AN ONLINE SITUATION FOR PROBLEM-BASED LEARNING IN A JUNIOR-LEVEL MANAGEMENT COURSE

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EXTENDED ABSTRACT

Two questions must be answered when incorporating Problem-Based Learning into an undergraduate business curriculum: First, what kinds of problematic situations are recent graduates likely to encounter? Second, how can students effectively be engaged with representative problems in a university environment? In this session I present a case that follows from answers to these two questions.

With reference to the first question, I reviewed research concerning the kinds of positions, organizations, and problems that recent graduates are likely to encounter and with which they are likely to have difficulty. While the positions that recent graduates enter vary widely from one another in many ways, the situations they encounter have underlying similarities: Their situations are likely to contain a number of important, though not necessarily explicit, issues. These issues are usually interdependent, and usually include how to apply of a variety of types of business knowledge in the graduates' work, how to capitalize on opportunities for improving work processes, how to determine appropriate personal behavior, and how to manage interpersonal relationships. There is usually no identifiable "best" solution, requiring graduates to come up with solutions that provide the best trade-off on conflicting interests. Often graduates must not only come up with a solution, but also to take action to make the solution a reality.

With reference to the second question, the author developed a case which attempts to capture the dynamics that recent graduates are likely to encounter. This case employs a Problem-Based Learning (PBL) format which is designed to engage learners in all aspects of problem solving. Cases using this approach characteristically: (1) begin learning with a problem, (2) involve a complex, real-world situation, (3) do not provide all needed information—students must determine needed information and actively seek it, and (4) assigns students to work in long-term teams.

Several aspects of this case go beyond the characteristics typically associated with a PBL format. First it is expressed in an online format which can be used in both face-to-face and online classes.

Second, students are asked not only to identify implicit issues in the case, but also to take problem solving past the solution stage to the formulation of an action plan for making the solution a reality.

Third, a vivid context is provided, which attempts to more realistically create the ambience of an actual work situation. The central element of the case is an online panorama of an actual office of the type a recent graduate can expect to occupy.

Resources are of the kind typically accessible to a recent graduate in the situation, and are accessed in ways similar to the ways they would be accessed in an actual situation. For example the phone in the panorama can be clicked, leading to a menu of numbers of people in the company, and these in turn lead to "conversations" with those people. The intent is to provide problem solving practice in a realistic setting so that recent graduates will be "cued" to apply problem solving skills by the environments of their actual jobs after graduation.

Fourth, the case organization is not an actual firm. Rather, it is a composite, drawn from actual organizations, but not based on any specific one. A "true-fiction" firm has the advantage of allowing the case to contain dynamics that we know occur, but which actual organizations would be reluctant to share with outsiders. An additional advantage is that students cannot use published analyses of the firm as a substitute for doing their own analyses. Yet they can research the industry in the case.

Finally, the online format allows tracking of students' progress through the case. Students log in to the case and the timing and frequency of page accessing is recorded through the use of asp (active server page) scripts linked to an MS-Access database. The information thereby gained is helpful in understanding the choices individuals make in navigating through the case, and in providing feedback helpful in developing their problem solving competencies.

The case is designed for a student team assignment which requires 4-5 weeks to complete. While conference participants will not have the time to engage fully with this case, they will be invited to try out the case's essential features. Participants will navigate to the case opening page, and from there go to the virtual office and linked resources. We'll discuss what participants see and their reactions to the case. Following discussion, I will provide additional information on characteristics of difficult entry-level situations, the scoring of problem-solving behavior, and details of software tracking of online problem solving behavior.

With reference to the second question, the author concluded that current case approaches are not entirely satisfactory to get at the learning issues relevant to entry level work. Regular cases tend to be too linear and focused to capture the quality of real-life situations. "Live" cases, where individuals carry out tasks in actual organizations, expose learners to actual organizations, but constrain the learners' roles to outsiders, allowed to carry out work, but not allowed to know too much about what's really going on in the organization.

