorization process to select the source and utilizing the source.

Starting homework. The issue of time repeatedly emerged as a factor that impacted the source selection process. Time influenced the number of sources available to participants and the length of time that participants spent searching for help. However, starting homework represented the most salient feature of decision-making impacted by time. Participants reported intentional decisions about starting the assigned homework. This decision influenced the help-seeking process. Participants felt the observed class as not relevant to their future and a some ($n = 4$) chose to intentionally start the homework close to the due date as a result. This impacted their decisions regarding seeking help. One participant stated *“I am less likely to go get help in math because I don’t care about it necessarily”* (J. Giblin, personal interview, July 21, 2016). Therefore, the homework was *“not usually my priority...I’m taking four other main core classes, so they have always taken precedence”* (J. Giblin, personal interview, July 19, 2016). These participants often intentionally prioritized more relevant assignments in their major classes over work assigned for this math class. Thus, they intentionally began the homework relatively close to the due date fully recognizing that they restricted their ability to seek help as a result.

Aside from this small group, participants reported typically starting the assignments at least two days prior to its due date, with some stating that they attempted the assignments as soon as assigned. Participants began early in order to leave time to seek and receive help from their preferred sources. For example, one participant stated *“I started it on Tuesday so I could go to [the professor] on Wednesday and then have at least enough time if I got stuck I could go to the professor”* (J. Giblin, personal interview, July 20, 2016) while another noted *“I try to do it at least a couple of days ahead...just for the sake if I do get stuck, then I am not asking people last minute”* (J. Giblin, personal interview, July 20, 2016). Participants expected to experience difficulty during assignments and made intentional decisions to begin homework in accordance with their prioritization of the class material and their desire to seek help.

Initial Attempt. Participants reported they attempted to figure out a problem on their own, often spending a significant amount of time on this initial individual attempt. Participants reported spending anywhere from *“five to seven minutes”* (J. Giblin, personal interview, August 2, 2016). to upwards of 90 minutes attempting a problem before branching out to online sources, classmates or faculty. Participants also noted attempts rather than time as an indicator of the length of the process stating they *“usually try to give a problem three or four tries before texting a classmate”* (J. Giblin, personal interview, July 20, 2016). In this context, attempts at a problem could range from 5 minutes to 45 minutes. During this process participants attempted to figure out their approach to the problem as well as isolate and classify the nature of their help need. Factors influencing the source selection process after the initial attempt included time, relationships, relevance, domain and other factors addressed in detail in research question three.

Evaluation. After the initial attempt at a problem, participants engaged in a complex process of categorization. These categorizations significantly influenced the source which the

participant selected. The participants typically evaluated the type of help needed, the type of assignment/project, the availability of sources, the domain of the problem and their prior knowledge, the response time of sources, the availability of sources and their relationships with classmates and faculty. Participants ($n = 25$) all stated that learning the material represented their help-seeking goal. Little evidence of decision making around seeking adaptive or non-adaptive help emerged. Participants who initially sought non-adaptive help earlier in their collegiate academic career reported quickly changing their help-seeking goal. A fuller explanation of this process takes place in the next section on research question three.

Source Utilization. Following the evaluation process described above, participants then utilized the source. Two main themes emerged, dependent upon whether the source being used was human, such as a classmate or a faculty member, or if it was an online source. Participants often mixed human and non-human sources in different ways.

Online. When utilizing an online source, participants frequently described an online search process where they selected websites based on a systematic process. Most often, participants reported engaging in a google search. One described the online search process as a series of narrowing searches noting, *“usually you start with something broad. Someone says something on what you are looking for, then you google that, and you work your way down to what you are looking for”* (J. Giblin, personal interview, July 27, 2016). This participant reported opening multiple tabs and relying on google searches to assist him in finding relevant material.

Others reported the online search process as a learnable skill, noting that they spent time *“learning how to structure your question, so you can get the most fine-tuned results, because if you can do that, most of the time the link you are looking for is in the first three results”* (J. Giblin, personal interview, July 19, 2016). A small number of participants ($n = 3$) reported

starting their online search directly at a specific website, such as Chegg, Khan Academy or Stack Exchange rather than engaging in a google search. Once on these sites, the participants engaged in a search process similar to a google search within the confines of their preferred site.

Once the online search process produced results, participants reported either selecting from the top of the google search results list or engaging in an evaluation process of the list. One participant described this evaluation of the list as looking “*at the wording underneath the site link to see if it, like, matches what I am looking for*” or looking at “*all the words underneath in the little paragraph, the ones that are bold, are the ones that are in your search term so I pick the ones with the most bolds*” (J. Giblin, personal interview, July 20, 2016; J. Giblin, personal interview, July 19, 2016). Participants also recognized and then selected sources that faculty or friends recommended, and, in the case of Chegg, tried sources that had been directly advertised to them. Participants reported engaging in this process to narrow down the large number of options presented by the search process. These searches are typically quick in nature, with most participants indicating that they would start over if they did not find assistance in the first page of results.

Once they selected a particular site from the list, participants also utilized reviewer/user comments as an indicator of the site’s accuracy, noting, for example, “*[This solution] has 8 thumbs up. That means 8 other people have referred to this and it has been the right answer. I can confirm that this is right*” (J. Giblin, personal interview, July 27, 2016). Other participants, especially in areas they feel confident in, evaluated the presented help based on their own knowledge. Participants reported that this secondary evaluation of the actual site helped them feel confident the material could provide them with assistance.

Classmates. Participants who utilized classmates typically described meeting face to face to access help. Some participants had regular, weekly meeting times set in advance that they relied on if they experienced difficulty. *“I have a lot of the same people in the same classes, so it's more of on a daily basis, I'll meet up. We have a specific place that we meet and a time that we meet, and almost every day we've got something to do”* (J. Giblin, personal interview, July 22, 2016). Less formal arrangements, such as meeting up as needed, emerged as the predominant method of working with classmates. Typically, once participants established a meeting time with classmates or if a standing meeting time existed, participants typically *“moved on”* from the problem, returning to it again during the meeting with their classmates (J. Giblin, personal interview, August 3, 2016).

Participants reported working alone and communicating electronically with classmates when they encountered difficulty. For relatively quick and easy questions, participants reported texting or Facebooking each other. For more typical problems, participants reported reaching out to classmates electronically to arrange a face-to-face meeting. This participant noted that he reaches out via text *“I'd say, most of the time, probably, we meet up and talk about it”* (J. Giblin, personal interview, July 27, 2016). Participants typically considered working on problems via text or other messaging services cumbersome and difficult. Only one participant stated they would call a friend. While many of the participants utilized video calling tools such as Skype for friends, they did not utilize these tools for academic help-seeking.

Participants reported finding their peer help through major classes, roommates, lab partners and friends of friends. Participants also reported developing relationships with classmates while attending faculty office hours or review sessions and through doing in-class group work. One participant discussed his standing commitment with his study group almost as

an accidental process that happened in his junior year, stating “*we just happened to do it a couple days. We were saying, ‘Wow, we should really do this every day’ and that’s how we’ve been doing it. We’re going to continue it on senior year*” (J. Giblin, personal interview, August 4, 2016). One student directly attributed his ability to find a group of students to do work with as a result of faculty encouragement: “*My teacher...was like, ‘No, you have to go to students. Go try ...’ Because she wanted us to communicate with each other. It was kind of a class where we needed to socialize*” (J. Giblin, personal interview, July 19, 2016). Other participants also noted that faculty impacted their likelihood of utilizing classmates as a result of assigned group work.

Classmates represent a unique pattern of utilization as both an expectation of help received and help given exists. Unlike all other sources, where participants expect to receive help without providing anything in return, utilizing classmates carried an expectation to also provide help. Participants who worked with classmates invariably described it as a mutually beneficial relationship where they expected both to give and receive assistance. One participant described the process as “*I don’t mind helping people as long as you don’t mind helping me*” (J. Giblin, personal interview, July 19, 2016). Participants mentioned an awareness that the relationship needed to be two sided, with both parties receiving and providing answers. One participant avoided utilizing a particular classmate because of this implied expectation of providing assistance. He noted “*my roommate, he’s in my class as well, he’s really good at this stuff ... I’ll ask him, but sometimes I don’t want to keep asking him because I don’t want to be that person, he’s like, ‘Oh, he’s always asking questions’*” (J. Giblin, personal interview, July 20, 2016). Classmates, while one of the most popular sources, also represented the source with the most complex set of expectations.

Multiple Sources. While these two patterns emerged from the data, participants did not exclusively utilize either and often reported mixing the two together. Participants frequently described a process where they utilized multiple sources nearly simultaneously. Participants would text a friend and while waiting for a response, refer to their notes or go online. Participants also described referring to the textbook while with a group of classmates. Some groups engaged one member in searching online while another searched the textbook.

Participants reported utilizing multiple sources at once to maximize their ability to resolve the problem quickly. Participants wanted “*answers right there and then*” (J. Giblin, personal interview, July 20, 2016). Participants felt engaged in the problem-solving process and were reluctant to put their thought process on hold while they waited for a source to reply. One participant described this as “*I’m in a thought process right there and then, it’s like how do I do this. If I have to wait twenty minutes or whatever a half hour for that response I’m just like okay, like I don’t know, my minds not even on there anymore*” (J. Giblin, personal interview, July 25, 2016). Participants also feared moving on and forgetting their thought process around a problem. Others were motivated and felt driven by a desire to complete the problem. They reported feeling reluctant to give up on a problem.

Participants generally described their help-seeking process as focused and goal driven. They initially worked independently and sought help when they encountered difficulties. Participants expected to experience difficulty and strategized to accomplish their goals. They articulated awareness about the impact of their decisions and consciously made decisions with awareness of the consequences. A complex evaluation of the sources prior to source utilization also occurred. Participants sought adaptive help and this drove participants to most often seek

practice problems, similar examples, or step by step solution manuals. Participants also described an evolution in their help-seeking behavior over time.

Research Question Three: Factors Influencing the Source Selection Process

Research question three examined factors that influence the source selection process. As noted above, participants described an intentional decision making process. The selection of source was influenced by a number of factors. Participants routinely evaluated the assignment, their goals, and a number of other factors to make intentional decisions to select a source. Clear patterns emerged as part of this evaluation process. This frequent, multi-layered categorization of sources permeated all of the interviews. This categorization process resulted in a source selected and utilized by the participant. Major shifts in source preference occurred infrequently.

Shifts in Preferred Sources. Every participant in the interview process described having a default, go-to primary preferred source when completing out-of-class assignments. Every interview participant also described a shift in their primary preferred source. Most participants described two shifts, one in their first year of college and one at the beginning of their junior year. These shifts occurred for a two reasons: an increase in the difficulty of the work and a broadened perception of available sources.

Participants generally described a shift in their primary preferred source in the first year of their undergraduate studies. Participants initially often continued in the same routine as in high school. One participant stated *“in high school you get off the bus, you go home, do your work. First year, I just kept that routine I guess. Get home, get back from classes, get back to my work, go to the library, do my work”* (J. Giblin, personal interview, July 26, 2016). Another participated stated *“I had the same process of homework and problem solving since the*

beginning of high school” (J. Giblin, personal interview, July 20, 2016). Participants saw no reason to shift their help-seeking behavior upon arrival to college.

