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Using a Brief Form of Problem-Based Learning in a Research Methods Class: Perspectives of Instructor and Students

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Abstract
Problem based learning (PBL) is an instructional method aimed at engaging students in collaboratively solving an ill-structured problem. PBL has been presented and researched as an overhaul of existing curriculum design, yet a modified version may be attractive to college instructors who desire active learning on the part of their students, but who cannot completely reorganize their current course design. A brief case using principles of PBL was constructed for use in an undergraduate research methods class. Instructor planning and student reflections highlight roles and skills demanded in the PBL classroom. Planned conceptual issues were successfully covered during the brief PBL case. In addition, important yet unforeseen topics emerged during the discussions and were seen as helpful for the activity and instructional objectives. Reported student perspectives indicated that the objectives of the PBL activity were successfully accomplished: students learned research concepts, engaged in discussion with peers, and were actively involved with and motivated by the authentic activity. This work supports the suggestion that a brief version of PBL may be an attractive option to instructors interested in having students be more actively engaged in the classroom. Further research on variations of PBL is encouraged.

Keywords
Problem-Based Learning, Descriptive Research, University Instruction

Cover Page Footnote
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Introduction

Higher-education instructors are increasingly interested in creating classroom activities that actively engage students in learning. The traditional classroom, in which the students sit in rows and passively receive information to later reiterate on a test, is decreasingly attractive to teachers and students alike. Alternative instructional methods such as problem-based learning (PBL) have been increasingly used and researched as an effective means to encourage students' critical thinking and active engagement with classroom material (e.g. Evenson & Hmelo 2000). The idea is to organise instruction around a single problem in an effort to promote learning in a more authentic manner. PBL was conceived as an integrated and interdisciplinary curriculum (Hmelo-Silver 2004) in which implementation often requires a reorganisation of an existing curriculum. This conception is often a challenge, as most college curricula are organised around specific disciplines and must cover a range of material with limited time. Thus, the goal of this paper is to research a variant of the PBL process – using a truncated version of PBL – and provide an exploration of its application in a tertiary classroom.

Goals and Benefits of Problem-Based Learning (PBL)

PBL is a student-centred approach to instruction in which students learn material in small groups by way of addressing or solving an authentic and complex problem. The aims of PBL instruction are to help students learn skills for problem-solving, collaboration and self-directed learning, and increase their adaptive knowledge and mastery motivation (Hmelo-Silver 2004). With PBL, students are challenged to think about material, apply their understanding and communicate and defend their thinking. PBL, which originated in medical education, emphasises self-directed inquiry via scaffolded guidance around understanding data (Hmelo-Silver, Duncan & Chinn 2007).

Research on PBL's effectiveness has emphasised its benefits to students. First, due to the importance PBL places on students' reflection and self-directed learning, a PBL approach has been helpful for promoting students' cognitive and metacognitive gains in the classroom. Meta-analyses of the use of PBL in tertiary-level classrooms has found PBL to be consistently positive for students' skills (application of knowledge) and long-term knowledge acquisition (Dochy et al. 2003; Strobel & van Barneveld 2009). In particular, PBL activities have been positively linked to development of metacognition (Downing et al. 2009) and to improved learning strategies and critical thinking (Sungur & Tekkaya 2006; Stefanou et al. 2013). Detailed reviews have highlighted the positive benefits of a PBL environment for students: for example, self-directed learning (Blumberg 2000) and flexible knowledge and problem-solving (Hmelo-Silver 2004).

Second, research has supported PBL's positive affective outcomes. It has been linked to increased levels of student engagement in tertiary courses (Ahlfeldt, Mehta & Sellnow 2005) as well as better study effort, including time management, concentration and self-testing (Wijnia, Loyens & Derous 2011). Furthermore, PBL has been shown to improve high-school students' task value and intrinsic goal orientation compared to traditional instruction (Sungur & Tekkaya 2006). Students in PBL environments reported higher social and academic integration (i.e. connectedness to people at school) and satisfaction with their contacts with faculty and peers (Severiens & Schmidt 2009). Hays and Vincent (2004) found that students in graduate-level psychology courses rated PBL favorably for promoting interactions between student and faculty.

