Learner Reflections from an Introductory Geographic Information Systems Course: A Case Study

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Abstract

A traditional approach to teaching the functionality of computer software (computer aided drafting, desktop publishing, geographic information systems) is to give learners step-by-step or prescriptive instructions for laboratory or homework exercises. A less traditional way of expanding the learners' capabilities is to provide a problem-based exercise that requires them to recall from lectures or demonstrations and/or explore the usage of new software functionality. This paper reports on two approaches to applying GIS functionality and collects student perceptions on each approach using a structured and learner centered reflection process. Through the problem-based framework exercise, there are more opportunities for learners to engage each other in collaborative learning. Both and instructor teaching objectives and learner aspirations following the course. The learners indicated through reflection that the problem-based exercise involving the project conceptualization into multiple sub-problems has helped them learn better than through prescriptive exercises.

Introduction

This paper documents how upper division undergraduate and beginning graduate students in landscape architecture and related natural resource based curricula perceive the opportunities and constraints of two instructional methods. This study sought to understand what learners perceive they are learning about GIS through the different approaches. Utilizing a learner centered self-reflection and reporting framework as a teaching tool, this case study contributes to the literature of instructional method comparison from the learner's perspective. This reflection experience helps learners hone in on learning approaches that work for them while documenting viewpoints concerning the opportunities and constraints of the two teaching/learning approaches.

There is a fundamental difference between teaching how to use software and using software to help a learner understand a process or system (Hall-Wallace and McAuliffe, 2002). One approach used in teaching the functionality of computer software (computer aided drafting, desktop publishing, geographic information systems) is to give learners detailed sequential instructions to follow for exercise completion. These prescribed exercises are referred to as "point and click," "cookbook," or "structured" exercises. Another approach to teaching software capability is to construct problem-based exercises that require the use of specific software functionality that has been previously demonstrated/used in class. In the context of this case study, the course's primary instructional method is a problem-based exercise approach (Duch et al., 2001) with some lecture sessions for specific theoretical instruction and technical component delivery. Problem-based learning, or PBL, is a method in which learning is placed in the context of complex and potentially meaningful problems or situations (Hmelo, 1998). PBL requires learners to recall from lectures, demonstrations, and/or self-exploration of new software functionality to complete exercises.

The setting for this qualitative case study is an introductory geographic information system (GIS) and landscape analysis course. Introducing GIS functionality for landscape analysis is an important course objective. GIS is now used by learners from as early as middle school through graduate school as well as by professionals (Hall-Wallace and McAuliffe, 2002). An additional objective is to develop a peer support network for problem solving in this as well as other courses later in the curricula that will build upon the skills learned in this course. Often the use of a GIS involves solving "mini" problems in succession while undertaking more complex landscape analyses for an overarching problem. Therefore, a third course objective is to build the learners' skills in hierarchical problem solving. Increasingly, geospatial data are available through state and federal government sources on the Internet, therefore, course content is structured around using data that are publicly accessible and are about geographic areas that are known to the learners or can be easily experienced.

Methods

Class Structure and Logistics

For this case study, there were 24 learners enrolled in the 15-week semester course as a single section with one faculty member and no teaching assistant. The three credit hour course met three

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times a week for roughly two-hour sessions in a university managed computer facility. The GIS software used is Environmental Systems Research Institute's (ESRI) ArcGIS v. 9.1 and related extensions such as Spatial Analyst and DATA EAST"s - Xtools Pro v.5. Several different activity segments are typically sequenced over the class period. The first activity is a brief overview of the layout for that period. The second activity is a short lecture that covers the theoretical underpinnings of the class period's focus. A transition activity involves the learners doing a think/pair/share (Lyman, 1981) for a few minutes, which leads into the third activity of a class-generated application's list of the introduced tool/approach. At this point, the instructor demonstrates the basic tool functionality while an LCD projector displays the instructor's screen to all learners. The learners can use his/her computer workstation and follow simultaneously or observe the demonstration exclusively. The instructor demonstrates the tool several times with pauses in activity to relate dialogue boxes back to previous lectures/questions or class periods/tools when appropriate. Once the demonstration is complete, the learners utilize about 30 minutes to explore the software tools in a hands-on workshop format without a prescriptive exercise but rather given general instructions to self explore what was just demonstrated. The instructor is available at this point to work as a facilitator with learners either individually or in small groups (Hmelo, 1998). Learner-to-learner collaboration and problem solving may also occur (Wagner and Gansemer-Topf, 2005). Once the exploration time has expired, the instructor facilitates a discussion about what the class observed/learned about the tool. Finally, a minute paper (Angelo and Cross, 1993) completes the learning cycle for the class period. This cycle reiterates itself in each of several class meetings until enough data/tools/procedures are introduced for learners to complete a larger project assignment. The larger assignment is typically a problem-based task presented through a descriptive statement provided by the instructor that requires learners to synthesize software functionality into landscape analysis solutions. These assignments typically resemble a "word problem" and are situated in the context of locally based real-world problems (Hmelo, 1998). This approach draws upon a project-based learning method, which has been shown to increase student-learning motivation (Blumenfeld et al., 1991).