Participants reported in their first year the more demanding nature of the work resulted in significant increase in their need to seek help. In high school, participants rarely felt the need to seek help with homework. If help was needed participants, with the exception of one student who had a private tutor, reported relying upon the textbook. On the rare occasion the textbook did not prove sufficient, participants asked their teacher the next day. Participants rarely reached out to friends, despite the availability of cell phones and messaging. A minority of participants also utilized google and YouTube in high school as well in place of the textbook. During the first year of college participants found themselves needing assistance as they began to struggle in their classes. According to one participant “*[high school] was easier than this definitely...yes, freshman year...the math got a lot harder*” (J. Giblin, personal interview, July 26, 2016). Participants reported working alone and later in the evening than they had in high school. In addition, unlike high school, some participants felt uncomfortable approaching their faculty.

The increased difficulty in the work often paired with increased awareness of new sources. Awareness of new help sources created opportunities for participants to receive help in new ways and re-think their current pattern of help-seeking. Participants reported that finding and accessing classmates became easier. For example, one participant spoke about the difficulty during the transition from high school to college: “*It was more difficult. Then at the same time, I just found it easier since I'm living on campus ... I could just ask my roommate, or someone else, if they wanted to work on it at the same time.*” (J. Giblin, personal interview, July 20, 2016).

For many participants, this represented the first time they intentionally and systematically sought

out classmates for help beyond logistical types of questions. Participants reported a shift in their behavior towards working together with others to resolve difficult problems.

Not all participants turned to classmates. Some participants reported utilizing online sources more frequently or for the first time for problem based homework. Participants reported they based this decision in part on the perceived availability of sources. One participant started googling at the *“end of freshman year. As I started doing homework later at night”* (J. Giblin, personal interview, August 1, 2016). Others found sources through advertising from textbook rental and sale companies, such as Chegg.com. For example, one participant stated *“Chegg is kind of something that you can rent books from, so I found out when I was getting all my text books and such”* (J. Giblin, personal interview, July 19, 2016). Others reported taking recommendations from friends and faculty. One participant noted *“I found out from a professor of mine. He also used it when he was in college. He was telling us Stack Overflow's a great source to find things”* (J. Giblin, personal interview, July 20, 2016).

Some participants also reported a second shift later in the academic career, typically around the end of the sophomore year and beginning of their junior year. Participant reported experiencing increased difficulty in their classes found their preferred source lacking. As they became busier and the work load increased, participants reported seeking a solution that provided help conveniently and reliably, even if they possessed little previous experience with the source. As one participant described it, *“I finally broke down and got Chegg”* (J. Giblin, personal interview, July 21, 2016). One participant noted that as he began working in groups and *“I started feeling like talking with other people and working in groups was better for learning material”* (J. Giblin, personal interview, July 19, 2016). Participants who experienced a second shift in their help-seeking pattern reported feeling that they needed additional support as classes

became more advanced. Other students discussed the need to access answers sooner and more efficiently than what they were able to do with friends or faculty.

Desire to Learn. A desire to learn the material drove the decision making process for participants. Participants reported seeking an understanding of the process rather than answers to the homework problems. Some participants explicitly stated this goal. One participant discussed why he chose not to simply search for the answers to the problems, explaining *“if you are finding answers, you aren’t really helping anyone, you aren’t really helping yourself”* (J. Giblin, personal interview, July 19, 2016). Others noted they searched specifically to learn conditional knowledge around when and how to use the mathematical formulas and concepts. For example, one student noted that solution manuals fall short and do not indicate *“why you use this equation. Generally, you need that extra step of why you would use something”* (J. Giblin, personal interview, August 1, 2016) Another participant described the search goal as *“not the exact numbers...but it’s just the process I am looking for”* (J. Giblin, personal interview, July 19, 2016) At least one participant reported changing his search goal from answers to understanding the process as a result of failure, stating *“I would just take the answer completely and just fail whatever I was doing. I failed plenty of times that year”* (J. Giblin, personal interview, July 20, 2016). The participant later described how he stopped searching for answers and began trying to learn the material. This desire to seek an understanding of the process, to learn the material and to utilize the homework as a method for learning emerged across the interviews.

Participants also reported trying to *“figure it out”* as a part of the learning process and a reflection of their desire to learn” (J. Giblin, personal interview, July 21, 2016). This phrase emerged repeatedly as a prevailing method for learning the material. Many participants expressed that figuring it out on their own was vital to their learning process. One participant

stated that *“I always try to figure it out myself before I really try and go to a helpdesk kind of thing”* while another stated *“the first thing I would do is probably try to figure it out myself through past problems”* (J. Giblin, personal interview, July 21, 2016; J. Giblin, personal interview, July 19, 2016). For some participants, figuring it out on their own was particularly important for the learning process as it *“it helps [them] understand, it just connects everything”* (J. Giblin, personal interview, July 20, 2016). Another participant made this connection explicitly, stating *“I’d rather figure it out on my own. You don’t learn if someone else tells you how do it”* (J. Giblin, personal interview, July 21, 2016). Another noted that *“half the process of learning is struggling through to understand it”* (J. Giblin, personal interview, July 20, 2016). This desire to figure it out on their own as a key element of the learning process shaped the process that they utilized, resulting often in an initial first step of working through the problem multiple times to isolate the issue. In addition, this desire to figure it out on their own also shaped the search goals, resulting in a search process with goals reflective of this desire to both learn and figure it out on their own.

Search Goals. To accomplish this goal of learning, participants described their help-seeking process in terms of their search goal. Participants noted they searched for *“explanations of why they did this or how they did this, or why did they pick to do this”* as well as a goal to *“find the process and learn the process, then I can do the next problems”* (J. Giblin, personal interview, July 19, 2016). Specifically, participants described search goals of additional practice problems, example problems, step by step guides, formulas and hints that they could then use to understand and learn the concepts. One participant noted *“I’ll try to find similar problems we did and see if I can figure it out going step by step”* (J. Giblin, personal interview, July 22, 2016). Another indicated *“I’ll usually find almost a problem that’s like it...it gives step by step how to*

work through one of those problems...then I can transfer it over and now I know how to do that type of problem. Then I go back and do the one in the homework” (J. Giblin, personal interview, July 20, 2016). For some participants, this represented their first step in the process: *“The first thing I do is see...if there is an example problem that follows along the same guidelines as the homework problem”* (J. Giblin, personal interview, July 21, 2016). This desire to learn and understand the process shaped the goal of the search process for many participants.

While most participants sought example problems, practice opportunity and step-by-step guides, as part of their decision making, some participants described reverse engineering from an answer key as their preferred method of learning. Participants sought an answer key or solution guide and used the answers to work backwards. One participant stated this preference because *“you can check if your answer is right or wrong, so just square it from there”* (J. Giblin, personal interview, July 19, 2016). Another participant stated he tried to *“reverse engineer it back to get the solution. Work your way back kind of thing”* (J. Giblin, personal interview, August 2, 2016). These participants reported seeking answers rather than hints, yet their use of the answers indicate their desire to learn the material. Answers as a search goal may appear as evidence of non-adaptive help-seeking, yet the intent and use of the answers should result in a classification as adaptive help-seeking. In adaptive help-seeking the learner master the process and likely benefits the learner in terms of their academic achievement (Karabenick & Newman, 2009; Ryan & Shin, 2011). Participants reported use of the answers found when seeking help appears to meet these criteria.

Efficiency. Participants stated their desire to learn as part of preparing for a future goal, such as upcoming exams or their career. Many participants reported their desire to learn the material co-existed with an equal goal of finding the material quickly and reliably. This balance

between speed and reliability is best summarized as seeking efficiency in the search process. For example, one participant stated that their goal was to utilize *“What will get me through this the fastest and the most efficient and what will make me understand it the most”* (J. Giblin, personal interview, July 20, 2016). In addition, participants valued having multiple examples available to them quickly and easily. For example, *“Chegg will have a lot of the example problems detailed about and solved. It's a good way to learn”* (J. Giblin, personal interview, July 27, 2016).

Participants discussed a desire for a quick, convenient and reliable source.

Efficiency also impacted the participants' search goals. As a result of the desire for efficiency, participants reported valuing targeted, practical explanations that narrowly focused on the specific piece of the problem that they did not understand. This theme emerged both as a negative, with participants avoiding certain sources based on their perceived verbose or theoretical nature, as well as in descriptions of sources that participants valued. One participant avoided tutoring because of its inefficiency compared with other methods, stating *“they were just able to maybe do one in a half hour, possibly two. Also, that was taking time out of my day, where I could be doing other homework and studying”* (J. Giblin, personal interview, July 20, 2016). Other participants avoided faculty because *“they give a broad theoretical explanation”* and *“they lead to more questions, which is great and all if you...want to become a philosopher, but you need an exact answer sometimes”* (J. Giblin, personal interview, July 20, 2016). Others also noted that *“time is more important to me”* and that they do not want to *“spend 20 minutes trying to find where it is in the book before I even spend time actually figuring out the question and learning it”* (J. Giblin, personal interview, July 27, 2016; J. Giblin, personal interview, July 20, 2016). The goal of an efficient process led to participants avoiding particular sources out of

fear that they would spend time learning a different or incompatible process to that expected by the faculty.

Participants also described utilizing sources for their efficiency. For example, one participant viewed their notes as a “*a lot more condensed down into what we need to know*” and thus tended to utilize their notes as a source early in the process (J. Giblin, personal interview, August 3, 2016). Participants also identified sources such as Khan Academy that “*were pretty straight forward to the point*” as valuable (J. Giblin, personal interview, August 1, 2016). Participants who reported online sources reliable and useful often described the efficiency of the online search process as a defining feature. Multiple participants ($n = 7$) noted that they had learned how to google more efficiently over time through “*trial and error*” with one stating “*I’ve literally learned how to google...I can shave what takes some people 45 minutes of googling down to 15, just by typing the right thing*” (J. Giblin, personal interview, July 19, 2016; J. Giblin, personal interview, July 27, 2016). The combination of convenience and reliability led many participants to utilize google as a source.

Class Achievement Goal Structure. Class achievement goal structure impacts participants’ help-seeking behavior (Giblin & Stefaniak, in press; Karabenick, 2004). To assess any influence class achievement goal structure exerted on source selection, participants completed a 7 point Likert scale reporting their perceptions of the class achievement goal structure. Overall, participants reported that the class achievement goal structure as mastery approach ($M = 5.67$, $Mdn = 5.4$), rather than a performance approach ($M = 3.46$, $Mdn = 3.66$) or avoid structure ($M = 4.5$, $Mdn = 4.67$) in nature, meaning they perceived the class focused on learning rather than on performance. However, source utilization did not significantly correlate with any of these scales. A chi-square test for association was conducted between sources and

the performance approach scale. Not all expected cell frequencies were greater than 5. The results were not statistically significant, $\chi^2 = 11.293$, $p = .34$. Similarly, for the performance avoid scale, not all expected cell frequencies were greater than 5. The results were not statistically significant, $\chi^2 = 10.24$, $p = .42$. Finally, for the mastery approach scale, not all expected cell frequencies were greater than 5. The results were not statistically significant, $\chi^2 = 7.15$, $p = .71$. Therefore, the perception of the achievement goal structure did not correlate with utilization of a specific source. This further lends support to the multi layered and complex evaluation process participants undertake to select a source of help.