1. Basic data

a) *Objective(s) of the Session*. 1) Introduce participants to a way by which Problem-Based Learning (PBL) methodology can be feasibly employed in an undergraduate business curriculum, 2) provide supporting information participants may need in adopting a PBL approach in their own courses, and 3) elicit participants' considerations about the value and feasibility of this approach.

b) *Target audience*. 1) University-level instructors interested in improving students' decision skills in any business course, 2) instructors interested in how an online clickable panorama can be created and used.

c) *Time needed* (including debriefing/discussion time). I'd estimate one and a half hours, given the following schedule:
    a. Introduction (15 minutes)
    b. Participants work with online situation (30 minutes)
    c. Discussion: Is this useful? Feasible? (30 minutes)
    d. Conclusion & handouts (15 minutes)

d) *Targeted number of participants*. The main constraint on size would be the number of computers available. For discussion purposes a group of 30 or under would be desirable.

e) *Materials required*. I'll provide handouts. No additional materials are required.

f) *Equipment required*. A computer lab with a connection to the web. Current web browsers (Netscape or Internet Explorer). If Internet Explorer is the browser, be sure that Java capability has been added.

g) *Room setup*. Ideally we would meet in a computer lab that also allows the capability of talking to the people and holding a discussion. We could also meet in a regular conference room (chairs in a circle if at all possible), adjourn to the computer room, and return to the conference room for the subsequent discussion.

2. Theoretical grounding and/or relevant constructs

Constructivism. The approach being applied in this session is an application of *constructivism*, where "...the learner is building an internal representation of knowledge, a personal interpretation of experience.. Learning is an active process in which meaning is developed on the basis of experience... Conceptual growth comes from the sharing of multiple perspectives and simultaneous changing of our internal representations in response to those perspectives as well as through cumulative experience" (Bednar et. al, 1991).

Objectivism. Constructivism is in contrast to "*objectivism*," where "..the mind is an instantiation of a computer, manipulating symbols... These symbols acquire meaning when an external and independent reality is 'mapped' onto them in our interactions in the world. Knowledge, therefore is some entity existing independent of the mind of individuals, and is transferred "inside" (ibid.). This approach is in widespread use in colleges of business and elsewhere, but is not suited for teaching problem solving skills.

Problem-Based Learning (PBL). This is a constructivist approach where students and student groups are presented with complex, ill-structured problems. The common features of PBL

are: (1) learning is initiated by a problem, (2) problems are based on complex, real-world situations, (3) all information needed to solve a problem is not initially given, (4) students identify, find and use appropriate resources, (5) students work in permanent groups, and (6) learning is active, integrated, cumulative, and connected (University of Delaware Institute for Transforming Undergraduate Education, http://www.udel.edu/inst/june99/introduction/sld006.htm).

Cueing. One other construct which seems useful in this session is *cueing*, a behavioral term where behavior is elicited by a cue. In testing our near-graduates, we have found that in confronting situations they seldom associate to past learning that may be helpful. The online offices used in my cases are panoramas of actual offices in local businesses, and of the type that entry-level people may use. The idea is that by tying course skill development activities to this office, graduates may subsequently be *cued* by their own office to apply course learning after graduation.

3. Pedagogical implications and/or outcomes of the activity

The activity is based on Problem-Based Learning, which is described above. By engaging students in complex, real-life problems, the PBL approach is a highly effective pedagogy for developing complex problem-solving skills. This outcome – improved skills in solving complex problems – is the primary rationale for adopting a PBL pedagogy.

4. Implementation issues such as the sequencing of the exercise in relation to course material or curriculum constraints:

a) *Sequencing*. This activity engages students as *individuals* in the problem solving process. Ultimately, however, the intent is to build on individual skill to enable *groups* to develop collective problem solving skills. In the context of the course, then, this activity takes place earlier on and lays the way for later team-based PBL activities.

b) *Time-consuming*. A PBL approach does take time for students to engage with and research situations. In terms of content learning, the "objectivistic" approach described above allows a far quicker, albeit shallower, coverage of topics.

c) *Faculty/student change in orientation*. It is often the case that both faculty and students are accustomed to objectivist learning. Both may come to equate scores on tests to learning, even though students are still incapable of using their knowledge. Studies show that PBL is superior to objectivist approaches in developing problem solving skills. Nonetheless, students and faculty may feel that "real" learning, of the type they are accustomed to, is not taking place. In addition students and faculty may have an implicit understanding that "good" teachers provide high structure. Students may have difficulty in dealing with less structured situations, and may see this as evidence of poor teaching.

5. Supporting material(s): See attached appendices.

REFERENCES

Bednar, A.K., Cunningham, D., Duffy, T.M., and Perry, J.D. (1991). Theory into practice: How do we link? In G. Anglin (Ed.), Instructional Technology: Past, Present and Future. Englewood, CO: Libraries Unlimited, Inc.

