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Evidence-Based Decision-Making: Awareness, Process and Practice in Management Classroom

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Abstract:

In an increasingly information rich environment, it is important to teach students decision-making alongside information gathering and management methods. This paper examines the implementation of evidence-based decision-making in a first year introduction to management course at a large university in the Midwestern United States. Students learned decision awareness, decision-making process creation and decision practice alongside areas of management and basic business principles. Students perceived increased skill in decision-making, both individually and in groups. This venture has implications for others looking to help students not only learn experientially, but also improve critical thinking in practice.

Keywords: management education, active learning, experiential learning, decision science, information literacy, undergraduate education

Introduction

We live in a time of information overload. According to a report published by the EMC Corporation, the digital universe is doubling in size every two years and will continue to do so until at least 2020. In terms of storage size, this means that data will grow to a size of 5,200 gigabytes for every human on earth by the year 2020 (Gantz & Reinsel, 2012). More information, without having the context of meaning and learning, can actually create students who are overconfident in their decision-making (Jones 2014; Meehl 1954; Stonebraker 2016). Teaching management is no longer just about teaching good management methods and where to find quality information for implementation of management methods; it is now also about teaching students how to weave information together with methods to make informed decisions. Teaching evidence-based decision-making is about slowing down the process of decision-making so that students can use their own logical minds to see how their brains might be missing elements of the decision on the way towards elegant answers. Teaching business students how to best use and evaluate the massive amount of information available to them is essential.

Making decisions takes up a high percentage of an executive or manager's time (Mintzberg, 1997), and part of the role of a business school is to prepare students to make informed decisions, many of which can determine if a business will flourish. In previous decades, it was the role of the business school to lead students to appropriate sources of information. While information gathering remains an integral role, it has been equaled, if not overshadowed, by the need to help students sort through the overabundance of information now available, and to help them learn how to use that information to make the best possible decisions.

The focus of this paper is to examine the implementation of evidence-based decision-making in a first year introduction to management course and to discuss student perceptions on

both group and individual decision-making. We hope to highlight innovative pedagogies that may be used by other librarians and business educators who are interested in helping students better break down problems. Students learned decision awareness, decision-making process creation, and decision practice alongside areas of management and basic business principles, including the principles of accounting, finance, strategy, and marketing. Through the use of cases and decision practice, they were able to tie the basic business principles in with evidence-based decision-making to better understand how they would be performing these functions once they graduate and are working in the business world.

Literature Review

Our aim in this study was to design an introductory course that incorporates evidence-based decision-making. In our review of the literature, we explored the literatures of evidence-based management, active and experiential learning, and how these have been historically used in the teaching of management education. As we come from information science disciplines, we also examined the information literacy literature for synergies in course design.

Evidence-Based Management

Evidence-based management (EBMgt) has its roots in the health science fields of evidence-based medicine and evidence-based practice (Tranfield, Denyer, Palminder & Smart, 2003). Historically, EBMgt developed due to a perceived gap between academic research and managerial practice (Rynes & Bartunek, 2017). The idea behind EBMgt is that “good-quality decisions should be based on a combination of critical thinking and the best available evidence” (Barends, Rousseau, & Briner, 2014). Rousseau and McCarthy propose that management education focusing on evidence will improve the decisions that managers are making and improve organizational outcomes. They suggest that if management education teaches students

to evaluate evidence equality, access information, and trace a cause and effect connection to critical outcomes, decision-making will be improved (Rousseau & McCarthy, 2007). EBMgt combines these four activities:

1. Use of the best available scientific findings.
2. Gathering and attending to organizational facts, indicators and metrics in a systematic fashion to increase their reliability and usefulness.
3. On-going use of critical, reflective judgment and decision aids in order to reduce bias and improve decision quality.
4. Consideration of ethical issues including the short- and long-term impact of decisions on stakeholders. (Rousseau, 2012)

It is essential that students graduating from business programs understand how to be informed leaders and make use of these activities. EBMgt has been used in a variety of management education areas, including human resources, doctoral education, MBA programs, and undergraduate programs (Jelley, Carroll, & Rousseau, 2012; Salipante & Kowal Smith, 2012).

To the best of our knowledge of the literature, EBMgt has yet to be implemented in an introductory management course until this publication. Citing a need for more implementation of decision-making, Stonebraker explored evidenced-based management as frameworks to reframe information literacy education (Stonebraker 2016). The author drew upon their best practices that they had used in their own classroom, but at the time of writing had yet to redesign an entire information literacy course based upon the informed leadership framework, and had no assessment of the decision management framework from the student side.