Problem-based Exercise

The problem-based exercise reported about in this case study involved performing a watershed-based landscape indicators study of the 36 watersheds where the university is located. By using local watersheds, the learners are able to make connections between the data they see and use in class and the actual area where many of the learners live (Hmelo, 1998). Learners often see the study area discussed in the local media in relationship to water quality issues which adds another dimension to the project's relevance. Most methods used to perform the watershed study were documented in an assigned class reading published by the United States Environmental Protection Agency entitled *An Ecological Assessment of the United States Mid-Atlantic Region: A Landscape Atlas* (Jones et al., 1997). The atlas is useful to an introductory GIS and landscape analysis course because many indicators utilize satellite derived (raster) data and related ancillary (vector) geospatial datasets. The twelve indicators in the assignment required the use of several essential GIS functions as they pertain to vector and raster data analyses. All of the data used are available for public download from Kentucky's Internet based geospatial clearinghouse (http://kygeonet.ky.gov). The problem-based exercise requires three learners to collaborate to measure each watershed indicator for each of the 36 watersheds. Since each learner is analyzing three watersheds, there is repetition and error checking built into the exercise. For example, if the indicator is determining a watershed's total amount of impervious cover, three learners perform the calculation and have the opportunity to compare methods and results as they are entered into a master database of watershed indicator characteristics. For clarity in this article, the author will use "problem-based exercise" as the phrase to describe this approach; while in many of the quotes in the Results and Discussion section, the learners refer to this approach as the Atlas project.

Prescriptive Exercise

Once learners have achieved a comfort level with the software through the completed problem-based exercise, the next activity in the semester is a prescriptive exercise involving landscape suitability analysis (McHarg, 1969; Steiner et al., 2000). The exercise used in this case study was *Modeling the Wildland/Urban Interface* by Mike Price (2003). The exercise's directions and data are downloaded by the learners from the ArcUser webpage, a publication of Environmental Systems Research Institute (ESRI), Inc. The prescribed exercise involves landscape suitability analysis in a fire dependent landscape utilizing a national fire classification framework. Once individual learners completed the specific directions of the exercise and produced a suitability map, the instructor asked each learner to place a geographic marker to indicate where a house was likely to be involved in a landscape fire and another marker to indicate where a house was not as likely to be involved in a landscape fire. The original exercise by Price (2003) did not require the learner to indicate on the resulting suitability map where he/she thought the safest location for a house would be in relationship to a potential landscape fire. The

addition of the marker placement step forces learners to make inferences about landscape locations based on their analysis of the prescriptive exercise. For clarity in this article, the author will use "prescribed exercise" as the phrase to describe this approach; while in many of the quotes in the Results and Discussion section, the learners refer to this approach as the Fire, step-by-step, or cookbook project.