PBL Limitations and Concerns

Problem-based learning is not without its critics and shortcomings. Some have argued that PBL, similar to other minimally guided instruction, is ineffective for those without much prior knowledge (Kirschner, Sweller & Clark 2006). They argue that the PBL approach requires a level and quality of schemata to successfully navigate an environment that is not available to novices, since it requires abilities to select and judge appropriate information. It has also been noted that the PBL process operates more successfully with a motivated and mature learner (Williams, 1999, cited in Wells, Warelow & Jackson 2009). Thus, PBL may be an instructional technique that works best with knowledgeable students.

There are also some practical issues with the implementation and use of PBL. Many of these matters highlight problematic features of students working in groups: individuals not preparing; poor communication with each other; having negative attitudes toward each other; potential problems with loafers not doing their share of the workload or with overly assertive members taking too much control; and anxiety about collaborative learning experiences (Vardi & Ciccarelli 2008; Wells, Warelow & Jackson 2009). In addition, there are concerns that the process of PBL can overshadow the content of what is supposed to be learned, such that students may be so concerned with interpersonal and communication problems that they do not address the scenario in enough depth (Wells, Warelow & Jackson 2009). Feelings of uncertainty in selecting appropriate resources combined with mandated behaviors (e.g. attendance) may neutralise the benefits of an autonomous and intrinsically motivating context when in a PBL environment (Wijnia, Loyens & Derous 2011).

Furthermore, the role of the instructor and quality of the problem scenario are important for successful implementation of PBL. The instructor is required to adopt the role of a facilitator who creates a student-directed learning experience and questions as a way to guide students' understanding (Wells, Warelow & Jackson 2009). Inexperienced teachers may tend to dominate and provide too much direction, and potentially revert to didactic instruction. A good PBL problem should be authentic and ill-structured, prompting critical thinking and analysis (Vardi & Ciccarelli 2008). Finally, PBL has been cited by both students and teachers as being too time-consuming (Vardi & Ciccarelli 2008) and requiring low student-to-instructor ratios, which are problematic for budget-conscious units (Wells, Warelow & Jackson 2009).

Rationale for Study

Due to these these concerns and limitations with implementing PBL, educators and researchers have begun to modify the original PBL conceptualisation by including varied facilitators (peers, community mentors) and assessment strategies (see Vardi & Ciccarelli 2008). However, the notion has not been challenged that PBL is used in the classroom as a long-term activity in which analysing a case can take multiple sessions and often requires reorganization of the classroom structure (Hmelo-Silver 2004). Yet, some of the drawbacks to PBL may be in reference to its long-term activity. Relatively unstructured environments put increasing demands on students for continuous activity, and require interdependence with potentially inconsistent peers who have varying motivations and competence levels. Moreover, PBL may be attractive as a focused, limited activity for instructors who can neither overhaul their existing curriculum nor reorganise their current course design, but are looking for ways to actively engage students in relevant and authentic coursework. Thus, this paper demonstrates the use of a brief or truncated version of PBL. This demonstration still encompasses the defining features of the PBL process as described by Vardi and Ciccarelli (2008):

(1) Learners are engaged with authentic, ill-structured

problems.
(2) Students identify the information they need to learn after first assessing their starting knowledge base.
(3) Students learn by interacting with small groups and with a facilitator.

A brief form of PBL may provide benefits for student engagement and motivation, but without the commitment of reorganising the structure of an entire course. A case that exemplifies a real-world situation was developed to be used in a PBL context along with instructional supports such that it can be implemented and accomplished in a shorter amount of time than is typical with PBL instruction. This potential form of PBL has not been considered or researched as to whether it is achievable and potentially successful. Thus, this paper seeks to present introductory research on this brief form of PBL in a tertiary classroom. I provide a description and preliminary evaluation of a truncated PBL lesson used in an educational-psychology research-methods class by providing first-hand perspectives of an instructor designing and implementing the shorter PBL case. I also give the perspectives of students working through a PBL case through both their qualitative reflections and quantitative evaluations. This discussion will provide a preliminary investigation of a brief-form PBL variant and provide some understanding of the instructional issues involved in its adoption.

