

Article

Be the Change You Want to See: Problem-Based Learning to Promote Diversity, Justice, Equity, Inclusion, Belonging, and Sustainability in the Classroom and Workplace

Franziska M. Renz ^{1,*} and Julian U. N. Vogel ²¹ College of Business, California State University, Sacramento, CA 95819, USA² Lucas College and Graduate School of Business, San José State University, San José, CA 95192, USA;

julian.vogel@sjsu.edu

* Correspondence: franziska.renz@csus.edu

Abstract: This study presents a problem-based learning (i.e., PBL) assignment to engage students around the areas of diversity, justice, equity, inclusion, belonging (i.e., DEI), and sustainability in the classroom and workplace. The assignment is developed based on the learning objectives of an upper division business course following an outlined three-step process. A pretest-posttest research design with a control group demonstrates that the experiential assignment is effective in enhancing students' problem-solving skills which, according to employers, recent college graduates need to improve upon. The PBL approach also increases students' interest in DEI and sustainability so that they want to make a difference in society. While students' confidence in their preparedness to become a manager decreases over the course of a semester, this loss in confidence is mitigated by students' active participation in the PBL assignment.

Keywords: problem-based learning; experiential learning; career-relevant skills; diversity; equity and inclusion; sustainability



Citation: Renz, F.M.; Vogel, J.U.N. Be the Change You Want to See: Problem-Based Learning to Promote Diversity, Justice, Equity, Inclusion, Belonging, and Sustainability in the Classroom and Workplace. *Merits* **2024**, *4*, 79–94. <https://doi.org/10.3390/merits4010006>

Academic Editors: Luis Miguel Ciravegna Fonseca and Wendy M. Purcell

Received: 28 November 2023

Revised: 8 February 2024

Accepted: 8 February 2024

Published: 1 March 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Higher-order thinking and problem-solving are highly demanded skills in today's workplace [1–3]. Employers consistently rank problem-solving, analytical thinking, and teamwork as the most relevant skills of college graduates [4,5]. Specifically, 54% of employers regard college graduates' ability to demonstrate complex problem-solving skills as very important according to the Association of American Colleges and Universities. 62% of employers expect excellent teamwork skills, while 60% want college graduates to show critical thinking skills [4]. These workplace skills can and thus should be taught [6–8].

However, a multitude of employers perceive recent college graduates as not sufficiently prepared to be successful in the workplace that they enter. Only 39% of employers report that college graduates are very well prepared to solve complex problems. 48% of employers attest effective teamwork skills to college graduates, and 39% of employers confirm college graduates' proficiency in critical thinking [4]. These numbers illustrate double digit discrepancies between employers' expectations and college graduates' preparedness to collaborate in critically analyzing and solving complex problems. At the same time, businesses are confronted with complex and persistent problems centering around diversity, justice, equity, inclusion, belonging (i.e., DEI), and sustainability (e.g., [9,10]). Daily evidence of the catastrophic effects of climate change, social injustice, and loneliness at work (e.g., [11–13]) require educators to adopt a career-relevant approach to higher education that prepares for the workplace and serves employers, future college graduates (i.e., today's students), and society alike.

Therefore, this study develops a problem-based learning (i.e., PBL) assignment that engages students around the areas of DEI and sustainability in the classroom and workplace.

The assignment is an experiential assignment. It is designed to support students in applying their conceptual and theoretical knowledge in business to existing and relevant problems of organizations, so that students are prepared for their responsibilities in the workplace (e.g., [3,7]). Utilizing the PBL approach, the instructor guides students through a series of activities to identify, address, and solve current organizational problems. The study assesses the extent to which the assignment enhances students' problem-solving skills and their understanding of DEI and sustainability, in preparation for their evolving and future careers. We evaluate whether the PBL approach is effective in this context and enhances students' learning experience, testing 13 hypotheses. We thus make three important contributions to the literature on PBL and the pedagogical practice in the field of business.

First, we offer a three-step process on how to develop a PBL assignment for an upper division course in business (e.g., [14–17]). The first step is defining the objectives of the PBL assignment based on the objectives of the course. The second step is determining the structure of the assignment so that the objectives can be accomplished. The third and final step is designing scaffolded activities that contribute to the completion of the PBL assignment. This development process is described based on prior literature on PBL and synthesizes best practices in the field.