Comparison Exercise and Analysis

After completing the problem-based (Atlas) and prescriptive (Fire) exercises, the learners compared and contrasted the opportunities and constraints related to the two instructional strategies using a Classroom Assessment Technique (CAT) as described by Angelo and Cross (1993). The specific CAT used in the study was the RSQC2 (Recall, Summarize, Question, Connect, and Comment), a comprehensive process to evaluate learning strategies or class sessions. According to Angelo and Cross (1993), the purpose of the RSQC2 is to allow an instructor to compare detailed information on learners' recall, understanding, and evaluation of an exercise or class session. In the first part of the RSQC2, Recall, learners are asked to use words or simple phases to describe what they liked and did not like about each exercise. The second part of RSQC2, Summarize, asked learners to summarize in a single sentence the essence of the most important points of the two exercises. The third part, Question, elucidates the still unanswered questions learners had concerning specifics of each exercise or the software itself. In a sense, this activity is similar to the one-minute paper used at the end of each class meeting. The results from this CAT section are not included in this article since the learner questions focused on specific data, methods, or software functionality aspects. The fourth part of RSQC2, Connect, requires learners to make clear the connections they saw between the problem-based and the prescriptive exercises, as well as with the major course objectives. The final part of RSQC2, Comment, provides learners with an opportunity to offer evaluative comments about the structure of the two exercises. This Comment section specifically asked for each learner's opinion in reflection form. In keeping with a traditional RSQC2 framework, the learners were given some ideas on how to begin this part of the assignment. The following prompts were used in the Comment section:

1. Which exercise helped build confidence in the use of the software and landscape analysis? Explain why you feel the way you do.

2. Which exercise allowed for more learner-to-learner collaboration? How did the collaboration help you learn or not learn? Is there anything you value from the collaboration to helping you learn?

3. During XX exercise I felt. . . During the YY exercise I felt. . .

The completed learner assignments were collected and subsequently used to identify salient themes/concepts for each RSQC2 section using modified content analysis. Content analysis describes the methodological procedures for extracting thematic data from a range of communications (Williamson et al., 1977). Content analysis's most common use is to detail the frequency with which certain items, symbols, or themes appear in a written document (Williamson et al., 1977). The RSQC2 assignments were used to summarize key contrasts as well as learner identified constraints and opportunities of the two exercise types. The responses for each RSQC2 section from each learner were reviewed to identify themes based on the researcher's interpretation of the comments. As two or more learners identified similar themes, a tally was recorded as to how many learners indicated the idea. The quotes included in the Results section are from the content analysis of learner RSQC2 assignments.

The instructor has used the problem-based and prescriptive exercises in various combinations for several years in introductory GIS classes. The exercise sequencing has developed over the years to the order described in this article based on anecdotal evidence and instructor observation of learner achievement. This case study reports the results of one class from a single term and uses the RSQC2 assignment as a way to formalize a process of understanding the learner perspective through reflection. Future work could replicate this case study as well as modify assignment-ordering sequence.

Results and Discussion

The results presentation follows the previously described RSQC2 format with results tabulated in Tables 1–4 followed by a general discussion. Based on the RSQC2 assignment, the Recall section revealed that the primary likeable themes expressed by the learners about the problem-based exercise are the chance to compare answers and the necessity to repeat procedures for each of their three assigned watersheds. It appears the comparison and repetition helps to build confidence in performing the procedures (Table 1).

The Recall section also ascertained that some

Table 1. Predominant learner recall themes describing the likes about the problem-based exercise

Number of learners indicating	What learners liked about the exercise
12	Comparing strategies/answers with group members increased understanding
8	Process repetition to build confidence
8	Use of different tool combinations
7	Exploration of different GIS tools
4	Development of creative problem and analysis process
4	Use of real downloadable data
2	Became more familiar with place I live
2	Use of GIS in conjunction with other software (Microsoft Excel)
2	Complexity of watershed analysis

learners disliked certain aspects of the problem-based exercise (Table 2). For example, the exercise was class time intensive and required the learner to synthesize several procedures together in order to determine an answer. It is understandable that some learners would perceive this as harder to do than using one tool at a time as required by the prescriptive exercise. Similarly, several learners did not initially conceptualize a correct approach to performing an analysis in the problem-based exercise. This resulted in a considerable amount of time expended, but did not result in the correct answer. Some learners frustratingly repeated the incorrect approach multiple times because of the required repetition for the three watersheds. In addition, file management is more complicated to control in the problem-based exercise as compared to the prescriptive exercise. This is particularly true for learners with limited computer file organizational skills. This deficiency can lead to additional learner frustration despite the basic operating system familiarity required for the course. It is important for the instructor to be aware of these student perceptions and have strategies to offer learners, to overcome typical problems related to learning GIS.