Appendix 1: Entry-level positions for Business Graduates: Skills for Job Performance Episodes

Streams of work behavior are not continuous, but are broken into discrete *episodes* where individuals do different kinds of things that make a difference to the organization. *Job performance* is the value to the organization of the discrete behavioral episodes that an individual performs. (Motwidlo, Borman, and Schmitt, 1997, pp. 72-73). *Episodes* are distinguished by particular sets of organizational goals/values the person is in a position to influence, and consist of programs of action that may take place in a single setting and time span, or over a series of coordinated activities in a variety of settings. A person may recognize the opportunity to act on particular goals but choose not to, or may fail to recognize latent goals. These goals nonetheless, are still a part of the person's performance evaluation.

Five types of skills possibly useful for each episode (rows)	Major types of episodes that business graduates are likely to encounter in entry-level positions									
	Reality Shock[1]	Task Routine[2]	Task Process Improvement, Assignments	Peers, Task force/ Project	Boss[3]	Super-vising	Negotiat-ing	Citizen-ship[4]	Mistakes[5]	Counter-Produc-tive[6]
1. Task Skills										
Accounting, Economics, Finance, Legal, Marketing, Computing, Management		✓	✓	✓	✓	✓	✓	✓	✓	
2. Foundation Skills										
Communication: reading, writing, listening, speaking		✓	✓	✓	✓	✓	✓	✓	✓	
Math skills		✓	✓	✓	✓	✓	✓	✓	✓	
Computer skills		✓	✓	✓	✓	✓	✓	✓	✓	
3. Interpersonal Skills										
Interpersonal				✓	✓	✓	✓	✓	✓	
Teamwork				✓		✓	✓	✓		
Negotiation				✓	✓	✓	✓	✓	✓	
4. Problem Solving Skills										
Problem solving, decision making, creative thinking		✓	✓	✓	✓	✓	✓	✓	✓	
Leadership			✓	✓		✓	✓	✓	✓	
Understands complex relationships			✓	✓	✓	✓	✓	✓	✓	✓
5. Self management Skills										
Responsibility		✓	✓	✓	✓	✓	✓	✓	✓	✓
Self-management		✓	✓	✓	✓	✓	✓	✓	✓	✓
Learning		✓	✓	✓	✓	✓	✓	✓	✓	
Developmental		✓	✓	✓	✓	✓	✓	✓	✓	

1. *Reality Shock*: Characterized by a first exposure to the realities of an organization, confrontations with those realities, and the discovery that working with others could be problematic. (McCall, Lombardo, and Morrison, 1988, p. 21).
2. *Task performance* contributes directly or indirectly to the production of a good or the provision of a service, and is not restricted to behaviors listed in the job description (Rotundo, 2000, p. 18)
3. *Boss.* Bosses have the authority to affect the daily lives and often the careers of those who work for them. Bosses may be seen as good, bad, or flawed (McCall, Lombardo, and Morrison, 1988, pp. 69-70)
4. *Citizenship performance* includes helping others, informing others, promoting the organization and its image, and volunteering (Rotundo, 2000, p. 30).
5. *Mistakes* in which bad judgment and poor decisions led to failure (McCall, Lombardo, and Morrison, 1988, p. 88).
6. *Counterproductive performance* is voluntary behavior that violates organizational norms and harms the well-being of individuals and/or the organization (Rotundo, 2000, p. 37). (NOTE: I'd include here unethical behavior and behaviors motivated by personal benefit to the detriment of the organization – JDB)

Appendix 2: Difficulties that Recent Graduates may have with Performance

1. *Systems Rational Emphasis*. Business schools tend to inculcate a "systems-rational" point of view where "..work processes can be formalized and rationalized to optimize labor productivity, as can the reward systems that guarantee recalcitrant employees' adherence to these formal processes" (Abrahamson, 1997, p. 493), with the result that "..students leave business schools without an appreciation of the importance of behavioral issues to organizational success.." (Rynes and Trank, 1999, p. 819).

2. *Problem Solving*. When faced with new problem students tend to use a strategy of pattern recognition to develop a solution; that is, they try to match the new situation with their remembrances of solutions to previous problems (Woods, 1995, Ch. 4). When confronting a novel problem, a person using this method is likely to inappropriately attempt to apply a solution to a previous problem. Additionally such a person will have difficulty dealing with opportunities for improvement, since they are by definition novel.

3. *Implementing Solutions*. In their educational experiences students may learn to regard the formulation of a solution as the final step of problem solving and have difficulty in implementing their solutions.