Channels/Dimensions. Recent work in academic help-seeking proposed four dimensions to classify sources (Makara & Karabenick, 2013). These proposed dimensions included the distinction between formal and informal sources, the extent to which a personal relationship exists, the medium through which help is rendered (such as mediated through technology or face to face) and whether a source is dynamic or static (its adaptability to the help-seeker's request). Specifically, Makara and Karabenick (2013) noted that these dimensions are subjective and their importance rests with the students' perception of the source.

Participants rated the importance of these dimensions as a general part of their selection process along a 10 point anchored response scale, with 1 representing Not Important and 10 representing Very Important. Overall, participants rated all four of these channels as similarly important when selecting a source, with the mean ($M = 5.81$) and median ($Mdn = 5$) for the lowest ranked channel, technology, very similar to the mean ($M = 7.18$) and median ($Mdn = 7$) for the highest ranked channel, adaptability. This indicates that none of these channels exerts significant influence on its own. Rather, these channels may represent tools to evaluate a source's efficiency for learning. See Table 4.

Table 4

Perception of Importance

Dimension	<i>N</i>	<i>Mean</i>	<i>Median</i>
Formal/Informal	93	6.55	7
Relationship	83	5.93	7
Medium	93	5.81	5
Adaptability	92	7.12	7

10-point scale. 1 = not important, 10 = very important

Formal/Informal. Participants also ranked their preferred sources along these dimensions to determine how they viewed each source along each channel. The requirement of the source to assist represents the defining factor of this dimension. Participants ranked their perception of their preferred sources along a four-point scale, with one representing required to help and four representing not required to help. The perception of the formal/informal nature of online sources shifted with the preference level of the source. For participants who selected online sources as their first choice ($n = 38$), they felt that online sources were required to help ($M = 2.24$, $Mdn = 2$) more so than participants who preferred online sources as either second ($n = 29$, $M = 2.7$, $Mdn = 3$) or third ($n = 22$, $M = 3$, $Mdn = 3$). This same pattern also existed for participants whose first preferred source were classmates and textbooks. Participants perceived faculty and textbooks as being required to assist them, especially among those who chose faculty as their first or second choices. However, despite this perception of requirement relatively few selected these sources as a first or second choice. See Table 5.

Table 5

Comparison by Source Preference: Formal/Informal

		<i>N</i>	<i>Mean</i>	<i>Median</i>
Online	First Choice	38	2.24	2
	Second Choice	28	2.7	3
	Third Choice	22	3	3
Classmates	First Choice	28	3.18	4
	Second Choice	25	3.4	4
	Third Choice	17	3.63	4
Textbook	First Choice	11	1.34	1
	Second Choice	13	1.70	1
	Third Choice	16	2	2
Notes	First Choice	14	1.77	2
	Second Choice	7	3.2	3
	Third Choice	12	2	2
Faculty	First Choice	3	1	1
	Second Choice	13	1.70	1
	Third Choice	16	2	2

The anchors for this scale were 1 = required to help, 4 = not required to help

Relationship. Participants also rated their perception of their preferred source according to the relationship they had with the source. Makara and Karabenick (2013) proposed that the nature of the relationship, whether it was personal or impersonal, would influence help-seeking behavior. Participants ranked their perception of their preferred sources along a four-point scale, with one representing a personal relationship and four representing an impersonal relationship. Perceptions of relationships with faculty shifted with source preference, with participants who felt a more personal relationship with faculty ($n = 16$, $M = 2.2$, $Mdn = 2$) less likely to prefer them as a source than participants who perceived the faculty relationship as impersonal ($n = 3$, M

= 3, *Mdn* = 3). Participants who felt a more impersonal relationship with the faculty were more likely to select faculty as a first choice source. Participants who felt the faculty relationship was more personal were more likely to select other choices first, then select faculty as a third choice. Participants who preferred online sources largely viewed them as impersonal ($n = 38$, $M = 3.49$, $Mdn = 4$) whereas participants who preferred classmates perceived a personal relationship existed ($n = 22$, $M = 1.18$, $Mdn = 1$). See Table 6.

Qualitative data confirms the importance of relationships for selecting classmates as a help source. Participants frequently mentioned working with a relatively stable group of classmates or friends, possessed multiple methods for contacting their classmates and expressed engaging in a give and take relationship with classmates. Conversely, participants who lacked relationships with classmates accessed alternate sources because they perceived classmates as unavailable. One participant stated he utilized “*Online resources first because... I didn't know as many people...It's kind of a solo mission here*” (J. Giblin, personal interview, August 1, 2016). This participant also stated he needed to actively work on creating relationships with classmates in order achieve higher grades. The effect of relationships appeared to impact the selection of classmates as a preferred source. See Table 6.

Table 6

Comparison by Source Preference: Relationship

		<i>N</i>	<i>Mean</i>	<i>Median</i>
Online	First Choice	38	3.49	4
	Second Choice	28	3.63	4
	Third Choice	22	3.46	4
Classmates	First Choice	28	1.18	1
	Second Choice	25	1.64	2
	Third Choice	17	1.44	1
Textbook	First Choice	11	3.20	4
	Second Choice	13	3.42	4
	Third Choice	16	3.75	4
Notes	First Choice	14	2.66	2.5
	Second Choice	7	3	3
	Third Choice	12	3.1	3
Faculty	First Choice	3	3	3
	Second Choice	13	2.54	3
	Third Choice	16	2.2	2

The anchors for this scale were 1 = personal and 4 = impersonal.

Technology. Participants also rated their perception of their preferred source according to the extent technology mediated the source. Participants ranked their perception of their preferred sources along a four-point scale, with one representing a face to face conversation and four representing a technology dependent source. As expected, participants viewed online sources as particularly technology dependent ($n = 38$, $M = 3.83$, $Mdn = 4$) and classmates ($n = 28$, $M = 1.43$, $Mdn = 1$) and faculty ($n = 3$, $M = 1.66$, $Mdn = 2$) as not dependent on technology. These perceptions stayed stable over preference. Participants considered the textbook as somewhat dependent on technology ($n = 1$, $M = 2.8$, $Mdn = 2$) and this perception of technology

dependence increased if the textbook was their second ($n = 13$, $M = 3.08$, $Mdn = 4$) or third most preferred source ($n = 16$, $M = 2.87$, $Mdn = 3$). Qualitative interview data provided context for this finding as participants reported accessing their texts online, either through intentionally purchased eBooks or through accessing “available” pdf copies of the book or through a subscription to Chegg. See Table 7.

Table 7

Comparison by Source Preference: Technology

		<i>N</i>	<i>Mean</i>	<i>Median</i>
Online	First Choice	38	3.83	4
	Second Choice	28	4	4
	Third Choice	22	3.81	4
Classmates	First Choice	28	1.43	1
	Second Choice	25	1.6	1
	Third Choice	17	2	2
Textbook	First Choice	11	2.8	2
	Second Choice	13	3.08	4
	Third Choice	16	2.87	3
Notes	First Choice	14	1.7	1.5
	Second Choice	7	2.2	2
	Third Choice	12	2.5	2.5
Faculty	First Choice	3	1.66	2
	Second Choice	13	1.67	1
	Third Choice	16	1.53	1

The anchors for this scale were 1 = face to face and 4 = technology dependent.

Dynamic/Static. This channel refers to the participants’ perception of the source’s ability to adapt to their help-seeking bid. Participants ranked their perception of their preferred sources along a four-point scale, with one representing an adaptable source and four representing a static source, such as a book. Participants found online sources more adaptable than not ($n = 38$, $M =$

2.3, $Mdn = 2$) and this perception stayed stable across preference as a second choice ($n = 28$, $M = 2.15$, $Mdn = 2$) with a small decrease in adaptability when participants selected online sources as their third more preferred choice ($n = 22$, $M = 2.67$, $Mdn = 2.5$). The semi-structured interviews indicate this perception may reflect the online search process itself rather than individual sites. Participants perceived classmates as adaptable, especially for those who preferred classmates ($n = 28$, $M = 1.21$, $Mdn = 1$) but this perception of adaptability declined for participants who selected classmates as their third choice ($n = 17$, $M = 2.38$, $Mdn = 2$). Conversely, participants who most preferred faculty found faculty less adaptable ($n = 3$, $M = 2$, $Mdn = 2$) than those who turned to faculty as their third choice ($n = 38$, $M = 1.13$, $Mdn = 1$). See Table 8.

Table 8

Comparison by Source Preference: Adaptability

		<i>N</i>	<i>Mean</i>	<i>Median</i>
Online	First Choice	38	2.3	2
	Second Choice	28	2.15	2
	Third Choice	22	2.67	2.5
Classmates	First Choice	28	1.21	1
	Second Choice	25	1.71	2
	Third Choice	17	2.38	2
Textbook	First Choice	11	3.56	4
	Second Choice	13	3.38	4
	Third Choice	16	3.93	4
Notes	First Choice	14	2.62	2
	Second Choice	7	2.8	4
	Third Choice	12	3.5	4
Faculty	First Choice	3	2	2
	Second Choice	13	1.17	1
	Third Choice	16	1.13	1

The anchors for this scale were 1 = adaptable and 4 = static.

Evaluation Process/Boundary Conditions. Participants undertook an extensive evaluation and categorization process to select the source they utilized for assistance. In other words, the source they utilized depended on a number of interchangeable factors, all of which exerted influence on their ultimate source selection. These factors included the type of help needed, the domain the problem was situated in, the nature of the assignment, timing, the accessibility or availability of sources, and perceptions of faculty.

Type of Help Needed. The participants' perception of the type of help they needed formed one of the most commonly cited influences on the source selection process. Participants frequently distinguished, without prompting from the researcher, whether they needed "quick help" or how to approach a problem as a whole. For issues the participants deemed small or minor, such as checking the accuracy of an answer, seeking a reminder of a formula or seeking help about a specific part of a long problem, participants reported generally choose to text a friend or to go online. If they needed help on a larger scale, for example they did not know how to begin a problem or felt completely lost, participants reported typically choosing a human source, either the faculty or a classmate. For example, one participant noted *"If I have no idea what to do for... how to even start it, I would ask the professor, but if I come across a small problem, like, "Hey, my code doesn't run," or, "It's not printing this," I can go on Google"* (J. Giblin, personal interview, July 19, 2016).

Another participant made the distinction between which type of source to use by distinguishing between short term and long term help. For example, *"using Google to learn something short-term to just do the homework, and maybe an exam, and maybe a final exam later, but if you really have no idea about it ... you have to see the professor. You need the*

professor's help to understand where you are and understand what you're missing in the class kind of thing" (J. Giblin, personal interview, July 19, 2016). Participants emphasized that turning to faculty occurred only if they felt unable to begin a problem.

While most participants discussed turning to a human source when extremely confused, a minority reported going online. These participants discussed starting with an online source in an attempt to orient themselves and *"figure it out in [their] head"* before approaching anyone else (J. Giblin, personal interview, July 19, 2016). This small minority of participants who first turned to google when unsure of how to approach a problem also reported feeling uncomfortable approaching their classmates. Many participants reported the distinction between feeling completely lost in a problem and needing just a small amount of assistance formed a primary determining factor in their initial source usage.