Table 2. Predominant learner recall themes describing the dislikes about the problem-based exercise

Number of learners indicating	What learners disliked about the exercise
8	Class time intensive
7	Complicated analyses
5	Difficult to remember file management procedures
3	A lot of tools to utilize
2	My classmates confusing me
2	Did not always understand the math
2	Entering data into the master analysis table
2	Hard to keep up when you miss class

Turning to the prescriptive exercise, learners provided a variety of words regarding their likes of the step-by-step approach (Table 3). The learners indicated that the exercise was easy to complete and not time consuming. In addition, learners liked that direction was provided on how to display data as well as name files. It is interesting to note that several lectures/demonstrations took place earlier in the semester, unrelated to the prescriptive exercise, which addressed how to display different kinds of data from the software's as well as the data's perspective. Therefore, the previous comments might indicate that learners did not recall some aspects taught near the beginning of the course or failed to associate those lessons with later activities.

Table 3. Predominant learner recall themes describing the likes about the prescriptive exercise

Number of learners indicating	What learners liked about the exercise
7	Provided direction to meaningfully display data in different ways
6	Step-by-step directions
5	Not time consuming
4	Written instructions made it easier to determine when a step was wrong
3	File management specifics
3	Independence from working with classmates
3	Easy assignment
3	New data to work with
3	Reinforced ideas first explored in the Atlas project
2	Different tools not covered in Atlas
2	Direction illustrations to compare my answers
2	Understand “real world” application

Table 4 shows the learners' prescribed exercise dislikes. Based on the comments, it appears learners were not engaged in the exercise and generally did not utilize the peer-learner collaboration network developed in the previous problem-based exercise. It is important to note that there was no instructor prohibition against learners working together to solve problems or clarify directions during the prescriptive exercise. In addition, for some learners merely going through the exercise will be enough in terms of subject learning; while others may want to learn more about a specific topic or data related to the exercise. This presents opportunities for individuals constructing prescriptive exercises to include in the directions links to in-depth resources available through the Internet. In this specific exercise, links to the National Interagency Fire Center (http://www.nifc.gov/) in addition to Price's suggested link to the FireWise (http://www.firewise.org/) webpage would be helpful.

Table 4. Predominant learner recall themes describing the dislikes about the prescriptive exercise

Number of learners indicating	What learners disliked about the exercise
11	Just following directions and not really thinking or knowing what I was doing
7	No explanation of why I did what I did
6	Limited or no student collaboration
4	Step-by-step directions
3	No sense of where the data came from
3	Inconsistent detail in directions
3	Only one way to explore the software/data
3	No analysis questions or discussion
2	I wouldn’t be able to do this again if I didn’t have the directions
2	Software interface changes between versions so the directions need to be updated
2	Canned data
2	Lost if something went wrong

RSQC2 - Summarize

The 'S' in RSQC2 is an opportunity for learners to summarize the perceived most important points. In

this exercise, learners provided one summary sentence that captured the essence of the most important points of the two exercise approaches. Representative responses from three learners are provided below:

"In doing the Atlas (problem-based) exercise, I was experiencing and understanding first hand how GIS (ArcMap in particular) is a tool for creating new information from base data, whereas in the Fire (prescriptive) exercise I was only an observer of a canned demonstration of that point."

"Showing us the two different exercise approaches helped us to understand how an integration of methods might work to our best advantage and that both methods have advantages and disadvantages."

"By using both the Atlas/Discovery method and the Wildland/Cookbook method, I am able to discover the power of GIS in different ways that show me an exploratory method and a directional method of learning."

Learners could see differences in the two approaches when asked to summarize and appreciated the advantages and disadvantages of each of them. The prescriptive exercise occurring late in the semester when learners are often under time constraints focused on finishing several academic term courses is a perception consideration. On the other hand, completing the prescriptive exercise as an end of term assignment could be more satisfying for learners because of the sense of achievement. In addition, the prescriptive exercise could serve as a condensed review of many course concepts in preparation for a practical "keyboard" final examination. From the instructor's perspective, it was encouraging that learners were able to see, using the reflection assignment (RSQC2), the learning potential and limitations of combining the two methods while recognizing what he/she preferred. Future work could involve adjusting the order of exercises in an additional case study to determine if similar learner perceptions exist.