Second, we present a fully developed PBL assignment to promote DEI and sustainability in the classroom and workplace. Students apply their knowledge from the classroom and make valuable contributions to the workplace. This assignment was developed using the offered three-step process. The complete instructions that were given to upper division business students are included in this study (see Table 1), and can be adapted if desired. The assignment can be implemented in upper division business courses, such as human resource management, strategy, marketing, finance, accounting, and business analytics. The assignment is designed to enhance students' sensitivity and managerial capabilities around the areas of diversity, justice, equity, inclusion, belonging, and sustainability, so that students are able to apply and contribute their knowledge and skills in the workplace.

Table 1. Problem-based learning assignment.

<p>PURPOSE</p> <p>The purpose of the project is to acquire highly relevant professional skills by identifying and analyzing challenges of managers in contemporary organizations. As a team, you collaborate and develop an initiative related to diversity, justice, equity, inclusion, belonging, or sustainability. This is an opportunity to apply your conceptual and theoretical knowledge from the course to important contexts and network with the business community.</p>
<p>STRUCTURE</p> <p>In 5 face-to-face sessions, you get time to collaborate with your team members. Each team has to determine the extent to which it needs to collaborate outside of these sessions or needs to prepare for in-class collaboration. These are the face-to-face sessions in which you are expected to collaborate as a team and their assigned activities that contribute to the completion of the project:</p> <p>In-Class Team Meeting 1: 8 September 2022</p> <ol style="list-style-type: none"> 1. Form a team of 4 to 5 students. 2. Identify a problem of an organization or entrepreneur related to diversity, justice, equity, inclusion, belonging, or sustainability within the organization or society. <p>Helpful Strategies:</p> <ul style="list-style-type: none"> ■ Share your experiences with and knowledge about diversity, justice, equity, inclusion, belonging, or sustainability in the workplace or student/community organization. ■ Share a problem that you have experienced in your own organization. ■ Share a problem that you have read or heard about. <ol style="list-style-type: none"> 3. Explain to the instructor why this problem is relevant and important. <p>Note: The instructor needs to approve the problem that a team wants to work on to ensure feasibility.</p>

Table 1. Cont.

<p>In-Class Team Meeting 2: 15 September 2022</p> <ol style="list-style-type: none"> 1. Log in and get the problem approved that you want to work on. 2. Share with team members information about the problem that you already have. 3. Verify information and collect new information about the problem. <p>Helpful Strategies:</p> <ul style="list-style-type: none"> ■ Consider not only the focal organization or entrepreneur, but also their stakeholders including shareholders, employees, customers, suppliers, competitors, creditors, governmental organizations, and non-governmental organizations. ■ Consider the different perspectives of stakeholders and critically analyze their positions. ■ Use sources that are available publicly or through the university such as news articles, consumer reports, or industry reports.
<p>In-Class Team Meeting 3: 22 September 2022</p> <ol style="list-style-type: none"> 1. Identify at least 2 individuals who you can interview about your chosen problem to gather further information that supports you in proposing a solution. The two individuals should belong to two different stakeholder groups to allow for differing perspectives. 2. Discuss how you will contact potential interviewees. 3. Discuss which questions you plan to ask them. Interviews should not exceed 1 h to avoid interviewee fatigue. 4. Explain to the instructor why these individuals are relevant stakeholders, and how you plan to conduct the interviews. <p>Note: The interviews need to take place before 20 October 2022, outside of class in-person, via phone, Zoom, or any other meeting platform. Make sure to present yourselves professionally when you contact potential interviewees and conduct the interviews. The interviews are an opportunity for you to expand your professional network!</p>
<p>In-Class Team Meeting 4: 20 October 2022</p> <ol style="list-style-type: none"> 1. Discuss what you have learned in the interviews: <ul style="list-style-type: none"> ■ Was the information that you had before the interviews confirmed? ■ What new information did you learn? ■ Did any new information surprise you? 2. Take inventory of all the information that you have collected about the chosen problem. 3. Generate and evaluate possible options to solve your chosen problem. <p>Helpful Strategies:</p> <ul style="list-style-type: none"> ■ Use your context-specific knowledge as well as conceptual and theoretical knowledge about the management of contemporary organizations. ■ Discuss how your problem will likely evolve in the future and will affect the identified stakeholders. ■ Discuss possible outcomes of the different options for the focal organization or entrepreneur and its stakeholders. <ol style="list-style-type: none"> 4. Design an action plan which outlines and describes how your chosen problem can be solved. <p>Note: Be very specific when proposing solutions! For example, if you propose a change in organizational policies, specifically state the current and proposed policies. If you propose investing money, specifically state how much money you propose investing. Managers also need to be very specific when they manage their employees.</p>
<p>In-Class Team Meeting 5: 27 October 2022</p> <ol style="list-style-type: none"> 1. Get your ducks in a row! Clarify in your team your proposed solution for your chosen problem. <p>Note: Again, be very specific when finalizing your proposed solution. This approach will also support you in identifying any potential issues in your proposal.</p> <ol style="list-style-type: none"> 2. Based on your findings, develop an intriguing discussion question for your peers that they can respond to on the final discussion board after they have watched your recorded presentation. 3. Prepare your project presentation: present the problem, your analysis of the information that you have gathered, your proposed solution, why your proposed solution is feasible, and an intriguing discussion question for your peers. <p>Helpful Strategies:</p> <ul style="list-style-type: none"> ■ Discuss when you will be ready to record your project presentation. ■ Discuss how you will record your project presentation.