Study Context

The brief problem-based case was presented in a single, 75-minute class period with upper-level undergraduate students enrolled in a research-methods course. The class is composed primarily of senior undergraduate students majoring in educational psychology. It is a required course in the major, taken near the end of one's coursework, and is known to be challenging. There is only one section offered each fall and spring semester, so there is no shopping for easy instructors or self-selection of students for any particular section. Enrollment in this course typically ranges between 17 and 22 students. This course is similar to other three-credit-hour, semester-long courses in the university in that it meets for 75 minutes, twice a week in the 15-week semester. I implemented the brief PBL activity in two sections of research methods over two semesters – one class each semester. The students, typical for the major, were majority Caucasian (73%) and female (82%).

This upper-level course in research methods was chosen for three reasons: 1) it includes older students with some prior knowledge of field, and some research suggests that PBL works best with mature, non-novice learners (Kirschner, Sweller & Clark 2006); 2) the course is similar to other contexts for PBL in that it emphasises critical thinking with acquired knowledge while requiring students to use skills in authentic-like contexts designed to emulate potential professional situations; and 3) the course is one in which I had much experience teaching and helped to design: I had taught this course 10 times in the previous six years.

In the following section, as the instructor I share my reflections on developing a PBL case for a research-methods class and applying it as a brief form of PBL. I provide useful qualitative information about the types of instructional issues and challenges faced in my effort to implement a brief form of PBL in a single class session. The subsequent sections provide quantitative and qualitative data from students in the course to serve as evidence for the potential benefits and limitations of a brief form of PBL.

Instructor's Perspective

After completing a problem-based training workshop at my university, I considered the use of a

brief form of PBL in my research-methods class. The approach in this course emphasises research from both a consumer end – educating students about how to evaluate disseminated research for quality – as well as from a producer end – preparing students to design and carry out their own research project. This class emphasises critical-thinking skills: students are encouraged to think about readings and course materials, apply their understanding and communicate and defend their thinking. For the most part, I use a variety of different instructional methods that require students to work in small groups; think about a topic or issue; write and communicate about a solution; and discuss as a larger class. A truncated version of PBL would further enable the type of thinking and activities that support active and responsible learners – my goals for the course. In an effort to develop a case that could be used in a shortened PBL format, I attempted to emulate many of the important characteristics of learning in a PBL environment (see Hmelo-Silver 2004; Vardi & Ciccarelli 2008): an authentic problem scenario, student-directed learning and small-group interactions.

Development of the Case

I developed the brief case to be authentic and appealing to students while highlighting some important research-method issues. The class is composed of senior students who are very much concerned with their job or career opportunities after leaving college. Using a real job scenario would capture their attention and be intrinsically motivating in relation to concepts in research methods. The case (see appendix) included a questionnaire on academic cheating and a mission to "do some research and report back to the University administrators". The questionnaire was created and adapted to be appropriate but needing improvement. The case was related to a topic that captured and sustained students' attention and motivation. Undergraduates have opinions and experiences related to academic cheating. Furthermore, the topic was authentic to students in that they could envision working at a university (many of our students want to go to graduate school in student affairs in higher education). By broadly defining the problem (e.g. "do some research"), students were encouraged to integrate their understanding of research methods with the problem.

In working on the case, I attempted to foster students' independent thinking and planning. The idea of presenting the problem prior to reviewing the material – a defining feature of PBL – was new to me. I liked the idea of presenting the problem and letting students struggle a bit with it. Problems require students to first assess what they know, then find and select resources, in an effort to learn a new idea or skill, and ultimately to decide or act. However, I realised that to create a brief version of PBL, two aspects required adjustments: the problem could not be so broad and ill-structured that students could not make some progress on it right away; and time to find and analyse resources should be streamlined. Accordingly, the case needed to have some structure so that it could be accomplished in a single class session: the scenario should exemplify real-world situations, but in the interest of time students needed some guidance in understanding what to produce. I challenged students to develop three distinct researchable questions from the given questionnaire. In this way, the problem was open-ended (and thus, somewhat ill-defined), but it scaffolded students' attempts to understand the scenario and immediately start making sense of it.