RSQC2 - Connect

The 'C' in RSQC2 creates an opportunity for learners to connect specific concepts back to the overarching course objectives. Learners explained in their own words the connecting threads they saw between the problem-based exercise, prescriptive exercise, and the course objectives. In general, learners are making course goal links and visualizing applications beyond the isolated exercises. Several learners also recognized his/her own limitations when it comes to performing landscape analysis with GIS. The first quoted response of this section is not the only one that had a tone acknowledging an ability limitation. This is good in an introductory GIS course because it demonstrates that learners are not simply accepting what the computer tells them. The problem-based exercise in particular helps build a sense of questioning since the answer is not provided immediately within a set of step-by-step directions. The encouraged answer checking process with classmates helps to confirm and/or raise questions about the derived answers from the computer as well as the learner's ability to operationalize his/her own problem conceptualization. This appears to force the learner to engage more with the problem-based exercise than the prescriptive exercise. Representative responses from two learners are provided below:

"The exercises were successful together in reiterating techniques in class and out of class. I felt this was the most successful link between the two assignments. This connection was pertinent in discovering my own data retrieval and analysis outside the classroom setting. I was finally able to recall and use the techniques that became automatic during class. I felt this was the success of the class: to finally make us realize we can apply our knowledge outside of class and to be able to take a task on our own and successfully complete it or know when to ask for help."

"These two exercises helped to learn spatial patterns of various natural resources and the importance of their arrangement in the ecosystem. I have an idea now how to effectively use GIS in making management decisions considering optimal use of various natural resources."

RSQC2 – Comment

The second 'C' in RSQC2 offers an opportunity for learners to express evaluative comments about the structure of the two exercises. The responses from the learners helped the instructor question the learning value found in the prescriptive exercise as compared to the problem-based exercise. Although there are some good aspects to the prescriptive exercise, the learners generally valued the problem-based approach more than the prescriptive exercise. The problem-based exercise approach can be frustrating at times for some learners as indicated in the comment from the second learner later in this section. Despite some negativity, upon completion of the exercise this learner revised his/her initial perceptions and saw the learning value in working through the frustration. It is important for the instructor to be sympathetic to learner frustration but also encourage learners to work through the difficulties by helping them to recall skills previously learned as well as to utilize the peer-learner support network. Representative responses from three learners are provided below:

"The Atlas approach definitely gave me a better understanding of the software as a whole and I was surprised to find myself feeling fairly confident about the work that I was doing. During the fire modeling exercise, I felt sure of what I was doing because the directions were sitting directly in front of me, but I was not the least bit engaged in what I was doing and I found myself hardly thinking about the exercise as I went through the set of instructions."

"During the Atlas exercise, I experienced much

frustration but it was the ingredient needed to push my motivation to learn. I wanted to learn as much as I could to maintain myself with the class pace. In retrospect, the frustration was an attribute to the exercise."

"During the Atlas exercise I felt that I was learning the software best. The strategy used in teaching was much more effective than the cookbook method for the Fire exercise. During the fire exercise, I felt frustrated at times because I did not know why I was doing certain things and what they were accomplishing. If we had not done the Atlas first I would have been even more lost and would have been clicking without learning."

Summary

Learners appreciated having exercises they could relate to a particular landscape as well as to what they might be doing in concurrent or future courses. Therefore, when designing a course that focuses on using GIS to perform landscape analyses, it is important to expand the exercises beyond merely demonstrating software functionality. It is essential that learners see the relevance in both the short and long terms of their formal education and beyond as well as using a landscape that is generally familiar to them.

Both exercises have their opportunities and constraints from the learners' perspectives as well as the instructor's. The straightforwardness of the prescriptive exercise provided the learners with a direct path to completing the exercise, a process that pleased some learners. The exercise also provided an opportunity to review quickly some tools and specialized usages of previously covered tools/functionality from earlier in the semester.