Table 1. Cont.

REQUIREMENTS
<p>A project presentation is required from each team, which presents the team's work and findings throughout the semester. Each team is required to record a video of their presentation and to submit the video as an mp4 file through Canvas. To record the video, you can, for example, schedule a Zoom meeting with your team members, share slides or any other materials during the meeting, and record a video of the meeting.</p>
<p>The project presentation should last approximately 15 min, include references in APA style, and be targeted towards relevant stakeholders. All team members are expected to equally participate in the project presentation. Each team is encouraged to find an adequate balance of professionalism and creativity for their presentation.</p>
<p>After the project presentation has been submitted, students are required to participate in the team performance evaluation. The purpose of the team performance evaluation is to reflect about the own performance and the performance of each team member while collaborating on the project.</p>

Third, evidence of the effectiveness of the presented PBL assignment is provided. The assignment was tested using a pretest-posttest research design with a control group (e.g., [18,19]). The results show that the topics related to DEI and sustainability become more important to students so that they want to make a difference in society. Students' problem-solving skills also increase, and students realize that business management is a more difficult task than anticipated. Yet, the PBL assignment prepares students to succeed in managerial roles. Scholarly implications are derived, and limitations and future research are discussed.

2. Problem-Based Learning

PBL is a form of active learning that can be implemented in the classroom and work-places. It puts students in the center of the learning process, and requires instructors to take a guiding and advising role [20–24]. This means that the instructor can provide students with specific problems to solve; however, providing only guidelines on how to identify a problem that is within the realm of the respective learning objectives leads to more effective learning [23]. In fact, letting students' interests drive the learning process is at the core of PBL [22]. Hence, the instructor should ensure that the problem that students identify reflects an authentic issue, and that students are challenged but have or can get access to needed resources to develop a solution for the identified problem [15,21,23–27]). The large availability of online resources supports this learning process [23].

When students are asked to collaborate in teams on PBL assignments, the learning process becomes more enriched because teams can develop synergies [14,23,24,28,29]. Due to each team member's unique characteristics and what they bring to team discussions, teams are able to develop better solutions than its members when working on their own [28,29]. It is also important to note that for any given or identified problem, there is neither only one correct solution nor one way to develop solutions [22,24].

2.1. Benefits of Problem-Based Learning

PBL has been shown to be superior to traditional curricular methods on numerous dimensions [3,30]. Specifically, PBL comprises the activation and elaboration of previous knowledge as well as context matching (e.g., [31–33]). Students actively process existing knowledge and integrate it with new information which is simultaneously applied in a relevant context [33]. Hence, according to information processing theory, this learning approach leads to more sustainable learning [34], and students become more likely to retrieve and apply their knowledge in their careers [33,35].