In providing the structure to the problem, I also simplified the search for sources. Because the problem was limited to developing research questions, they could target their search for appropriate resources by focusing on understanding the different types of research questions. In effect, in this brief version of PBL, the practice of students searching for and evaluating their resources is severely limited. Although I realise the search for sources is part of the PBL process as originally conceived, it was not possible to require searches and evaluations of resources with a version of PBL that lasts a single class session. Students instead had their textbooks, their prior

knowledge and each other to help them understand and address the problem. The case still emulated many of the other important characteristics of learning in a PBL environment: engaging students with an authentic case by working in small groups. In terms of course material, the purpose of the case was to challenge students to (1) develop researchable questions, (2) distinguish between different types of research questions and (3) review concepts of independent and dependent variables.

Implementation of the Case

At the beginning of the 75-minute class period, I divided students into small groups of three to four students each and handed out the case (see appendix). I acted as facilitator to the five groups of students. The case challenged them to create three different types of research questions (e.g. descriptive, comparative and correlational) that could be answered from the given questionnaire. A representative from each group wrote their questions on a chalkboard for discussion and debate from the entire class. Table 1 shows examples of the types of research questions generated from the case.

Table 1.
Examples of Research Questions Generated from the Brief PBL Case

Type of Research	Research Questions Generated
Descriptive	*"How often do seniors cheat?"* *"How many students report purchasing an assignment off the Internet or from someone?"*
Comparative	*"Are there gender differences in different forms of cheating?"* *"Do students in a fraternity or sorority cheat more than non-Greek students?"*
Correlational	*"What is the relationship between cheating and achievement?"*

Students, through interactions with their peers, soon realised that because no variable was manipulated only non-experimental designs could be entertained. In the scenario, the hypothetical questionnaire was already given to students, so students were limited to the variables they could find or create from it. Since the focus was on academic cheating, many students wanted to include a frequency of academic cheating as a variable. To do so, they revisited the idea of operational definition and newly considered the idea of creating a construct variable from several individual items; that is, they could count up the number of yes responses to questions 1 to 10 and include that as one variable on frequency of cheating. Through their discussions in the small groups, they came to understand the shortcomings of the way the items were created. That is, if a researcher only asks yes or no items about whether a student has ever cheated, the researcher cannot get a sense of the number of times a student has cheated. For example, on the survey, someone may respond yes to an item about copying answers from someone else's test, but have done it multiple times during their college career.

As the instructor, I asked questions to guide them on certain issues that they had not considered. For example, I asked them to think about the kind of variable (scale of measurement) they could use with different types of research questions: for example, correlations would require continuous variables. Furthermore, students offered their concerns with the instrument. Many of them

realised that the questionnaire did not ask about students' GPA or grades and many of them wanted to understand more about whether "cheating ever pays". This issue brought to the forefront the connection between what is measured and what one can address in one's research, as well as important issues in designing questionnaires. The students soon saw that planning up front for the research questions one wanted to answer would be helpful in the creation of a questionnaire.

In addition to addressing the objectives of the case, discussion in the larger class integrated additional research issues of sampling, development of survey items and ethics in data collection and management. As the case designer and course instructor, I had not anticipated that these topics would be discussed with this PBL case. They were not designed to be the main issue for the case; however, they were relevant and important issues for a research methods course. In my role as facilitator and course instructor, I provided feedback that they were thinking appropriately and authentically, like researchers in the field, and assured them that these issues would be discussed in more depth later in the term. Although some instructors may not be comfortable with the discussion getting "off-track", I was pleased to see my students thinking about and working with broader research issues. These instances when they took control of the material reflect a major goal of PBL: active student engagement. As the facilitator, I adjusted to these new topics, yet helped them to maintain their focus on addressing the case. I had not prepared these new topics for class, but I did talk about their importance and assure them of their relevance for their discussion. I also primed them to be considering them later during the semester. The PBL case then served as an anchor for discussions later in the term as it became helpful as a common example to the entire class. So in effect, the reach of the PBL case went beyond the one class period. Furthermore, the additional topics suggested that students' understanding was deepening and that they could think about the interconnectedness of major issues in research. All these issues come into play in research design, and students as future researchers should consider and critically examine them. In effect, discussion of these "add-on" issues became critical to the PBL process, and represented students' attempts to understand and grapple with relevant material, signifying their growing proficiency.