One of many ways in which to assess classroom activities is to use learner perceptions of his/her own learning. Most learners in this study preferred the problem-based exercise for several reasons. The first reason was the collaborative approach to the exercise. It allowed learners to learn from classmates as well as teach classmates in collective problem solving. Second, the repetitiveness helped reinforce the usage of the particular analysis approach. With each watershed analysis performed three times, the learner was able to see how he/she improved when building a specific analysis process. In a sense, the learner was "mapping" the analysis process. This is believed by the instructor to have built learner confidence. Third, just following a prescribed exercise seemed to fail at sparking software experimentation/exploration in the learners. The prescriptive exercise does not allow for deviation from the predetermined path. When answer differences occur in the problem-based exercise, the learners are compelled to explain to each other the methods used to determine their answers. This process encourages learners to peer-teach/learn and reinforces the need for data quality control and quality assurance. This process enables learners to interact to defend his/her answer as well as develop a peer support network for use in this class as well as other classes in the curricula. The instructor is available to assist learners when differences exist in understanding either the methods and/or answers. In GIS, as well as many other things in life, there are multiple ways to accomplish the same thing. The problem-based exercise not only allows for, but also encourages exploration of multiple paths to reach meaningful conclusions. It is important to note that the prescriptive exercise lasted less than three 2-hour class periods while the problem-based exercise lasted several weeks.

On balance, the problem-based exercise appears somewhat more successful in achieving the instructor's long-term student learning objectives based on the student reflection exercise. However, the prescriptive exercise does have usefulness in exposing learners to a range of software functionality in a short amount of class time. The prescriptive exercise also serves the purpose of refreshing skills previously learned during the semester or potentially for use in follow-on courses as an exercise to refresh skills from this introductory course. Likewise, the prescriptive exercise can also be useful when preparing learners for a formative assessment such as a keyboard-based final examination. Despite taking time to complete, the problem-based exercise is more holistic in terms of an actual GIS approach for a landscape analysis project. The learners had to read Jones et al. (1997) and transfer those concepts for use with newer data and software to a landscape with which each student was familiar. A problem-based exercise approach to teaching can demand a large amount of instructional time to address all the learners' needs. Using peer-to-peer teaching in the problem-based exercise can change demands on the instructor while empowering learners to develop a peer support network available in and beyond this introductory course. The peer support network also encourages increasing learner knowledge, self-confidence, and mutual respect.

Literature Cited

Angelo, T.A. and K.P. Cross. 1993. Classroom assessment techniques: A handbook for college teachers. Second Edition. San Francisco, CA: Jossey-Bass.

Blumenfeld, P.C., E. Soloway, R.W. Marx, J.S. Krajcik, M. Guzdial, and A. Palincsar. 1991. Motivating project-based learning: Sustaining the doing, supporting the learning. Educational Psychologist 26(3-4): 369–398.

Duch, B.J., S.E. Groh, and D.E. Allen (eds.) 2001. The power of problem-based learning. Sterling, VA: Stylus.

Hall-Wallace, M.K. and C.M. McAuliffe. 2002. Design, implementation, and evaluation of GIS-based learning materials in an introductory geoscience course. Jour. of Geoscience Education 50(1): 5-14.

Hmelo, C. 1998. Problem-based learning: Effects on the early acquisition of cognitive skill in medicine. The Jour. of the Learning Sciences 7(2): 173–208.

Jones, K.B., K.H. Riitters, J.D. Wickham, R.D. Tankersley, Jr., R.V. O'Neill, D.J. Chaloud, E.R. Smith, and A.C. Neale. 1997. Ecological assessment of the Mid-Atlantic region: A landscape atlas. EPA/600/R-97/130. http://www.epa.gov/emfjulte/html/pubs/docs/groupdocs/landecol/atlas/ma_atlas.html (Accessed 06 April 2008).

Lyman, F. 1981. The responsive classroom discussion. In Anderson, A.S. (ed.), Mainstreaming Digest, College Park, MD: University of Maryland College of Education.

McHarg, I.L. 1969. Design with nature. Garden City, NY: American Museum of Natural History by the Natural History Press.

Price, M. 2003. Modeling the wildland/urban interface. ArcUser April – June Issue http://www.esri.com/news/arcuser/0403/files/firemodel.pdf (Accessed 06 April 2008).

Steiner, F., L. McSherry, and J. Cohen. 2000. Land suitability analysis for the upper Gila River Watershed. Landscape and Urban Planning 50(4): 199–214.

Wagner, M. and A. Gansemer-Topf. 2005. Learning by teaching others: A qualitative study exploring the benefits of peer teaching. Landscape Jour. 24(2): 198–208.

Williamson, J.B., D.A. Karp, and J.R. Dalphin. 1977. The research craft: An introduction to social science methods. Boston, MA: Little, Brown and Company.