Active & Experiential Learning

Scholars in the education sphere have been discussing and studying active learning for decades, but it has only recently been implemented in higher education. Active learning engages students in the learning process by having students read, write, discuss, and engage in active problem solving. Students use a level of critical thinking not found in a typical lecture

environment, and report enjoying the experience, feeling they have learned more than in a traditional lecture (Everly, 2013). Studies have shown that active learning exercises reduce the achievement gap between disadvantaged and non-disadvantaged students. In an active learning classroom, students participate and take ownership of their own learning as they work through the lecture materials on their own time and spend time in class working with and teaching each other (Haak, HilleRisLambers, Pitre, & Freeman, 2011). Active learning has been shown to raise exam scores and course grades, increase attendance, and improve engagement (Deslauriers, Schelew, & Wieman, 2011; Everly, 2013; Lyon & Lagowski, 2008; Mazur, 2009; Missildine, Fountain, Summers, & Gosselin, 2013). Though active learning classrooms generally have fewer students per square foot, they are actually a better use of the space due to the increased occurrence of students meeting learning outcomes (Baepler, Walker, & Driessen, 2014).

Active learning is based on the experiential learning theories common in the business school world. The Kolb experiential learning process describes conceived learning as a process, rather than just focusing on outcomes (Kolb, 2015). Kolb's experiential learning cycle builds on the works of psychologists Jean Piaget, John Dewey, and Kurt Lewin to create a model of learning, change, and growth. The model is built on a process that includes the four points of concrete experience, reflection on the experience, analysis (learning from the experience), and active experimentation based on what has been learned (Kolb & Fry, 1975). Kolb and Fry propose that the learning cycle can start at any of these four points. The experiential learning process encourages critical thinking in tandem with decision-making. While experiential learning is used throughout business schools, much of the focus is on concrete experiences versus the change and growth aspects of the model. Our evidence-based decision-making approach put

particular emphasis on the ways students make decisions, the analysis and reflection aspects of the cycle.

We drew upon library and information science literature involving active learning as well, especially as it relates to information literacy (Senecal & Fratantuano, 1994). Library and information science literature defines information literacy as the set of abilities requiring individuals to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information” (Association of College & Research Libraries, 1989). Information literacy has previously been applied in introductory management courses with an intentional focus towards sources and evaluation (Fiegen, 2011; Leigh & Gibbon, 2008). We built upon this work in our integration of information into decision-making. In order to make evidence-based decisions, students needed to be able to find the best available information, which is the heart of information literacy.

Active Learning in Evidence-Based Management

Using active learning in business education gives students the opportunity to practice evidence-based management. It can be used to teach students how to make decisions in a world of too much information. Business school curricula have been left largely unchanged since 1959, and competencies that have been identified more recently as desirable by employers (e.g. creativity, teamwork, interpersonal skills, problem solving, and ethics/integrity) have not been addressed (Herrington & Arnold, 2013). Experiential learning can be highly effective in management education, including in the diverse fields of talent management, leadership performance, competence development, change management, community involvement, volunteering, cross-cultural training, and entrepreneurship (Bevan & Kipka, 2012). Teaching active learning in conjunction with information literacy is an excellent opportunity to cover these

topics in an integrative way, as they are not generally associated with a department or area within the business curriculum and may otherwise be missed.

Though information rich environments can be overwhelming to decision makers, they do not have to be a hindrance. Research has shown that a systematic decision-making process is associated with better outcomes than unstructured human processing (Highhouse 2008; Meehl 1954; Rousseau 2012; Stonebraker 2016). Although case studies have been a traditional method of teaching business students, McCarthy and McCarthy make a case for mandatory experiential programs across the business curriculum, as case studies cannot substitute the learning that occurs through experiential learning activities (McCarthy & McCarthy, 2006). Henry Mintzberg also states that MBA students can only learn the essential skills of effective management from experience, and suggests a major change in management education to allow this to occur (as cited in McCarthy and McCarthy 2006). The design of this course was intended to put management research into practice, something that is often seen as a gap within the academic process (Burke and Rowe, 2010).

Context- Introductory Management Course

Purdue University is a large, land-grant university located in West Lafayette Indiana with an enrollement of over 40,000 (Purdue Data Digest). At Purdue University, the Krannert School of Mangement includes undergraduate and graduate degrees with enrollment 3,256 includes (Ibid). The authors of this paper have previously experiemented with integrating decision-making into an experiential couse (Stonebraker 2016). This paper serves as a update to that work looking at how the framework can be implemented into a combined introduction to management course.