Additionally, PBL is linked to a higher degree of students' motivation [36,37]. Students' self-guided analysis and resolution of the problem is an autonomous motivator based on

self-determination theory [38]. Students experience curiosity, and a need to know and learn to solve the identified problem, instead of simply studying to do well on an exam [33].

Therefore, a variety of benefits of PBL has been acknowledged in prior literature, including enhanced decision-making, problem-solving, critical reasoning, self-directed learning, and teamwork skills [7,22,33]. As such, this learning approach allows students to learn on a cognitive, affective, and behavioral level [1,25]. It increases not only knowledge and applied skills, but also awareness and sensitivity. Students realize, for example, how individuals can have perceptual or ethical differences, and how not all decisions made in an organization are fully rational [25]. Students also learn how to deal with the complexity and ambiguity of problems that await them in their careers [21].

2.2. Development of Problem-Based Learning

Grounded in the literature on PBL, we followed a three-step process to develop a PBL assignment to promote DEI and sustainability in upper division business courses.

Step 1: Define Objectives of Problem-Based Learning Assignment

In the first step, we defined the objectives of the PBL assignment based on the course learning objectives (e.g., [14–17]). The course learning objectives were:

- Learn the foundational knowledge of human behavior in organizations;
- Develop an understanding of the impact of human behavior on organizational outcomes;
- Apply the knowledge in contemporary organizational settings.

Following these course learning objectives, and because the PBL assignment was intended to be the culminating project of the course to foster higher-order thinking and problem-solving skills [1–3], we defined the overall purpose and objective of the PBL assignment as to acquire highly relevant professional skills by identifying and analyzing challenges of managers in contemporary organizations (e.g., [16,37]). Hence, the assignment was an opportunity to apply conceptual and theoretical knowledge from the course to important contexts and network with the business community (e.g., [15]). Each instructor needs to determine which objective a PBL assignment can accomplish within their course curriculum.

We further defined the scope of the PBL assignment to help the instructor in guiding students through the assignment [23]. Students were asked to develop an initiative related to diversity, justice, equity, inclusion, belonging, or sustainability. Since only 61% of businesses clearly articulated how they supported sustainable development goals [39], both DEI and sustainability were areas of improvement for a multitude of businesses (e.g., [9,10]). Another important and current area for such an assignment could be issues around new technologies such as generative artificial intelligence. Hence, students were supported in identifying an important and relevant topic. Students needed to think about current issues, including implicit issues of businesses [6]. At the same time, the assignment could be implemented in a variety of major-specific courses, ranging from human resource management and marketing to finance, accounting, and business analytics. As the assignment was strongly related to students' major, and since PBL generally enhances students' motivation to learn [36–38], we expected that the PBL assignment fostered students' awareness about the problems that contemporary organizations faced, interest in topics related to DEI and sustainability, and willingness to make a difference in society.

Hypothesis 1 (H1). *The PBL assignment increases students' awareness about the problems that contemporary organizations face.*

Hypothesis 2 (H2). *The PBL assignment increases students' interest in topics related to DEI and sustainability.*

Hypothesis 3 (H3). *The PBL assignment increases students' willingness to make a difference in society.*

In addition, we anticipated that the PBL assignment supported students in achieving the course learning objectives, and thus fostered students' foundational knowledge about human behavior in organizations, understanding of how human behavior affects organizational outcomes, and preparedness to take on responsibilities of a manager in an organization. These relationships can be expected because PBL is an active and applied approach that on the one hand reinforces conceptual and theoretical knowledge, and on the other hand provides students the opportunity to practice this knowledge [25,40].