Participants primarily received online homework in this class. Online homework brought a unique set of challenges. Participants reported working out correct answers to problem sets, then receiving incorrect feedback when they inputted the answer in the online homework system. This created a great deal of frustration as well as second-guessing their work process. Nearly all ($n = 23$) of the participants discussed this situation. Online homework added a layer to their categorization process, impacting their source selection. Typically, if participants felt their answer was correct and rejected by the system, they contacted the faculty, noting *"There have been issues with our [online] assignments. Sometimes the answers are right but it says it's wrong so that causes some confusion, but if I don't hear back I usually will e-mail my professor"* (J. Giblin, personal interview, July 20, 2016). Participants also reported checking in with their classmates to confirm the accuracy of their answer prior to contacting their faculty. Participants perceived this type of help as logistical in nature and not part of solving a problem.

Domain. The content of the class, particularly the relevance of the class to their future, impacted participants' effort and their source selection process. Again, all participants expressed a desire to learn the material as their overarching motivation. Participants felt the required math class possessed little relevance to their future career. Instead participants sought to learn in order to do well on exams. Participants repeatedly made a distinction between this math class and their major classes, often clarifying which subject the interview focused on. One participant stated "*It depends on what we're talking about. For math, I would say faster and more efficient. For computer science, I would say know it better and learn it*" (J. Giblin, personal interview, July 20, 2016). Participants reported spending more time working with faculty, more time understanding the problem and a greater reluctance to give up on the problem in their major classes than in classes perceived to be less relevant to their future careers. For example, one participant stated "*[The] major difference I see is I care more about the theory behind my major, rather than the tools I might use later down the road*" (J. Giblin, personal interview, July 21, 2016). The perceived relevance of the material played a role in their source selection process.

In addition, for their major classes, one participant also viewed working with classmates and faculty as a beneficial networking opportunity for the future. In a class perceived as career relevant, this participant sought out classmates stating, "*How I handle them is different. I like to interact with my [major classes] with my peers and my friends because that's what I'm going to be doing out in my job. I'm going to be interacting with these people or people similar to them. It's going to give me more experience and better prepare me I guess*" (J. Giblin, personal interview, July 22, 2016). This represented a significant shift in the source selection process, making them more likely to seek out classmates and faculty in classes where they believed the domain was relevant to their careers.

Participants reported seeking out classmates based on the nature of the content itself. Some participants felt that certain subject areas lent themselves more towards conversations and group work than others. For example, one participant stated in *“math, I’ll probably do mostly by myself just because it’s more repetition and critical thinking. Whereas, [major classes], it’s much more problem solving and it’s good to have multiple people around sometimes to talk about it, discuss why this is the best solution, why this is the best way to move forward, why it’s right, and everything like that”* (J. Giblin, personal interview, August 1, 2016). Another participant stated *“Unless you get to the really high levels of math, it’s like you could try to figure it out yourself. Whereas engineering, if you try to figure it out yourself ... you could be missing something the entire time and have no shot to solve it. Whereas math you could trial and error it and eventually figure it out”* (J. Giblin, personal interview, August 2, 2016). Participants reported that different domains created greater levels of efficiency for different sources.

Prior knowledge in the domain of the subject also impacted the source selection process. Participants felt more comfortable evaluating online sources in their major classes, expressing more confidence in their ability to detect whether the help was accurate or not online *“With more of the major courses, it’s easier I think to do so because you know it to the level where you can understand if somebody does something a different way, what the differences are. Some of the less important courses in my mind, I don’t feel comfortable going online because I don’t necessarily have that understanding of the material where if somebody is doing it a different way than my professor’s doing it, I don’t think I’d be able to pick up on those differences. I think it would just confuse me more so than help”* (J. Giblin, personal interview, August 2, 2016). Participants reported feeling comfortable in the domain allowed them to feel more comfortable utilizing online sources as they felt better prepared to evaluate the accuracy of the source.

Type of Assignment. The type of assignment also influenced participants' source selection process. Participants reported drawing distinctions between online and paper based assignments as well as between problem sets/homework and projects. The distinction between online and paper based homework created different conditions and a different environment to complete the assignment. For online homework, participants reported feeling that possessing multiple attempts at a problem, as well as automated instant feedback, resulted in more individual attempts because "*you know you are going to get the right answer eventually*" (J. Giblin, personal interview, July 21, 2016). In addition, because different permutations of the problems appeared to different individuals and system presented the problems in a randomized order, participants found it less efficient to work together on online homework. One participant stated "*there's always the wrinkle between your problem and their problem so it's not always the best idea*" (J. Giblin, personal interview, August 3, 2016). Participants reported working more independently on the online homework, even if they chose to complete the homework in the same physical location as classmates.

Paper based homework in this context included both take home assignments created by the professor as well as textbook based assignments. When participants received paper-based homework assignments from the text, they reported utilizing the textbook as the most efficient source. As one participant noted "*most of my problems come from the book so the answers can be found in the book somewhere. Not necessarily the exact answer, but how to do it, so it's easier to find it through the book then having to go online and hope that the answer is correct or the source is reliable*" (J. Giblin, personal interview, July 19, 2016). Not all participants relied on the textbook as some reported continuing to utilize online sources if they needed assistance to provide more detailed step-by-step solutions.

Participants reported turning to classmates for faculty created take home assignments. One participant summed up the distinction as *“We have...online [homework] so we'll usually do those separately, but if we have take-home homework assignments, we usually try to get together to see if we got the same answers, if we did it right, that kind of thing, to compare answers and notes”* (J. Giblin, personal interview, July 19, 2016). This distinction rests on the differing levels of feedback the medium allows. For example, one participant noted that with the *“online [assignments] you get that immediate response whether if you're right or not. Whereas if it's your own paper homework, you may think you've got the right answer, but ultimately you don't know”* (J. Giblin, personal interview, July 20, 2016). While most participants reported working in groups for take home assignments, one chose instead to refer to their notes instead. For that participant, a take home always resulted in utilizing their notes, stating for *“take home I never look anywhere else. I can usually just do them with my notes...Usually we just go over that material that day, so it's still fresh”* (J. Giblin, personal interview, July 20, 2016). This participant also reported completing take home assignments the same day for this reason. The decision to shift sources based on the delivery medium was driven by a desire for an efficient process. Participants reported a desire to access the most convenient and reliable source to learn the material as well as a desire for confidence in the accuracy of their results.

Participants also reported distinguishing between projects and homework/problem sets to help them select a source. Participants reported they turned to classmates and approached faculty more often for projects. As one participant noted *“projects tend to be a little bigger and a little tougher to solve. That's when we would go to faculty and ask for help”* (J. Giblin, personal interview, August 3, 2016). Participants would typically make this distinction about projects when discussing their homework source selection process.

Availability of Sources. Participants also evaluated the availability of sources as part of their selection process. Participants took into account the likelihood of finding sources based on the time of day, expected response/access time in conjunction with the amount of time left for the assignment, and the level of the class.

The general level of the class played a small role in the consideration of sources for use. A consensus emerged that more “*general*” lower level classes such as math were readily and easily available in multiple venues. However, assistance for more advanced classes became harder to find. Participants reported a sense of narrowed availability of reliable sources the more advanced they became in their academic career. As the level of specification in the course subject occurred, the harder it became to find sources reliably. Participants referred to on-campus tutoring in this context, with participants expressing a desire for more tutors in difficult upper-level classes. Participants noted difficulty in finding convenient reliable assistance for these classes. The perception of efficiency for tutoring increased in this context as participants viewed the tutors as reliable even though they reported finding tutoring inefficient for lower level classes due to the plethora of available sources. Because the participants in this study were juniors and seniors, this emerged as a concern.

In addition, time played role in the source selection process, both in terms of the time of day in relation to accessing sources as well as the potential response time for help to arrive. Participants reported that the time of day impacted their source selection. For example, one participant noted that if he ran into problems “*I would text my classmate or Facebook my classmate...and then next would probably be Google, if it's late at night*” (J. Giblin, personal interview, July 20, 2016). Another participant responded “*definitely Google because a lot of my work is done at night anyways, so I don't really have people that ask how I'm doing my work*” (J.

Giblin, personal interview, July 19, 2016). This participant's primary source is an online search in large part based on when the assignment was being completed.

Time of day influenced not only whether participants would contact other classmates or go online, but also whether or not they contacted faculty. Many participants took into account the faculty member's office hours as well as expected response time. One participant noted *"I guess the main thing would just be, it's mostly based on when I have time to do homework, and what's available at that time. Most professors, office hours are at regular times. Half the time, I'll have class during it"* (J. Giblin, personal interview, July 27, 2016). The inaccessibility of offices hours emerged as a common theme, even among participants who planned to do the work in advance. *"The office hours aren't exactly convenient, but if I do it 2 days in advance and their office hours don't exist the day before the homework's due, I don't have the opportunity... It's usually just I don't want to deal with trying to work around their schedule unless I absolutely have to"* (J. Giblin, personal interview, July 21, 2016). This participant expressed a combination of frustration at not being able to access office hours as well as the inconvenience of planning their schedule around office hours on the chance that they will need assistance.

Participants also reported contacting their faculty by email, and in one case, skype. Participants were acutely aware of the expected response time of the faculty. Participants noted that some faculty *"don't check their email consistently, so unless you ask them in class, you don't really get any help from them"* (J. Giblin, personal interview, July 20, 2016). In addition to constraining their sources by eliminating faculty due to an expected non- response, participants also reported knowing the approximate length of time to expect for a response and planned accordingly. One participant noted that it never took longer than *"three hours for [the faculty member] to respond"* and another noted *"it can be anywhere from an hour to 6. I think the*

longest I've waited is probably 6" (J. Giblin, personal interview, July 20, 2016). Participants reported taking these considerations into account when deciding which source to select, especially when also considering the amount of time left before an assignment due date.

Participants also demonstrated an awareness of why faculty response times differ. Participants ($n = 6$) stated concern for their faculty's personal lives, other teaching responsibilities, their load of students as well as the difficulties that adjuncts face as potential reasons for these response times. One student noted that faculty may have *"6 other sessions or they're working at [a nearby university] as well...They're working all over the place so it's just kind of touching where they can"* (J. Giblin, personal interview, August 3, 2016). Another student spoke about taking into account both the time of day that they emailed and their other concerns, stating his expectations for a response *"depend on what time of the day it is. I'm not going to email the teacher at 9:00pm and expect to get a response. They have a life too"* (J. Giblin, personal interview, July 20, 2016). Still another participant attempted to reach out to faculty only as a last resort because *"there's 30 students in the class. If we all went to the faculty member, he'd probably get really annoyed"* (J. Giblin, personal interview, July 20, 2016). This participant also expressed discomfort in asking questions in class unless explicitly being invited, due to his awareness of the faculty's need to get through the curriculum.