Students' Perspectives

As the instructor, I had ideas and goals for this activity that I could observe in their discussions and questions, but to get a richer understanding of the PBL process, it was helpful to also obtain students' feedback. In this section, the student-level perspective of this PBL process is captured via quantitative and qualitative information. First, a traditional analysis of the evaluations at the end of class is included via quantitative analysis of student feedback. Second, students' comments to open-ended questions about the PBL case are documented and reviewed to capture more specific reactions about what they felt they learned and about working with other students.

Quantitative Analyses

The 33 students in the two sections responded to a variety of questions aimed at understanding their reactions to the PBL process. At the end of the case, they were asked two Likert-scaled questions: one on how informative they felt the PBL activity was and one on how interesting it was. Each of these items was rated on a scale of 1 (not at all informative or not at all interesting) to 7 (very informative or very interesting).

The evaluations revealed that the preponderance of students rated the activity as informative and as interesting. In fact, 67% rated the activity as very informative (a 6 or 7 on a seven-point scale)

and 73% rated it as very interesting (6 or 7 on a seven-point scale). Out of the 66 ratings received (33 students responding to two Likert items each) only three were less than 5 on the 1 to 7 scale. On ratings of the informative value of the PBL activity, students averaged 5.82 with a standard deviation of 1.01, while on their rating of interest level of the PBL activity, students averaged 5.97 with a standard deviation of 0.88. Overall, students generally were very positive about the PBL activity, indicating they thought it both interesting and informative.

Qualitative Analyses

On the evaluation at the end of the PBL case, students were also asked to comment anonymously on what they thought of the case, activity, and discussion. Specifically, they were asked to comment on three questions: 1) how the activity compared to lectures, 2) what they thought of discussion with other students and 3) open-ended comments about the case. The responses from the students were subjected to inductive data analysis, and three **t**hemes emerged: (a) the beneficial nature of the PBL case for content understanding (in this case, research topics); (b) the strengths and weaknesses of working collaboratively with peers; and (c) how the case promoted active learning and increased motivation.

First, students' qualitative reactions indicated that using PBL in the classroom enlightened them on a variety of research issues by virtue of the authentic nature of the case. They found the activity helpful for understanding different concepts in the case, including developing an appropriate survey, determining operational definitions and identifying different types of studies. Approximately 25% of the comments mentioned the clarification of specific research content through the PBL activity:

- *This activity helped me understand how important the format of your survey plays in your research.*
- *…gave me a chance to understand the concept of operational definition better.*
- *…hands on knowledge of how to address descriptive, correlation, and comparative studies.*

A small subset of comments (9%) referred to the topic of cheating (the content of the questionnaire) as interesting and enlightening. Students were intrigued by the topic of cheating as a researchable topic that could inform how a university operates: "A study such as this one will provide a great opportunity for administration to crack down on cheating at their university."

Other written comments involved issues about working with other students in groups (17%). Almost all were positive about interacting with their peers. They enjoyed sharing different perspectives and found it helpful to learn from peers and to hear their ideas:

- *It was good to put us in different groups than usual so we could interact with new people.*
- *I enjoyed working with different people.*
- *Interesting to get feedback.*
- *More interactive and gave students opportunity to ask questions, work together, and discuss ideas.*
- *…very informative. It helped me to look at things I did not understand in a different perspective.*

However, there were at least two students who were negative about working with other students. For example, one student wrote: "My group wasn't too helpful, it was hard to do it all…without any helpful input in that short amount of time. I felt like I was having to teach them about the

different types of research. But don't think I don't like group work." In fact, the only negative comments about the PBL case were about the nature of group work. Some students do not enjoy sharing ideas with other students, some because they reject learning from anyone other than the instructor and others because they feel there are unequal responsibilities in the group and that one person ends up doing the majority of the work. These complaints are not indicative of PBL only; these are social challenges involved in any kind of collaborative work and can affect both PBL and non-PBL activities.