Hypothesis 4 (H4). *The PBL assignment increases students' foundational knowledge about human behavior in organizations.*

Hypothesis 5 (H5). *The PBL assignment increases students' understanding of how human behavior affects organizational outcomes.*

Hypothesis 6 (H6). *The PBL assignment increases students' preparedness to take on the responsibilities of a manager in an organization.*

Step 2: Determine Structure of Problem-Based Learning Assignment

In the second step, we determined the structure of the PBL assignment based on the objectives of the first step (e.g., [14–17]). Since the process of solving a problem related to DEI or sustainability is rather complex, we found it is most reasonable and most practical to lead students step-by-step through this process. Course requirements and expectations, for example that the assignment was a culminating project, allowed to give students five in-person class sessions over the course of a semester to work on the assignment in teams. We asked students to work in teams to enrich the learning process and create synergies among the individual team members [23,28,29]. Due to the COVID-19 pandemic, many students felt isolated and experienced difficulties in connecting with peers (e.g., [41,42]). PBL allows students to connect with one another [3,27]. By giving students an opportunity to collaborate, we expected that they built meaningful connections among each other.

Hypothesis 7 (H7). *The PBL assignment increases students' connections among each other.*

Furthermore, each team had to determine the extent to which it needed to collaborate outside of the in-person class sessions or needed to prepare for collaborating in these class sessions. The dates of the dedicated class sessions were communicated in the syllabus and assignment instructions since the beginning of the semester to avoid scheduling issues (see Table 1). We anticipated that this structure of the PBL assignment fostered not only students' cognitive skills, but also their behavioral and affective skills (e.g., effective decision-making; sensitivity towards different perspectives; perseverance [1,25,40]), and thus helped them to solve any arising conflicts in their teams.

Hypothesis 8 (H8). *The PBL assignment increases students' preparedness to solve conflict in workgroups or teams.*

Step 3: Design Activities of Problem-Based Learning Assignment

In the third step, we designed the activities of the PBL assignment based on the first and second steps (e.g., [14–17]). For each of the in-class team meetings (see Table 1), we designed an activity that successively contributed to the completion of the assignment. The five activities follow the idea of a common to-do list, and are shown in Table 1. Each activity includes concise and scaffolded instructions on the tasks that students needed to accomplish, and provides helpful strategies and notes on how to understand and complete the respective activity [3,43]. Students needed to ask pertinent questions about their identified problem, and conduct thorough research to find answers [6,24,35]. We expected

that these activities supported students in identifying, accessing, and considering available and relevant information in order to form an independent opinion.

Hypothesis 9 (H9). *The PBL assignment increases students' ability to identify relevant information.*

Hypothesis 10 (H10). *The PBL assignment increases students' ability to access relevant information.*

Hypothesis 11 (H11). *The PBL assignment increases students' consideration of all available information and formation of an independent opinion.*

In the spirit of PBL (e.g., [6,15,16,37]), we anticipated that the PBL assignment overall prepared students to think critically about the different facets of a problem so that they practiced to form an objective judgement, and thus to develop innovative solutions [20]. This approach was prompted by the strategies and notes that were given within the instructions of the five activities [3]. For example, in Team Meeting 4 (see Table 1), students were asked to discuss how the problem will likely develop in the future and affect the identified stakeholders. This prompt required students to look beyond the current state of the problem and consider future developments and their consequences on important stakeholders.

Hypothesis 12 (H12). *The PBL assignment increases students' preparedness to critically think about all aspects of a problem and form an objective judgement.*

Hypothesis 13 (H13). *The PBL assignment increases students' preparedness to come up with an innovative solution.*

3. Method

A survey-based research design was implemented to test the hypotheses. Since the research design required human subjects, the research protocol was submitted to and approved by the Institutional Review Board (IRB).

3.1. Data Collection

For a pilot test, we performed the PBL assignment in one section of an upper division business course in Spring 2022. In the same section, we administered an online survey to fine-tune the assignment based on students' learning experiences (e.g., [44]). Students' participation in the PBL assignment was a part of the regular course schedule. Their participation in the survey was voluntary and incentivized with extra-credit. An alternative extra-credit assignment was also offered.