Faculty. The final major piece of categorization and evaluation included a multilayered evaluation to determine whether the participant should approach the faculty. Several main patterns emerged from the data. First, participants for the most part considered faculty a *"last resort"* or a source used under very specific circumstances (J. Giblin, personal interview, July 20, 2016). Participants relied on faculty if they felt they needed help only the faculty could provide. In addition to inaccuracies in the online homework solutions, this included items such as

faculty preference for *“how things should be done”* or *“what way do you want me to write this. What do you want me to put in it, kind of thing”* when completing projects, papers or assignments (J. Giblin, personal interview, July 19, 2016).

Second, the perceived approachability of the faculty played a significant role in whether a participant would approach the faculty. Participants evaluated faculty approachability in a number of different ways, including their comfort level, how they conducted their classes as well as that specific interactions with faculty that left them feeling judged or incompetent by the faculty. In terms of the participants' comfort level, many reported that their comfort in approaching their faculty grew over time both as a result of being more confident in themselves as well as with repeated exposure to the same faculty. A number of participants stated that they felt *“nervous”* or *“intimidated”* in their first year approaching faculty for unknown reasons. As participants progressed through their academic careers, their perception of the approachability of faculty became more nuanced (J. Giblin, personal interview, July 19, 2016; J. Giblin, personal interview, July 20, 2016). *“It kind of depends on the class and how I feel or how confident I am with meeting up with the professor”* (J. Giblin, personal interview, July 19, 2016). Participants reported feeling more comfortable with faculty in their major and that *“in my major classes we've been together for three years now. We obviously know each other very well”* (J. Giblin, personal interview, July 27, 2016). Overall, participants reported feeling more comfortable approaching faculty in their major than those not in their major.

Faculty style in their classes also left an impression of approachability. Several participants noted that when professors rushed through class, lectured right up until the last minute or beyond the time allotted negatively impacted the participants' willingness to approach the faculty. For example, faculty who *“kind of try to go through the material during the period*

without having any breaks” were often perceived as unapproachable and unwilling to field questions (J. Giblin, personal interview, July 19, 2016). Participants also viewed faculty who failed to recognize lack of comprehension in class as less approachable as well.

Participants also reported faculty’s treatment of student questions also contributed their perceived approachability. The results of the five point Perceived Teacher Support of Questions scale, administered as part of the survey at the end of the class, found that overall participants felt their faculty were receptive of questions ($M = 3.98$, $Mdn = 4.08$). The scale had a high level of internal consistency as determined by a Cronbach alpha of .82. However, faculty support of questions does not appear to be correlated with source selection. A chi-square test for association was conducted between sources and perceived faculty support for questions. Not all expected cell frequencies were greater than 5. The results were not statistically significant, $\chi^2 = 6.44$, $p = .76$.

The semi-structured interviews provided context for these results. Participants reported valuing faculty who repetitively and systematically asked for questions during class and reminded students to contact them for questions. For example, participants in this research consistently reported one faculty member as particularly approachable because *“he always mentions during class, ‘If you have any questions, feel free to ask.’ Stuff like that. Just kind of having that repetitive thought going through my head makes me go, all right, I’ll send him an email”* (J. Giblin, personal interview, July 19, 2016). Positive reinforcement of the importance of questions appeared to make a positive impression of approachability.

While the majority of participants perceived the faculty involved in this study as receptive to questions, some participants in the semi-structured interviews reported feeling uncomfortable approaching the faculty with questions. Participants reported some faculty

actively discouraged questions, either by not stopping the lecture to ask or because participants perceive “*they just kind of want to get thorough [the lecture and], brush off any questions that come along*” (J. Giblin, personal interview, July 22, 2016). Faculty also answered questions, but often times those answers were “*unsatisfactory*” as they were broadly theoretical and/or assumed knowledge unknown to the participant. In some cases, participants struggled to identify exactly the cause of their discomfort. “*There have been teachers where I feel like I can't really go to them. Not because of anything they said, but just because, I don't know. There was one teacher who I was failing his class, and I felt like I couldn't go to him...I feel like if he was more approachable then I would have gotten a better grade from the beginning*” (J. Giblin, personal interview, July 19, 2016). This participant described going to multiple other sources due to their discomfort.

Finally, faculty’s choice of words played a role in participants’ opinion of their approachability. Participants described wanting to appear “competent” to their faculty. Therefore, if faculty, inadvertently or otherwise, threatened that perception, participants reported feeling less comfortable utilizing the faculty as a source unless they felt no other choice existed. For example, one participant described a faculty member who told the class the content was easy, which made them immediately not want to seek the faculty out for help. They stated “*I should have went to him, but he was always like, ‘This is so easy, you guys got this. You guys are all doing so well.’ It's like, I'm not doing well, so I felt like he would think I was stupid, and he knew I was stupid and I shouldn't go to him*” (J. Giblin, personal interview, July 19, 2016). This general comment to the class inhibited this participants’ willingness to approach the faculty for help, despite failing the class.

Other participants described faculty as being “*not condescending exactly, but they speak as if you should already know the material, and they, for me, seem less approachable... I don't feel as comfortable just going in there and saying I have no idea what I'm doing*” (J. Giblin, personal interview, July 20, 2016). In addition, another participant noted “*if you go to a professor and you feel like he's talking down to you just because you don't understand something. You know, questioning, 'Why don't you understand this?' So on and so forth. That's when things become difficult*” (J. Giblin, personal interview, July 21, 2016). Therefore, both the professors’ attitude towards the questions as well as their attitude towards the content may significantly alter the participants desire to seek them as sources of assistance.

CHAPTER IV

DISCUSSION

The results of this study expand the literature on academic help-seeking in a number of ways. The results demonstrate that the help-seeking process involves a complex web of nested intentional decisions influenced by factors previously not identified by quantitative methodological approaches. These factors include time, the type of assignment, relevance, domain, availability of sources and an expanded understanding of the role of faculty. The outcomes of the participants' intentional decisions result in the selection of a source of help. Participants utilized a variety of human and non-human sources in order to seek help for problem-solving activities, viewing both types of sources as interchangeable tools in their quest to resolve their knowledge gap. The findings of this study support and expand on important recent work suggesting the inclusion of online sources in help-seeking models as well as underscore the need for the development of an integrated framework for understanding help-seeking in a realistic setting (Makara and Karabenick, 2013; Puustinen & Karabenick, 2013; Puustinen & Rouet, 2009).

Integrative Framework

This study clearly demonstrates that learners utilize online sources with similar help-seeking goals as when they engage human sources. The results also demonstrate that learners engage in help-seeking among both human and non-human sources in accordance with self-regulated learning theory (Zimmerman, 1990). For the learner, the efficiency of the source in resolving the comprehension gap drove the value of the source. This study also provided evidence that the type of help-seeking, adaptive or non-adaptive, may shift and grow with time. A number of participants noted that they changed their help-seeking strategy from non-

adaptively seeking answers to seeking to learn based on the undesirable outcome seeking answers produced compared with their academic goals. These shifts revealed participants engaged in a feedback loop and adjusted strategy usage in accordance to their goals, key characteristics of self-regulated learning (Zimmerman, 1990).

Selecting the source of help, step five in the generalized help-seeking model (Karabenick & Newman, 2009), represented the main focus of this study. Learners in this study engaged in a series of intentional decisions to select their source of help. They also constantly evaluated their choices, adapting as necessary. Participants in this study were goal-oriented, focused on a desire to learn and driven by efficiency, expressed as a combination of reliability and convenience. Participants' selection of a source altered dependent upon whether their priority fell to reliability or convenience. A variety of factors influenced participants' final decisions on a source, but the selection largely depended upon their perception of efficiency mediated by their individual constraints and preferences.

The results of this study indicate that researchers should consider revitalizing the framework of information-seeking. Information-seeking encompasses both information searching and academic help-seeking behavior. Tricot & Boubée's (2013) literature review examined information-searching and help-seeking among adolescents. The findings of this study begin to provide information on the issues raised. Participants viewed online and other sources as possessing similar credibility and accuracy. Participants not only used online sources, but also preferred them to other sources when engaged in problem-solving activities. They utilized all sources with nearly identical motivations and in nearly identical ways, to close gaps in comprehension, to master an understanding of new material and to persist in learning.

Online searches, seeking help from friends, faculty, a textbook, and notes all fell under the category of seeking help for the participants because they were driven by the same motivation and intent. Participants utilized the different sources with same goal, to learn how to solve the problem. They viewed the process independent of the source. Subjectively, the sources represented interchangeable elements in the same machine working towards the same goal. The quality and accessibility of online sources allowed participants to move beyond the strict artificial constructs that divide academic help-seeking and information seeking (Karabenick, 2011; Puustinen & Rouet, 2009).

Information seeking begins with the learner's intention to resolve a gap in knowledge. In both information-searching and academic help-seeking, the learner seeks to resolve a knowledge gap, but utilizes different sources, either human or non-human sources. The results of this study show that learners utilize both online and human sources to resolve gaps in knowledge. Therefore, information seeking, encompassing both information-searching behavior and academic help-seeking behavior, provides a strong integrative framework useful for exploring learner's actual behavior when seeking to resolve a knowledge gap.

Decision-making heuristics. Any future integrative framework should also consider decision-making theory, especially heuristics. The current help-seeking models rely on the assumption of intentional decision-making on the part of the learner (Karabenick & Newman, 2009). Previous research assumed a cost/benefit type of analysis to the assumed intentional decision-making. This study represents the first in-depth exploration of the decision-making process grounded in decision theory. The extensive use of online sources by participants in this study, as well as clear evidence of carefully considered decision making regarding their use, provides a more robust understanding of the decision-making process utilized by participants.

These heuristics can guide researchers to develop instructional interventions to facilitate help-seeking.

The decision-making process was influenced by a number of factors, including environmental factors and learner characteristics. The number of options available to participants, while not limitless, still represented a wide variety of choice. In order to reduce the cognitive load of making these choices, participants frequently expressed behavior which falls within the characteristics of bounded rationality (Simon, 1955/1990). Participants clearly demonstrated evidence of decision-making heuristics or “empirically derived short cuts” (Goodrich et al., 2000, p. 85). Evidence for the satisficing heuristic, found in web-searching and even survey responses among college students may be inferred from the theme of efficiency (Agosto, 2002; Hadar, 2011; Simon, 1955). Participants frequently made a series of trade-offs between accessibility, convenience, reliability and a variety of other factors. These trades-offs represent a compromise or a settling for an alternative to their ideal source (Simon, 1972)

Participants demonstrated evidence for the availability heuristic, which falls under the principle of reducing effort by accessing easier to retrieve information (Shah & Oppenheimer, 2008; Tversky & Kahneman, 1974). Initially, participants continued to treat the help-seeking process in college similar to high school. High school and college represented similar mental models, making high school approaches to learning difficulties the easiest to retrieve and thus utilize (Tversky & Kahneman, 1974). Participants continued to use familiar sources of help that they had utilized in high school when they began college. All of the participants in this study shifted their preference, indicating their approach was not well matched for the task.

Participants also continued to evidence use of decision-making heuristics after they developed a new pattern of use. Far from evaluating every source available independently each

time a new comprehension gap arose, participants ran through an established list of boundary conditions that impacted the source selected. This finding represents a previously unexplored theoretical basis not only for how learners select sources, but also for how they make the intentional decisions referenced in academic help-seeking literature (Karabenick & Berger, 2011; Karabenick & Dembo, 2011; Karabenick & Newman, 2009). An understanding of decision-making heuristics may help instructors design effective instructional interventions to facilitate effective help-seeking behavior.