At our university, we have been teaching management in an active learning environment using the flipped classroom (Stonebraker 2015). We specifically focus on teaching students how to make decisions using information. After several years of teaching in a flipped environment, it became clear that while the flipped model could be used effectively to help students find quality information, they were less skilled in using that information in their decisions.

During the fall semester of 2016, we implemented evidenced-based decision-making as an innovation in our pedagogy in an introductory management course for highly capable first year students. These 105 students were directly admitted to the school of management based on high GPA and required to take this course as part of their orientation. The two credit course, titled “Introduction to Management and Information Strategies”, serves both as an introduction to the school of management and an introduction to the field of management studies. Students were required to take the course as part of their first year management education experience. The class has three main objectives: (1) Students will learn how to manage themselves (identify various professional development options available to them, reflect upon what type of management student they would like to be, learn strategies and tactics to help them transition to college life, (2) Students will learn how to manage teams and (3) Students will learn how to use information and fundamentals of management to make decisions. The course met twice a week, once during a large lecture, and again in small teams for a lab section, and was co-taught by faculty members from the school of management and the business library.

Early in the course creation, we identified evidence-based decision-making as an important element of the course. As the course is about management in general, we wanted to emphasize not only the types of management, but also the importance of learning early in a

college degree program the importance of evidence-based decision-making. We had observed excellent information literacy skills, but not improved decision-making.

To accomplish this goal, the course emphasized several important pedagogical practices: decision awareness, process creation, and decision practice based on Rousseau's 2012 framework (Rousseau, 2012). We believed using this framework would positively influence students' critical thinking and information appraisal skills, as well as their ability to transfer these skills to real-life scenarios. An abbreviated syllabus can be found in Appendix 1.

Decision Awareness

Decision awareness refers to using metacognition to aid students in understanding how they might make uninformed decisions even when they think they are acting rationally. In the classroom, this included using several well-known psychological manipulations based on cognitive bias in lecture slides. An example follows:

Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations. Which is more probable? Linda is a bank teller, or Linda is a bank teller and is active in the feminist movement? (Kahneman, 2011, p. 156)

The answer is that Linda is a bank teller because there are more bank tellers than banker tellers who are active in the feminist movement. However, the majority of students, when the manipulation is done well, will choose the second option. This is an example of attribute substitution bias, which is part of the wide family of biases that might affect how a person processes information, including confirmation bias, affect heuristic, optimistic bias, etc (Ibid).

Making students aware of how their own decisions are affected by different types of bias is important on a metacognitive level because it makes them more critical of how others make decisions as well. In class, students were asked to evaluate past group decisions they had made to find previously unnoticed bias. As the course progressed, groups analyzed each decision they

made and attempted to critically evaluate all decisions made for hidden bias. Practicing this made spotting their own bias easier, as well as noticing it in the decision-making of their peers.

Process Creation

Prior to the class, students tend to fall into one of two groups: those who think a decision is good because the outcome is good, and those who think a decision is good because the process is good. After the in-class discussion of bias, most students think that a good decision requires both. This leads to conversations about process creation. In the class, we spend considerable time examining a variety of models of how people make decisions. Some models we talk about are the Kolb Cycle, Kahneman's System 1 and System 2 (Kahneman, 2011), and the KWL model (what you know, what you want to know, what you learned). The objective of teaching process creation is not to uncover one single way that students should make decisions, but rather encourage the students to think about how they think through information and develop models that are most helpful to them individually. An example of this is an in class activity where students are given a business problem and, rather than being asked to solve the problem immediately, are instructed to break the problem down into pieces. Students make a list of what they already know about the problem, what information they would like to have in order to solve the problem, and where they think that information can be found. Students are not required to use this method going forward, but are encouraged to try different ways of breaking down a problem and determining which system they prefer.

Decision Practice

Finally, and most importantly, the students make a large quantity of decisions based on information in the course. Each week the students must make a recommendation for the case of a fictional client, using evidence found in research databases, within a short time period (50

minutes). For example, in one project they advise a wealthy investor on the merits of investing in the United States beer market. In another project, they advise the university on with which company with which they should enter into a partnership on a research park. They primarily make these decisions in assigned four-person groups in a computer classroom. Working in these groups is valuable for two main reasons. First, the teams work together all semester, so students get a chance to get to know other students in their program. Second, decision-making with a group helps students improve their metacognitive decision awareness. When a decision is made in a group environment it becomes more susceptible to some types of cognitive bias, however the group itself provides the check of having to explain the decision to other people (Kerr, MacCoun, & Kramer, 1996).