After the pilot test and making minor adjustments to the PBL assignment, we implemented a pretest-posttest research design with a control group (e.g., [18,19]). We performed the assignment in two sections of an upper division business course in Fall 2022, and collected data about the effectiveness of the assignment in the same two sections. These two sections served as the treatment group. Four other sections of the same upper division business course served as the control group. In all six sections, data were collected through paper-and-pencil surveys administered at the beginning and at the end of the semester during regular class sessions of the sections. The two surveys were administered approximately 14 weeks apart from each other. Participation in the surveys was voluntary and not incentivized. With the first survey, students were assigned a participant number which they were asked to record for the second survey at the end of the semester. The surveys included five-point Likert scale items, and open-ended questions to which students could comment more freely on their learning experience. Table 2 illustrates the close-ended survey items with their corresponding hypothesis and response format. Since we were asking students about their perceptions and experiences of their participation in the PBL assignment, we used direct questions about their perceptions and experiences. For this purpose, we did not need measures of abstract constructs. This approach is reliable according to existing literature. Article [45] found that single-item measures are comparable to multi-item measures

in their psychometric properties. This has also been confirmed more recently by [46,47]. According to [48], single-item measures can be implemented to minimize respondent burden, reduce criterion contamination, and increase face validity. The authors of [49] advocate for the use of single-item measures when the scope of the question is narrow and the item is unambiguous. All of these findings apply to our research context.

Table 2. Close-ended survey items with hypothesis and response format.

Hypothesis	Survey Item	Response Format
1	I am well informed about the problems that contemporary organizations face.	1 = strongly disagree; 5 = strongly agree
2	Topics that center around diversity, justice, equity, inclusion, belonging, or sustainability are important to me.	1 = strongly disagree; 5 = strongly agree
3	I want to make a difference in society.	1 = strongly disagree; 5 = strongly agree
4	I have foundational knowledge about human behavior in organizations.	1 = strongly disagree; 5 = strongly agree
5	I understand how human behavior affects organizational outcomes.	1 = strongly disagree; 5 = strongly agree
6	How prepared do you currently feel to take on the responsibilities of a manager in an organization?	1 = not prepared at all; 5 = very prepared
7	I feel connected to peers at [name of institution].	1 = strongly disagree; 5 = strongly agree
8	How prepared do you currently feel to solve conflict in workgroups or teams?	1 = not prepared at all; 5 = very prepared
9	I am generally able to identify relevant information.	1 = strongly disagree; 5 = strongly agree
10	I am generally able to access relevant information.	1 = strongly disagree; 5 = strongly agree
11	I generally consider all available information and form an independent opinion.	1 = strongly disagree; 5 = strongly agree
12	When I am confronted with a problem, I feel well equipped to critically think about all aspects of the problem and form an objective judgement.	1 = strongly disagree; 5 = strongly agree
13	When I am confronted with a problem, I feel well equipped to come up with an innovative solution.	1 = strongly disagree; 5 = strongly agree

Each class section had an enrollment of 55 students. This means, 110 students were part of the treatment group and 220 students were part of the control group. At the beginning of the semester, the treatment group returned 97 complete surveys and the control group returned 144 complete surveys. Due to changes in course enrollment until the end of the semester, the treatment group returned 46 complete surveys and the control group returned 55 complete surveys.

3.2. Analytic Procedures

The data from the surveys were recorded into Microsoft Excel files. The quantitative data were analyzed using Stata 17.0. Before the main analyses, descriptive statistics were calculated in terms of sample size, mean, standard deviation, median, and 25th and 75th percentiles of the treatment group and the control group. Subsequently, means-difference *t*-tests were implemented to compare students' responses from the beginning of the semester and the end of the semester. The means-difference *t*-tests were performed separately for students in the treatment and the control group. The differences of students in the treatment and control groups were analyzed with a separate set of means-difference *t*-tests. For these tests, student scores from the end of the semester were subtracted from their corresponding scores from the beginning of the semester. The means-difference *t*-tests then compared the changes in scores from students in the control group to the changes in scores from students in the treatment group.

In addition, we reviewed and organized the qualitative data of the open-ended questions. We identified common themes among the comments to further explore the meaning of the quantitative data. Representative quotes were selected to demonstrate students' learning experiences with the PBL approach.

4. Results

Table 3 shows the descriptive statistics. Since all items were coded on a scale from 1 to 5 (see Table 2), a mean or median greater than 3 indicated that the majority of students agreed with a statement or felt prepared for their professional career.