Decision-making heuristics may be highly task or domain dependent (Shah & Oppenheimer, 2008). This study demonstrates that the selection of a help source is highly domain dependent. The domain dependency of the source selection process is likely influenced by the learners' previous experiences. Previous work demonstrated that adolescents entered college from high school familiar with google and internet searches (Agosto, 2002). Based on this familiarity and use, the researcher expected that utilizing online sources would continue in the first year of college. However, participants made a clear distinction between utilizing google for "research" and paper writing versus using online sources for homework help in high school. Previous research in information-searching found that students typically used online sources for prescribed or narrowly defined research assignments (Biddix, Chung & Park, 2011; Tricot & Boubee, 2013; Warwick & Rimmer, 2009). Participants in this study continued utilizing their preferred high school source well into college, despite more the availability of more appropriate sources.

As a consequence of decision-making heuristics, learners may not consider all of the available sources. Heuristics represent shortcuts in the decision-making process and may cause biased decisions as a result of assumptions about the domain, past experiences or affective

characteristics (Tversky & Kahneman, 1974). Defaulting to a known source, based on the domain or task, instead of considering all available sources may result in students unintentionally utilizing inefficient sources for the problem at hand. Previous studies investigated help-seeking behavior across multiple classes or without regard for the relevance of the material. This approach resulted in an altered understanding of the help-seeking process. The results of this study demonstrate the importance of content and domain as a result of this decision-making heuristic (Kitsantas & Chow, 2007; Kozanitis et al., 2007; Makara & Karabenick, 2013). These altered understandings may result in instructional interventions which are inappropriate or underutilized. These results underscore the importance of content and domain with regard to both decision-making and help-seeking behavior.

Methodological Approach

The results of this study demonstrate that the overwhelming reliance on quantitative methodology has limited our understanding of help-seeking behavior. Due to its unusual methodological approach for this field, in this study participants' themselves asserted their subjective understanding of their motivations and intentions regarding their help-seeking process. These results support many of the inferences drawn from a review of the literature comparing help-seeking and information-searching (Tricot & Boubee, 2013).

This study is also unusual among help-seeking research as the results represent actual help-seeking behavior rather than an intention to seek help (i.e. Karabenick, 1994; Karabenick, 2004; Karabenick & Sharma, 1994). Help-seeking intentions, often used by researchers to control for varying needs for help, may differ significantly from actual help-seeking behavior (Huet et al., 2013; Kozanitis et al., 2007). The results of this study demonstrate actual real world help-seeking behavior, albeit self-reported, not intentions to seek help if needed in the future.

Previous research on actual help-seeking behavior has, by necessity, taken place largely through technology/computer mediated sources, relying on predominantly quantitative methodology (Huet et al, 2013; Aleven, Stahl, Schworm, Fischer & Wallace, 2003). The methodology of this study allowed for a discussion of actual help-seeking behavior. This represents another positive step forward towards building an understanding of real world help-seeking behavior.

This discrepancy between help-seeking intentions and actual behavior provides some context for the difference in the results between this study, where students preferred online sources, and a previous study where students preferred face to face help-seeking either before/after class (Reeves & Sperling, 2015). Unlike the current study, previous research relied on help-seeking intentions and narrowly constructed help-seeking sources in a list format. The list contained human and technology mediated options of human sources, such as emailing a professor, but excluded online options, such as google (Reeves & Sperling, 2015). This again demonstrates the importance of a qualitative component in future research as we attempt to understand a vastly changed landscape from when researchers conducted the seminal help-seeking studies. New methodologies will generate more accurate understandings of the phenomena.

Faculty. The role of faculty illuminates the importance of qualitative methodological approaches to help-seeking research. A discrepancy exists between utilization of faculty as a preferred source and the results of the perception of teacher's openness to questions scale and the classroom achievement goal scale. Prior research in this area suggested that classes perceived by students as mastery based would result in more questions, even when controlling for other characteristics, because the faculty would view questions positively, not as evidence of a lack of intelligence or motivation (Karabenick, 1994; Karabenick, 2004). A separate study found that

teacher support for questions may not result in a greater number of questions (Karabenick & Sharma, 1994) and still another found a more complex relationship between perception of achievement goal structure and behavior (Kozanitis et al., 2007).

In this study, participants generally found faculty receptive to questions and perceived a mastery based learning environment, yet they did not utilize faculty either in or out of class with great frequency. In other words, participants in this study were more likely to seek help from any other source than from a faculty member who explicitly invited questions, walked around soliciting questions and was perceived as supportive of questions in a mastery based classroom perceived. This discrepancy highlights the complexity of the factors which influence source selection in particular and help-seeking behavior more generally. This discrepancy argues for additional qualitative research to gain a more robust understanding of real world help-seeking behavior.

Embarrassment. The results of this study challenge prevailing narrative of embarrassment as one of the primary causes of face to face help- avoidance (Karabenick, 2011; Keefer & Karabenick, 1998; Kitsantas & Chow, 2003; Nelson-Le Gall, 1981; Ryan et al., 1997). Researchers theorized the cost of social embarrassment, threats to self-esteem or expected admiration resulted in learners working alone rather than seeking help, creating missed learning opportunities or failure (Karabenick, 2011). The emergent data from the qualitative interviews in this study challenge these assumptions. Participants expressed attempts at figuring out the problem as an essential part of their learning process. Participants stated the decision to stay in the confusion, to retry piece of the problem and to specifically avoid seeking help from any source, online or not, until they had expended a great deal of effort to try to figure out the problem was intentional and undertaken for the sake of their learning.

In addition, while the social cost of seeking help publically has been documented, especially in younger students, the participants in this study described nuanced reasons for avoiding faculty. Participants viewed faculty as the least convenient and reliable source. The qualitative methodology, specifically the semi-structured interviews, allowed participants the opportunity explain why they chose to utilize sources other than faculty. Their reasons underlined the need and the drive for efficiency in their help-seeking process, something that faculty did not provide most of them.

Help-Seeking Goals. The methodological approach in this study also allowed participants to clarify their help-seeking goals. Previous work has assessed help-seeking goals either through self-reporting or through inferences made from learners' choices (Karabenick, 2011). One study coded the goal of help according to whether or not students asked for direct answers, inferring that direct answers requests represented non-adaptive help-seeking (Makitalo-Siegl et.al, 2011). The results from the current study suggest that inferences of non-adaptive help-seeking based on seeking answers may be inaccurate. In this study, participants' descriptions of "*reverse engineering*" from answers to learn process demonstrated adaptive help-seeking behavior despite intentionally searching for answers to problems (J. Giblin, personal interview, July 27, 2016). The intent of the learner, rather than the object of their search, should determine the classification of the type of help-seeking behavior as adaptive or non-adaptive.

Expectancy Value Matrix for Source Selection

The results of this study partially supported Makara and Karabenick's (2013) expectancy value matrix. Additional factors, such as participant skill level, prior experience, and reciprocity for help emerged as factors in the expectations section of the matrix. Participants uniformly ($n = 25$) sought adaptive help, thus the values section of the matrix played less of a role for this group

of participants. Quality and accuracy of the source, also in the values section of the matrix, were supported. The data from this study generally supports the outcomes section of the matrix as well with two additional considerations: online help solicitation and the role of evaluation in online help searches.

Expectations. Participants considered the accessibility and availability of the source as well as their expectation that the source will provide help, both of which the matrix clearly identified under the expectancy label. An additional skill component emerged as well. Participants factored their own skill level in manipulating google searches as part of their expectation that the source would provide help. Prior experience with sources, as predicted, influenced their expectations (Makara & Karabenick, 2013). In this study, participants possessed considerable experience seeking help in the observed class and as third or fourth year undergraduate students. This experience resulted in participants only considering sources they perceived as available to provide help, as predicted by decision-making theory (Tversky & Kahneman, 1974).

Expectation in the model accounted for participants' expectations of the source. However, an additional consideration of reciprocity to provide help emerged with peer help-seeking, which is not accounted for in the model. While participants perceived classmates as capable and willing of providing help, they also expressed an expectation that they themselves provide help to their classmates. This expectation of reciprocation factored into participants' source selection process, preventing them from utilizing an available, accessible, reliable source of help if they felt they could not reciprocate. It is unclear how this expectation of reciprocation may alter based on relationships between the sources, if at all.

Values. The values category in the model considers the type of help (adaptive or non-adaptive) the source provides as well as the quality/accuracy of the source (Makara & Karabenick, 2013). As noted, participants in this study sought adaptive help and focused on a desire to learn the process. How they learned the process depended upon the personal preferences, characteristics and style of the learner. Participants largely tried to problem-solve on their own and many viewed searching online as part of this problem-solving process. Other participants searched for adaptive help by seeking to reverse engineer back from the answers to teach themselves the process. For this advanced group of participants, the matrix referred not to the adaptive or non-adaptive nature of the source, but instead to very specific format that had proven beneficial to them in the past. Examples of formats include answers, similar example problems, practice problems or narrative guides. The results of this study supported the quality and accuracy values present in the model.

Outcomes. Makara and Karabenick (2013) proposed that the combination of expectations and values result in the solicitation and utilization of help. The results of this study support these outcomes, with two important caveats. First, most students utilized online help, yet the definition of solicitation remains unclear in this context. Does simply entering into a google search qualify as soliciting help? While Makara & Karabenick (2013) briefly sketch an online search process, participants in this study described undertaking a complex second search process with an additional layer of evaluation to identify a specific site for help. Simplified, the solicitation of help first includes going online, then evaluating the results of the second search using a distinct set of criteria prior to utilizing the source. This complexity does not appear in the model, distorting our understanding of the effort needed to engage in online searches.

A second caveat includes the evaluation of the help prior to utilization. Participants describe the evaluation process differently than Makara and Karabenick's (2013) succinctly described online source selection process. Participants engaged in this evaluation across multiple sources, including faculty, but online sources most directly demonstrate the process. Participants in this study described comparing specific sites, not to each other for consistency or quality as proposed, but instead utilizing the source-provided ratings in the forms of comments, stars or other user generated indicators of quality. If these indicators were not present, participants utilized their own prior knowledge and understanding of the problem they were trying to solve to evaluate the quality. If neither of these actions proved sufficient, participants would then compare sites seeking consistency of content.

Proposed Source Selection Model

For this group of advanced participants in a STEM class working on problem solving activities, a different model may better illustrate the source selection process. Participant descriptions of their source selection process also provided evidence not only of the intentional decision making processes that participants undertook, but also of decision-making heuristics. Borrowing elements from Makara and Karabenick's (2013) expectancy value model, the model described by participants in this study heavily weights accessibility, availability, and a perception of quality. The individual weighting of these factors drives a narrowing of source options. After this narrowing, participants determine the format of the help they seek and any additional considerations, such as relationships, expectations of reciprocity, or other personal characteristics, leading to a solicitation and obtaining of help, as identified in Karabenick & Newman's (2009) generalized model. The solicitation is followed by an evaluation of the help

presented. If the information conforms with participants' prior knowledge, expectations or fits with their understanding of the problem, it may be utilized. See Figure 4.