Finally, the greatest number (50%) of comments dealt with students reflecting on the learning process during the PBL activity. These comments encompassed issues about active learning and how the PBL case challenged their thinking, motivated them and moved them past the passive roles they often assume during typical lectures. Their reflections indicated metacognitive processes at work, too. They appreciated the authentic and participatory nature of the PBL activity and highlighted their learning from it:

- *I felt that this activity made me think and forced me to understand material.*
- *Better way of learning for me than just listening to lectures.*
- *More informative because we actually worked on examples.*
- *Challenging. Sometimes its [sic] hard for me to think like that, so it was helpful.*
- *Very entertaining and helpful – applying it to a real-life situation and working through it helped me see and understand it better than I would have with just a lecture.*
- *Effective. Since we had to write out our own research questions it got everyone thinking more.*
- *I think this will aid my critical thinking when conducting my own study/*

Overall, these qualitative comments reflect students' very positive reactions to the PBL activity, highlighting its effectiveness as a motivating and novel experience for learning research methods.

Discussion

This study illustrates how a truncated or modified approach to PBL can be successful. It used a one-time session as an example of a truncated approach to PBL that still provided foundational aspects of PBL: student interaction and active learning around an authentic problem. Results indicated that students found it interesting and informative, and the brief form PBL challenged them to learn material in a motivating context. This work provides some introductory information about the process for using a truncated or one-off PBL case, and about the instructor/facilitator and student roles in this brief PBL context.

From my perspective as the instructor, I found that I could still successfully cover the planned and relevant content issues in the brief-form PBL. In addition, I was impressed to see important yet unforeseen topics also emerge during the discussions. I realised that students were truly integrating past concepts learned in class with new material, and were thinking critically. They were concerned with issues I did not even envision for the case, yet were very much relevant to the ideas in the case. To me this demonstrated that the PBL case could encourage students to think authentically (that is, like researchers). On the other hand, I had to forgo some aspects of the PBL process in an effort to streamline it into a brief version. In particular, I structured the questions for students and limited their use of resources. This was due to the attempt to make the entire process take place in a single class period. Other versions could, for example, allow more

time than a single session and encourage students to look for and review resources. In addition, searching for viable resources and evaluating their usefulness is very important in particular contexts, such as medical fields and clinical casework. However, this case related to research methods, and potential sources are more uniform in nature.

Student perspectives highlighted that (1) many found the PBL activity helpful for understanding the research topics; (2) most found it beneficial to share ideas with fellow students; and (3) students were actively involved with and motivated by the "hands-on" activity. Students shared positive thoughts about how the PBL activity was different to a typical lecture, provided them with more active roles, encouraged metacognition and made information feel "true to life". Students stressed this as important for their learning: "Instead of just learning a definition, we processed the information, applied the concept, and ultimately we ended the lesson by evaluating our own work." Overall, the PBL activity appealed to the instructor in that students achieved the conceptual goals of the research-methods lesson, and it appealed to students in that for the most part they enjoyed the opportunity to work collaboratively with other students and actively participate in a non-traditional instructional format.

Limitations and Future Research

However, there are limitations to this work. It was descriptive in nature and offers thoughtful analysis for consideration of the use of a brief form of PBL. However, it did not test those effects in a comparative way against traditional long versions of PBL or against typical lecture classes. It offered evidence of students' reactions to the activity (their increased engagement and motivation) but did not attempt to directly link the PBL activity to better understanding or long-term learning. Investigating PBL impact on student learning was not the goal of this study; other research has demonstrated the more sustained cognitive benefits of PBL (Dochy et al. 2003; Downing et al. 2009; Strobel & van Barneveld 2009, Sungur & Tekkaya 2006).