Table 3. Descriptive statistics.

Variable	Treatment Group						Control Group					
	N	Mn	SD	25P	Md	75P	N	Mn	SD	25P	Md	75P
H1 Pretest	97	3.05	0.83	2	3	4	144	3.15	0.82	3	3	4
H1 Posttest	46	3.98	0.80	4	4	5	55	3.65	0.82	3	4	4
H2 Pretest	97	4.09	0.78	4	4	5	144	4.16	0.91	4	4	5
H2 Posttest	46	4.57	0.78	4	5	5	55	4.31	0.92	4	5	5
H3 Pretest	97	4.12	0.77	4	4	5	144	4.20	0.75	4	4	5
H3 Posttest	46	4.43	0.69	4	5	5	55	4.24	0.79	4	4	5
H4 Pretest	97	3.26	0.86	3	3	4	144	3.61	0.76	3	4	4
H4 Posttest	46	4.28	0.62	4	4	5	55	4.16	0.71	4	4	5
H5 Pretest	97	3.57	0.97	3	4	4	144	4.16	0.67	4	4	5
H5 Posttest	46	4.39	0.65	4	4	5	55	4.48	0.69	4	5	5
H6 Pretest	97	3.10	1.15	2	3	4	144	3.21	1.03	3	3	4
H6 Posttest	97	1.85	2.02	0	0	4	144	1.39	1.84	0	0	3
H7 Pretest	97	3.21	0.66	3	3	4	144	3.17	0.86	3	3	4
H7 Posttest	46	3.52	0.81	3	3	4	55	3.47	1.03	3	4	4
H8 Pretest	97	3.31	1.07	3	3	4	144	3.63	1.04	3	4	4
H8 Posttest	97	1.93	2.08	0	0	4	144	1.50	1.97	0	0	4
H9 Pretest	97	4.04	0.65	4	4	4	144	4.19	0.51	4	4	4
H9 Posttest	46	4.37	0.57	4	4	5	55	4.27	0.49	4	4	5
H10 Pretest	97	4.01	0.67	4	4	4	144	4.14	0.61	4	4	5
H10 Posttest	46	4.30	0.66	4	4	5	55	4.31	0.54	4	4	5
H11 Pretest	97	4.06	0.72	4	4	5	144	3.98	0.75	4	4	4
H11 Posttest	46	4.43	0.58	4	4	5	55	4.07	0.66	4	4	5
H12 Pretest	97	3.81	0.78	3	4	4	144	3.91	0.77	4	4	4
H12 Posttest	46	4.26	0.68	4	4	5	55	4.15	0.65	4	4	5
H13 Pretest	97	3.54	0.95	3	4	4	144	3.77	0.82	3	4	4
H13 Posttest	46	3.98	0.68	4	4	4	55	3.76	0.67	3	4	4

Note: H1–13 = Hypothesis 1–13, N = sample size, Mn = mean, SD = standard deviation, 25P = 25th percentile, Md = median, 75P = 75th percentile.

Table 4 shows the results of means-difference *t*-tests comparing pretest and posttest scores. For both the control group ($t(198) = 6.49; p < 0.01$) and the treatment group ($t(142) = 7.72; p < 0.01$), the scores for H1 have significantly increased over the course of the semester. Thus, Hypothesis 1 is supported. The scores for H2 have increased for both the control group ($t(198) = 0.85; p = 0.40$) and the treatment group ($t(142) = 4.18; p < 0.01$), but this increase was only significant for the treatment group. Hence, Hypothesis 2 is supported. Similarly, the increase in scores for H3 have increased in both groups, and while the increase was significant for the treatment group ($t(142) = 2.47; p = 0.01$), it was not significant for the control group ($t(198) = 0.55; p = 0.58$). Thus, Hypothesis 3 is supported. The scores for H4 increased significantly for both the control ($t(198) = 6.70; p < 0.01$) and the treatment group ($t(142) = 9.32; p < 0.01$). Hence, Hypothesis 4 is supported. The scores for H5 also increased significantly for both the control group ($t(198) = 3.46; p < 0.01$) and the treatment group ($t(142) = 6.78; p < 0.01$), supporting Hypothesis 5. The scores for H6 saw a decrease over the semester, and this decrease was significant for