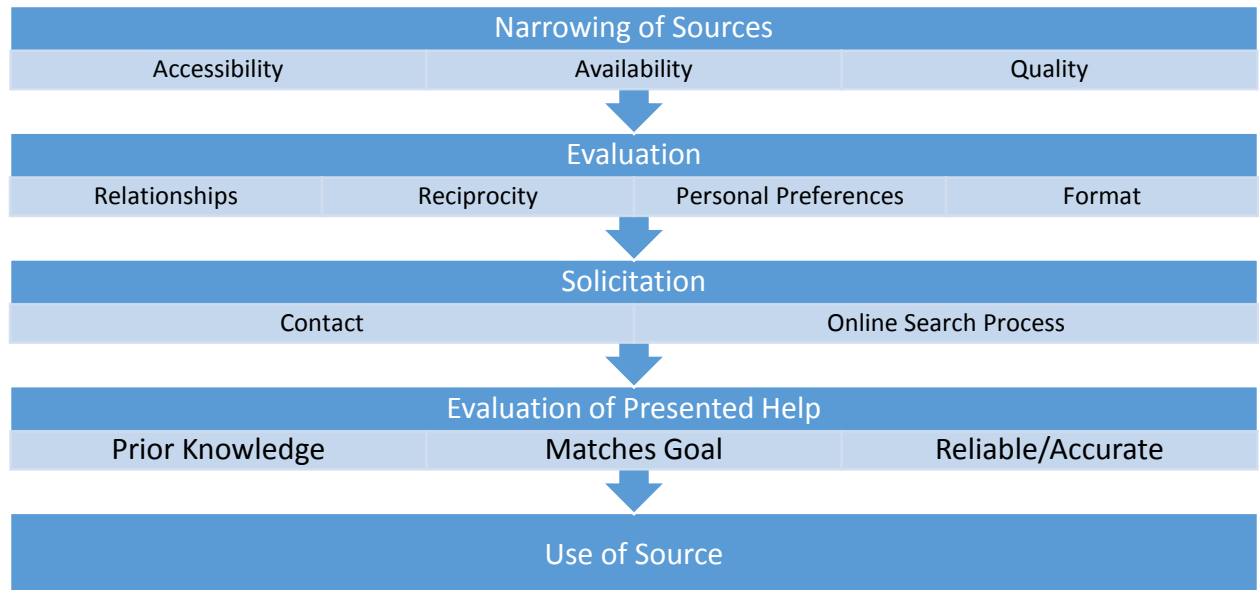


Figure 4. Proposed Source Selection Model

Source Classification Taxonomy

Makara and Karabenick (2013) proposed a taxonomy for classifying sources, noting that sources fit into the dimension subjective to the learner's perspective. The goal of the classification framework is to link source categories to learner characteristics to influence learners' selection of a source (Makara & Karabenick, p.46). The results of this study suggest that none of these dimensions functioned as a primary driver of the source selection process, as participants rated their importance as nearly equal. The dimensions in isolation do not provide a robust understanding of the influences on the help-seeking decision-making process. The dimensions, when compared with source preferences, do not present a unified picture of source selection, suggesting other factors not captured in the classification matrix significantly influence

help-seeking behavior. The classification matrix may not be robust enough to properly categorize sources into the categories which most influence help-seeking behavior.

Accessibility/technology. In light of the results of this study, the technology dimension may be better characterized as accessibility. Technology always mediates online sources, but the value to learners lies in the accessibility of the source. For example, participants utilized online textbooks in similar fashion as paper textbooks. Participants cited accessibility and price as the primary advantages of online texts. Online tutors provide another example of the distinction. If an online tutor is immediately accessible, this influences the decision to utilize them. If a wait time exists, these wait times likewise represent an influence on the decision making process and the likelihood of the selection of the source. Technology enables the primary characteristic of accessibility by “easing temporal demands” (Kitsantas & Chow, 2003, p. 394). It is the accessibility, not technology, which influences source selection processes. This dimension should be renamed to reflect the appropriate characteristic it represents.

Adaptability and Formalness. The relationship between dynamic/static and formal/informal dimensions appears complex. Participants preferred online sources in and out class and perceived them to possess similar levels of both adaptability and formality, or the requirement to help. Both dimensions displayed unexpected patterns of results. Participants preferred sources which they perceived as less adaptable and less required to help. For participants who utilized online sources, it is likely that these two channels are related in some fashion, perhaps the less adaptable a source, the less helpful it may be and may perceive the source as less required to help. Online sources represent a broad range of options, from static websites and scanned documents to interactive forums and live help. The ability to search, identified by some participants as a learnable skill, also impacts the efficiency and usability of

online sources. In addition, some online sources require payment in exchange for adaptability, such as Chegg. These two channels may be correlated in an unidentified way.

Human based sources represent another example of this phenomenon and demonstrate the inability of the characteristics presented in the matrix to wholly account for help-seeking behavior. Participants considered faculty adaptable and required to help, yet avoided seeking help from them, even when participants experienced a need for help in the classroom with the faculty present. Participants also perceived classmates as similarly adaptive. However, participants perceived classmates as least required to help, even less than online sources, yet classmates represent the second most preferred source. Adaptability alone does not account for help-seeking behavior, as participants perceived both faculty and classmates similarly adaptable. Adaptability and required to help together also do not account for this phenomenon. Participants perceived faculty as the most required to help source and online sources as only somewhat required to help. It may be the requirement to help is not a significant influence on help-seeking behavior. Future research should be undertaken to determine if this dimension should remain in the classification framework.

Relationships. Participants perceived their classmates as the source with the most personal relationship and online sources as the most impersonal relationship. Participants who viewed their relationship with faculty as less personal were more likely to select them as a preferred source. While participants rated adaptability as the most important characteristic in general, those who preferred classmates were most likely to rate the source as personal. Participants who preferred online sources were most likely to rate these sources as impersonal. Therefore, while not rated as important by participants in general, when compared with actual source selection, relationships appear to exert more influence than the other three dimensions.

Proposed Classification Taxonomy. The results of this study demonstrate that the classification taxonomy proposed by Makara and Karabenick (2013) may not be applicable to advanced undergraduate students in problem-solving contexts. Factors proposed by Makara and Karabenick (2013) did not appear to exert influence over the source selection process, such as technology and the formal/informal requirement for help, and other factors, such as the accessibility of the help and the efficiency of the help, did not appear. The results of this study suggest that a new classification taxonomy may be more appropriate for advanced STEM students. See Figure 5.

Dimension	Makara and Karabenick's Classification Taxonomy (2013)	Proposed Taxonomy
Requirement to Help (Formal/Informal)	X	
Technology (F2F/Technology Dependent)	X	
Adaptability (Dynamic/Static)	X	X
Relationships (Personal/Impersonal)	X	X
Accessibility of Help (Immediate/Delayed)		X
Efficiency of Help (Practical/Theoretical)		X

Figure 5. Comparison of Source Classification Taxonomies

Instructional Implications

Decision-making heuristics and the factors identified above both play a role in students' selection of sources. Specifically, the findings of efficiency and a desire to learn should factor

into the design of any instructional environment. Because influences on the source selection process depend on personal characteristics, participant perceptions of faculty and domain, and factors unique to each individual, no one universal design to facilitate help-seeking exists. Instructional designers and faculty should create multiple methods to facilitate this behavior.

Referrals. Participants found their preferred source through a number of different means, including direct advertising from textbook rental companies. Participants most often relied on recommendations and referrals. Recommendations from classmates often initiated the use of a source. Designing learning environments to encourage the exchange of these referrals may help participants become aware of new or more efficient uses of sources. Basic suggestions include offering time and space for students to share their strategies and sources with each other after they have worked on a challenging assignment.

Participants also heavily weighted faculty recommendations. Faculty should consider discussing sources they find or have found helpful in class. Participants noted they approached faculty who repeatedly stressed the importance and openness of questions, therefore, repetitiveness regarding efficient and helpful sources should also be integrated into the classroom environment. These on-going conversations about sources may represent a valuable piece of the instructional routine.

Posting sources in an accessible location may also facilitate efficient help-seeking behavior. Decision-making theory identifies a number of ways individuals make decisions, most importantly through heuristics (Shah & Oppenheimer, 2008). Faculty suggestions carry increased weight, reducing the cognitive effort for the student who prioritizes these recommendations. The availability heuristic (Tversky & Kahneman, 1974) and other heuristics which facilitate the retrieval and storage of information about the decision indicate that “easy to access information”

(Shah & Oppenheimer, 2008, p.211) will influence the decision making process. These source suggestions should be posted either directly into the assignment or in a clearly identified location accessible to students at all times.

Online. Instructional designers and faculty need to recognize that traditional aged undergraduates utilize online sources for help, view online sources largely as reliable and authoritative and access them frequently even in face to face classes. In short, instructional designers and faculty should assume that students will turn to online sources fairly quickly in their search for help. Rather than ignoring this fact, designers and faculty should embrace this new avenue of providing assistance to students. Posting important source information regularly in a designated online space in the learning management system may prove beneficial to students. Links to appropriate websites, texts or posting key processes, creating videos or screencasts, especially with targeted information directly applicable to the concepts would benefit students. Faculty and instructional designers should embrace the comfort and familiarity of students in using online sources to seek help and design these areas appropriately.

Relationships. Creating instructional space which allows students to discuss their source selection process and help-seeking behavior not only raises awareness about efficient strategies, but also allows students to form peer relationships, potentially creating a new help-seeking source. Similarly, faculty engagement in these discussions may also create a relationship between the faculty and the student. Because personal relationships influenced help-seeking behavior, instructional designers and faculty should intentionally encourage the development of these relationships in their design of the instructional environments.

Task. Domain and content played a role in source selection. Designers of introductory classes or non-major classes, regardless of the level of student, should be aware that strategies

participants used to seek help in other areas may prove less effective in the new domain. This may reduce the learners' ability to succeed. Additionally, the introduction of a new task, representing a significantly different mode of work, such as assigning a research paper in a math class, may also complicate learners' ability to seek help. Supporting student help-seeking behavior in these circumstances include making sources available specific to the task, not the content.

Instructors and designers may choose to make space for student self-reflection to explore their help-seeking behavior in different classes or tasks as well as the similarities and differences in their approaches. Further class discussion on how tasks differ structurally and the impact on help-seeking would also support students' development of metacognitive awareness of their source selection process. Faculty may also make clear their receptiveness and openness to questions as well as reiterate this in self-reflections and class discussions.

First Year Student Instructors. All of the participants in this study shifted their source selection, indicating that their approach was not well matched for the task. Participants frequently used established patterns developed in high school, indicating the use of decision-making heuristics (Shah & Oppenheimer, 2008; Tversky & Kahneman, 1974; Tversky & Kahneman, 1973). Participants shifted their pattern when struggling to understand the content and finding their sources lacked efficiency. Participants needed a combination of perceived academic failure in addition to increased awareness of available sources to create a shift in their behavior. Instructors seeking to encourage first year students to shift towards more productive help-seeking behavior may attempt to replicate these conditions by providing very difficult assignments while at the same time providing recommended sources and targeted opportunities to connect with their classmates. The difficulty of the assignment alone may not be sufficient to

produce a shift in help-seeking behavior. Given the goal of efficiency uncovered in this research, providing recommended sources may speed the help-seeking process.