Further research on truncated variations of PBL should still be done, and could test whether students who engage in it have any better, less or similar understanding of the topics than those who are taught in a more traditional manner. Also, it would be useful to investigate if brief versions of PBL offer similar benefits as does extended PBL. There may be additive effects on student learning and critical thinking if students engage in multiple short versions of PBL similar to longer, sustained cases. Finally, there remain open questions about PBL and its long-term effects. Future research can investigate whether engaging in PBL promotes students' transfer of critical-thinking skills to other arenas and sustains motivation and engagement in later contexts.

Implications

Even given these limitations, there are practical implications for this work. This paper is helpful in describing and evaluating how a brief form of PBL can function in an educational-psychology research-methods course. A successful demonstration of a truncated approach to PBL is beneficial to college instructors who might be hesitant to overhaul their classroom structures in the way that is often described for engaging in PBL. Instead, the brief approach described here seems to capture many benefits of PBL (e.g., increased student engagement) while being more manageable to incorporate into a classroom. By using these smaller units, instructors might be more apt to engage in PBL activities. This descriptive research can encourage instructors to move away from passive, lecture-based formats and test out alternatives like PBL in their classes, and thus engage students to critically analyse authentic problems. This example is shared in an effort to encourage others to adopt it in their classes or adapt it to their needs for other topics. It is

recognised that there were necessary tradeoffs and adjustments in attempting a truncated version of PBL. Table 2 summarises the differences and commonalities between traditional PBL, brief PBL and typical lecture courses according to dimensions elaborated in this research: role of student, role of instructor, amount of structure, tasks and skills required, interaction with fellow students and resources.

Table 2.
Comparison of Typical Lecture, Traditional PBL and Brief PBL

	Typical lecture	**Traditional PBL**	**Brief PBL**
Role of student	Passive, receive information	Active, generate ideas	Active, generate ideas
Role of instructor	Direct	Facilitate	Facilitate
Amount of structure	Much	Little, ill-structured	Some, semi-structured
Skills	Listen and write notes	Reason and defend thinking	Reason and defend thinking
Tasks	Study for test	Produce artifact on authentic problem	Produce artifact on authentic problem
Interaction with fellow students	None to minimal	Much	Much
Resources	Given	Seek and evaluate	Given

The use and evaluation of this brief PBL case in a research-methods class actively engaged students and fostered understanding of the material. This paper demonstrated that a brief, non-traditional approach to PBL could be successfully accomplished. By providing an example of a truncated case of PBL accompanied by explanations and reflections of its use, this paper may assist more instructors at the college level in recognising its benefits and engaging in truncated PBL activities in their classrooms.

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Appendix: Brief PBL Case for Research Methods

University officials want to know about academic cheating and dishonesty on campus and have developed a survey for students. You are part of a student affairs personnel group who has been asked to "do some research with this" and report back to the administration about the kinds of questions the survey will allow them to answer concerning student cheating.

Report to the administration on your plan. Be sure to include three different *types* of research questions that you can address from the questionnaire given. Be sure to label your independent and dependent variables.

Directions: Please respond by marking an "X" in the box next to the response that applies to you.
Please indicate your gender:
□ Male □ Female
What is your race or ethnic identification?
□ Caucasian □ Asian □ African American □ Other
What is your classification?
□ Freshman □ Sophomore □ Junior □ Senior
Are you a member of a Greek Fraternity or Sorority?
□ Yes □ No
What is your major?
DURING YOUR COLLEGE YEARS:
1. Have you ever copied answers from another student's test?
□ Yes □ No
2. Have you ever copied answers from another student's assignment?
□ Yes □ No
3. Have you ever asked a fellow student to pose as you and take an exam?
□ Yes □ No
4. Have you ever used materials during an exam that were not authorized by the instructor?
□ Yes □ No
5. Have you ever purchased an assignment off the internet or from someone else?
□ Yes □ No
6. Have you ever sold an assignment to another student?
□ Yes □ No
7. Have you ever used a cell phone to receive answers during an exam?
□ Yes □ No
8. Have you ever used signals during an exam?
□ Yes □ No
9. Have you ever allowed another student to use your assignment for credit?
□ Yes □ No
10. Have you ever been caught cheating during your years as a college student?
□ Yes □ No
11. If so, what were the consequences?