4. *Focusing on evaluation rather than performance*. The dynamics of the educational environment may shift students' concern from performance to how performance is evaluated and how they can boost their rating. Representatives of one firm commented that new entrants from the school system often brought with them the belief that to make a mistake was to fail and that, therefore they often sought to conceal or rationalize mistakes (Bullard et. al., 1995, p. 26). Since evaluation systems are invariably imperfect this means that graduates are likely to miss opportunities to add value to the firm if these opportunities are not clearly evaluated. They may see the need for action, but argue that it is "not my job," since it is not explicitly in their job description.

5. *Moral Reasoning*. There is evidence, that students who select business as a major start and conclude their programs with lower levels of moral reasoning than other college students (Conry and Nelson, 1989). Their moral level suggests that consequences to oneself and the judgment of important others (e.g., boss & coworkers) are key determinants in making decisions. People using this kind of reasoning are vulnerable to being drawn in to unethical behaviors if important others condone it.

6. *Ability to learn from experience*. Managers who are able to learn from experience have: (1) a learning orientation, (2) a proactive stance toward problems and opportunities, (3) engage in critical reflection, and (4) are open to other points of view, feedback, and criticism (McCauley, 1998, pp. 46-47). Recent business graduates are often characterized as having: (1) a grading orientation, (2) a passive stance towards problems and opportunities, (3) have difficulty "bringing one's assumptions, premises, criteria, and schemata into consciousness and vigorously critiquing them (ibid.; definition of critical reflection), and (4) and are often defensive when presented with feedback and criticism. To the extent McCauley's attributes of learners are relevant for recent graduates, they may have difficulty learning from work experiences.

Appendix 3: **Problem-solving Behavior Rating Sheet**

Problem Solver (Team/ Individual name):   Problem:

STEP	CRITERIA	RATING[1]
Step 1: Situational Alertness & Issue-Raising	1. Lists important issues and associated outcomes in situation (*An issue is a situational dynamic prospectively leading toward/away from an undesired/desired outcome. Add any issues surfaced during step 2*). 2. Represents the position of a socially responsible protagonist.	
Step 2: Questions, research, and understanding	1. Raises and researches pertinent questions directed toward understanding potentially important aspects of the situation (*e.g., structural, financial, human, political, legal, and ethical aspects*). 2. Identifies course concepts and at least four additional publications (from web and library resources) helpful for understanding/acting in the situation. 3. Explicitly uses the above to support reasoning in later steps.	
Step 3: Set Objectives	Lists objectives that: 1. Describe a future state where important issues from step one are resolved. 2. Do not point to specific ways of getting to this state. *(Include additional objectives as appropriate; e.g., cost and time constraints, ethicality/legality, etc.)*	
Step 4: Generate Aternatives	1. At least 4 distinct alternatives are proposed. 2. Proposed alternatives plausibly accomplish most or all of the objectives stated in step 3 (*no "straw" alternatives*). 3. Proposed alternatives represent the major possibilities inherent in the situation.	
Step 5: Assess Alternatives, Choose Step	1. Alternatives (in rows)/ objectives (in columns) are laid out in table format, and every cell is rated. 2. Choice is made by considering the net impact of alternatives on objectives (not simply on numerical scores or pros of choice; do not introduce new considerations). (*Teams: choice made by consensus and process is described.*) 3. A single coherent choice is explicitly identified.	
6: Implementation and Followup	Implementation plan: 1. Stakeholder analysis: Specific consideration of solution's impact on stakeholders and actions the protagonist[2] will take to manage them. 2. Lists action steps, actionable by the protagonist2. 3. Lists who is responsible and completion time for each step. 4. Describes how/when/by whom the success/failure of the solution will be assessed.	
Step 7: Carry Learning Forward	1. Identifies protagonist[2] and organizational learning derived from problem solving. 2. Identifies one or more future contexts in the situation for which learning is relevant.	
EFFECTIVE COMMUNICATION	1. Full APA style in MS-Word document including subheadings, name, and date. 2. Includes an executive summary on the first page. 3. Explicit and correct APA referencing of all materials. 4. Quality: e.g., spelling, grammar, and complete sentences.	

1. Rating: **--**= not present; **OK-**= below expectations; **OK** = satisfactory; **OK+** = above expectations
2. This rating sheet is for projects that include both information about a situation and identification of a designated protagonist in the situation, whose point of view the problem solver is asked to take.