Limitations

This research intentionally studied a group of narrowly defined students completing a problem-solving activity assumed to be relevant to their discipline. The findings confirmed that these research design decisions impacted the results and play a role in undergraduate help-seeking source selection. The limitations of this study reflect the intentional design. The results clearly indicate domain, personal characteristics, relationships and environmental factors affect help-seeking behavior. Content and domain in particular represented significant influences on help-seeking sources. Participants specifically noted a distinction between research and problem-solving help. The results of this study likely do not transfer to liberal arts classes or even writing and/or research tasks within traditional STEM classes. Relevance also influenced the selection of sources, adding another layer of limitations. Therefore, the results of this study likely to not transfer outside of the STEM problem-solving context.

The researcher interviewed junior and senior level students in STEM based majors, all of whom had studied at the university for at least a full academic year. The results of this study clearly do not transfer to new students. This sample also represented students who persisted and succeeded through their learning challenges in order to successfully move through at least half of an academically rigorous program. Participants in this study indicated that their academic achievement in part rested on their ability to find help efficiently. This limits the transferability of this study to students in academic distress or jeopardy, such as students on probation. The researcher inferred from this desire a mastery oriented approach, which supports previous

research (Butler, 1998; Karabenick, 2004; Karabenick, 2011; Ryan et al., 2005). It is unclear if this achievement goal orientation represents a limitation on the transferability of the findings.

The results of this study may not transfer to situations where little opportunity to form face to face relationships exist. Relationships emerged in the data as an important influence on source selection and a number of participants stated that they had been classmates for a number of semesters. Likewise, participants also stated that their perceptions of faculty in general and specific faculty in particular had shift over time. It is important to note that the participant class sizes within the STEM majors at this university tend to be between 20 - 40 students. This research also focused on a face to face class of traditional aged students with no significant online instructional activities. The classes met multiple times per week and the researcher intentionally entered the class at the end of the semester to allow students time to form an opinion of their faculty

Participants in this study overwhelmingly skewed male. Both in the qualitative and quantitative data, more than 80% of the participants were male. Previous work demonstrated that adherence to masculine norms and a high degree of self-reliance predicted that men would be more likely to engage in non-adaptive help-seeking (Wimer & Levant, 2011). The results of this study do not support that finding. In this study, a desire to learn motivated participants and they sought adaptive help. However, as the results of this study also demonstrate, the determinations of adaptive and non-adaptive in previous research may need to be re-examined. This study also included both human and non-human sources, possibly leading to different results than previous research.

Future Research

The limitations of this study provide a path for future research. Future research focusing on how domain and relevance impact help-seeking behavior may uncover specific instructional implications. As this study took place at one institution, it is unclear if the distinction in help-seeking behavior found between domains results from the nature of the content or the individual academic departments' philosophy and culture. This study should be replicated across multiple institutions to determine if the domain content or the culture of the academic department is influencing student help-seeking behavior.

Personal characteristics should also be investigated. For example, future research may focus on the interaction of gender and help-seeking behavior using an integrated human and non-human framework of sources, especially in STEM disciplines. Additional learner characteristics, specifically as they relate to forming relationships, should also be investigated. Future research into the role of relationships on help-seeking may be especially productive as the results of this study confirm previous findings regarding the importance of relationships (Makara & Karabenick, 2013). Large universities and classes where little opportunity exists for forming relationships should also be investigated. The role of technology in mediating these relationships and the effect on help-seeking may also be beneficial in the current educational landscape.

This study also raises questions around age and experience. Participants in this study were in their third or fourth year of study and described a change in their help-seeking behavior over time. Different influences likely affect the decision-making process of first year and new students, which should be investigated. Participants were no older than 24 years of age. Adult learners may also experience different motivations and source usage preferences. In addition, the

research took place in a face to face setting. Therefore, future research into online and hybrid environments may reveal different patterns of source usage

Finally, future research into the development of an integrative help-seeking/information searching framework that includes both static and dynamic sources remains necessary. Decision-making heuristics may provide a new method to explore help-seeking behavior. A variety of research methodologies should be employed to investigate how and why learners select a source of help in a real world setting.

Conclusion

The results of this study broaden the current literature on academic help-seeking. Specifically, the results of this study reinforce the need for a comprehensive, integrated framework to describe how learners resolve gaps in knowledge. This study demonstrates that learners clearly utilize online and human sources with similar intentions for similar reasons. Learners do not distinguish between the two types of sources when they encounter difficulty in a learning context. This study also suggests that information seeking may serve as an appropriate theoretical framework to integrate academic help-seeking and information-searching behavior. This study also demonstrates that decision-making theory may provide a useful theoretical lens for academic help-seeking behavior

The study also explored a newly proposed source classification matrix and expectancy-value theory of source selection. The findings indicate that the proposed expectancy value theory and the proposed classification taxonomy may not prove robust enough to fully capture and integrate human and non-human source usage behavior by undergraduate students (Makara & Karabenick, 2013). Additional factors, such as an expectation of reciprocity for help among peers and a complex evaluation process, emerged in this study. The expectancy value model can

not integrate these factors. In the classification taxonomy, technology represents one of four dimensions to classify sources, yet the results of this study indicate technology masks the more relevant factor of accessibility.

The results of this study demonstrate the value of differing methodological approaches towards understanding academic help-seeking behavior. The mixed methods approach uncovered the influence of content and domain on help-seeking behavior. The grounded theory methodological approach revealed previously unknown dimensions to the relationships influence, specifically regarding the impact of the reciprocity expectation among peers. Qualitative approaches, such as open ended entries of sources and semi-structured interviews, allowed participants to describe their actual help-seeking behavior in a real world setting. This methodological approach led to new understandings of the intentional decision-making process, the multifaceted evaluation process used by undergraduate students, previously unexplored influences on the selection process and captured the sources utilized by undergraduate students for help in problem-solving activities.

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Appendix A

Log Sheet

Instructions: During the problem solving activity, please note any source of assistance you consult while solving the problem. Please list the name, followed by the type of source in parenthesis next to it. For example, if you use Wolfram-Alpha, please list the Wolfram-Alpha (Web).

Appendix B

Perception of Class Goal Structure

This scale will be used to determine the learners' perception of the goal orientation of the class.

Learners will select from a 7-point scale with the following instructions:

“Please use the following scale to answer the statements below. Circle the number that best describes how true or false each statement about this class. Please use the following scale to answer the statements below. Circle the number that best describes how true or false each statement is for you.”

(not at all true of me) – 7 (very true of me)

1. In this class, it is important for me to do better than other students
2. In this class, the teacher stresses that it is important for me to do well compared to others in this class
3. In this class, it is important to get a better grade than most of the other students
4. The teacher stresses in this class to learn as much as possible
5. In this class, it is important to learn the content as thoroughly as possible.
6. In this class, it is important to master the material
7. In this class, it is important not to do worse than other students
8. It is important in this class to not do poorly
9. In this class, the teacher stresses to avoid performing poorly compared to other students

Karabenick (2004)

Appendix C Perceived Teacher Support of Questioning Scale

Below is a series of statements. Please respond to each one by indicating the degree to which they describe the teacher in this class when he/she is teaching or explaining something. Please keep in mind that there are no right or wrong answers; just respond as accurately as possible. Remember, *the statements below are to refer to times in class when your teacher is teaching or explaining something.*

Please place a number in the blank before each statement using the following scale:

1 2 3 4 5

Not at all true Very true

1. Your teacher tells students to interrupt him/her whenever they have a question. (A)
2. Your teacher typically gets annoyed when students ask questions. (B)*
3. Your teacher responds to questions by trying to answer them as carefully and thoroughly as he/she can. (C)
4. Your teacher believes that student questions take up class time more profitably spent by teaching or explaining the material. (D)*
5. Your teacher compliments students who ask questions. (E)
6. Your teacher let it be known that students should not interrupt him/her for questions. (A)*
7. Your teacher provides sufficient time for students to ask questions. (F)
8. Your teacher responds to questions by answering them as briefly as possible so that he/she can return to what he/she was saying. (C)*
9. Your teacher generally feels good when students ask questions. (B)
10. Your teacher doesn't stop for questions once he/she begins talking. (F)*
11. Your teacher believes that student questions are important. (D)
12. Your teacher is sometimes harsh with students who ask questions. (E)*

Content areas. A = specific instructions; B = emotional response to questions; C = informative response; D = value of questions; E = reward; F = opportunity; and * = items to be reverse scored.

Karabenick & Sharma (1994)

Appendix D Classification Survey

Please list which source you first utilized when attempting to solve the problem.

Please move the slider below to indicate the qualities which best represent the source along the 4 dimensions.

1. Role Dimension- To what extent is the source required to assist you?

I-----I-----I-----I

Formal

Informal

Examples: Faculty Member, Tutor, book
Classmate

Friend,

2. Relationship Dimension- To what extent do you have a relationship with this source?

I-----I-----I-----I

Personal

Impersonal

Examples: Friends, classmates, family

Professor who does not know
you, asking anonymously,
books

3. Channel Dimension- To what extent is the source based on technology?

I-----I-----I-----I

Face to Face

Mediated by Technology

Examples: Face to Face Conversation

Texting or Skyping

4. Adaptability Dimension- To what extent can the source adapt to your need?

I-----I-----I-----I

Adaptable

Not Adaptable

Friend, email instructor

Books, Video tutorials

Appendix E
Semi-Structured Interview Questions

1. Thank you for meeting with me today to discuss how you solve problems that you do not have an answer for in this class. First, can you describe a time that you encountered a homework problem that you could not immediately solve?
2. What was the first thing you did to try to solve the problem?
3. Why did you select that particular source?
4. What factors did you take into account when selecting your source?
5. Had you used that source in the past?
6. Where did learn about the source?

VITA

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Adjunct Instructor (May 2009- September 2010)	
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Peer Reviewed Conference Presentations

Giblin, J. (October, 2016). *Factors influencing the selection of academic help sources* presented at National College Learning Center Association National Conference

Giblin, J. (2016). *Encouraging Help-Seeking* presented at Northeast College Reading and Learning Association Conference

Kennedy, K. G., Smith-Zbarsky, E., Hattaway, A., **Giblin, J.** (August, 2015). *Implementing Learning Labs as Instructional Support for Freshman Calculus* presented at Mathematical Association of America MathFest.

Giblin, J. (March, 2015). *Learning Spaces, a Conversation* presented at Northeast College Reading and Learning Association conference

Giblin, J. (March, 2014). *Learning Assistance and Project Based Learning* presented at Northeast College Reading and Learning Association conference

Giblin, J., Cheney, S., Levesque, J. (2010). *Strategic Partnerships to Infuse Technology in Student Affairs* presented at National Association of Student Personnel Administrators (NASPA) Annual Conference

Peer Reviewed Publications

Giblin, J. & Stefaniak, J. (in press). Achievement Goal Structure and Type of Assistance Sought in an Undergraduate Classroom. *Journal of Applied Instructional Design*