When the students begin the course, they often read through the case and came to a decision before doing the research. By the end of the course, the students learned to look at the evidence before deciding. As they get feedback from every recommendation they give, they get better at giving nuanced decisions based on the body of evidence they find. Decision practice helps the students learn how integrating information may at first feel slower, but often leads to better decisions.

Results

Data Collection and Analysis

In order to understand how students perceived changes in their decision-making during the course, we asked the students to reflect on these changes during an in-class group activity. This mid-term assignment was part of a larger group evaluation of their efficiency and effectiveness. They were asked other questions as well, such as what is working in their groups, what is not working, etc. The data was collected as part of the groups' assessments of how they

excelled in the group and what changes they might need to make to be a better team for the final weeks of the semester. We first coded the responses into categories independently, then met in a norming meeting to decide on coherent categories. An independent reviewer then used those categories to assess the responses. 38 responses representing 105 students enrolled in the course were submitted. The teams filled out the assessment for in-class participation points (see Table 1 for themes and number of responses).

All responses (n= 38) said that the class improved their decision-making, individually and as a group. Students mentioned they learned more about making decisions in teams from having taken the course, including making better decisions (n= 7), faster decisions (n= 4), and more informed decisions (n = 14). A large group also indicated that they better understood bias and fallacies (n= 10). A good example of how the course affected decision-making is seen in the following quote.

“We have used our research to determine our decisions. We have thought more dynamically and creatively and used our facts gathered from research to make better and more thoughtful decisions.”

There are other examples of how the course affected the student’s decision-making:

“We’ve learned to not rush to conclusions, as well as to take time to analyze information.”

“We are thinking about others’ opinions more and are more analytical.”

“We have learned to how to do better research and now know to get as many relevant facts as you can before deciding the best of course of action to take.”

[INSERT TABLE 1 ABOUT HERE]

Discussion and Implications for Practice

Decision practice, decision awareness, and process creation are not new ideas, but when implemented in an active learning classroom where students are engaged in information rich scenarios with complicated problems, the practice creates classroom experiences that have the potential to create substantial differences in student outcomes. A student who learns early in their

academic career how to use information in these decision-making processes may think critically, act logically, and ask questions that are much more engaged than those who do not have this experience. Anecdotally, the students who took this version of the course scored highly in several notable competitions. At these competitions, the judges praised the students for how they presented information and integrated it into their decisions in ways that many had not seen before with students this early in their academic careers.

As often with new innovative models, we hope to continue to iterate the course in future semesters. This current work confirms some student perceptions, but the next step in our research is to explore various methods to assess student learning growth in a decision-making context. We hope to pursue qualitative and quantitative methods in decision science, information science, and management for better holistic assessment. For now, assignments are the only way to assess student growth, which makes it challenging to isolate decision-making from other skills like professionalism.

Conclusion and Next Steps

As we enter into the self-proclaimed “era of responsibility” where companies are under increasing scrutiny, it is more important than ever that managers understand the implications of decision-making and its processes. While the initial results are promising, we continue to assess the use of evidence-based decision-making in this course, since this is the first time an introductory class has been taught using this method. We plan to continue teaching evidence-based decision-making in the school of management. In addition, we are interested in better understanding how evidence-based decisions can be better assessed through questionnaires in order to develop a pre-test/post-test model. Elements of this model have been integrated as part of orientation for the MBA program and we are looking actively for more opportunities to work

the same pedagogical tactics into the Masters' program. We are also interested in the long term impacts of teaching in this style. Do students who are instructed in this manner revert back to their old methods of ignoring their own decision-making models after a couple of semesters? Do other instructors or employers perceive improved critical thinking skills from students who have been taught in this manner? Or do students retain the information skills, but neglect to apply sound decision-making practices later in their career because of other determinants not present in first year high achieving students? These are some of the questions we hope to address and hope others will address in their work.

The information available to students in decision-making context has reached exponential proportions. As educators of management professionals, we cannot possibly analyze the vast amount of information for them. Elements of the case method facilitate experiential learning that hinges on the use of nuanced decision-making. Emphasizing how information affects decisions in management is an innovation that could have long-lasting positive impacts. We hope this article will encourage others to pursue teaching decision-making in their classrooms and beyond.

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