both the control group ($t(287) = -1.10; p = 0.27$) and the treatment group ($t(193) = -0.62; p = 0.54$). Thus, Hypothesis 6 is not supported. The tests for H7 revealed a significant increase in scores for the control group ($t(198) = 2.11; p = 0.04$) and for the treatment group ($t(142) = 2.48; p = 0.01$). Hence, Hypothesis 7 is supported. The scores for H8 significantly decreased for both the control group ($t(287) = -12.05; p < 0.01$) and the treatment group ($t(193) = -5.91; p < 0.01$). Thus, Hypothesis 8 is not supported. The scores for H9 increased significantly for the treatment group ($t(142) = 2.93; p < 0.01$), but not for the control group ($t(198) = 0.98; p < 0.33$). Hence, Hypothesis 9 is supported. The scores for H10 increased significantly for both the control group ($t(198) = 1.79; p = 0.07$) and the treatment group ($t(142) = 2.44; p = 0.02$), but only at the 10% level for the former. Thus, Hypothesis 10 is supported. The scores for H11 increased significantly for the treatment group ($t(142) = 3.07; p < 0.01$), but not for the control group ($t(198) = 0.81; p = 0.42$). Hence, Hypothesis 11 is supported. The scores for H12 increased significantly for both the control group ($t(198) = 2.02; p < 0.04$) and the treatment group ($t(142) = 3.32; p < 0.01$), supporting Hypothesis 12. The scores for H13 increased from the beginning to the end of the semester for the treatment group ($t(142) = 2.83; p = 0.01$), but not for the control group ($t(198) = 0.06; p = 0.95$). Thus, Hypothesis 13 is supported.

Table 4. Means-difference *t*-tests between pretest and posttest.

Variable	N Pretest	Mn Pretest	N Posttest	Mn Posttest	Means Diff.
H1 Control	144	3.15	55	3.65	0.50 ***
H1 Treatment	97	3.05	46	3.98	0.93 ***
H2 Control	144	4.16	55	4.31	0.15
H2 Treatment	97	4.09	46	4.57	0.47 ***
H3 Control	144	4.20	55	4.24	0.03
H3 Treatment	97	4.12	46	4.43	0.31 **
H4 Control	144	3.61	55	4.16	0.56 ***
H4 Treatment	97	3.26	46	4.28	1.02 ***
H5 Control	144	4.16	55	4.48	0.32 ***
H5 Treatment	97	3.57	46	4.39	0.82 ***
H6 Control	144	3.21	144	1.39	-1.82 ***
H6 Treatment	97	3.10	97	1.85	-1.26 ***
H7 Control	144	3.17	55	3.47	0.31 **
H7 Treatment	97	3.21	46	3.52	0.32 **
H8 Control	144	3.63	144	1.50	-2.13 ***
H8 Treatment	97	3.31	97	1.93	-1.38 ***
H9 Control	144	4.19	55	4.27	0.08
H9 Treatment	97	4.04	46	4.37	0.33 ***
H10 Control	144	4.14	55	4.31	0.17 *
H10 Treatment	97	4.01	46	4.30	0.29 **
H11 Control	144	3.98	55	4.07	0.09
H11 Treatment	97	4.06	46	4.43	0.37 ***
H12 Control	144	3.91	55	4.15	0.24 **
H12 Treatment	97	3.81	46	4.26	0.45 ***
H13 Control	144	3.77	55	3.76	-0.01
H13 Treatment	97	3.54	46	3.98	0.44 ***

Note: H1–13 = Hypothesis 1–13, N = sample size, Mn = mean, Means Diff. = means difference. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5 shows the results of means-difference *t*-tests comparing the changes in scores of the control group to the changes in scores of the treatment group. Since we expected that the assignment led to larger changes, these *t*-tests are directional. The scores for H1 ($t(100) = 2.80; p < 0.01$), H2 ($t(100) = 1.73; p = 0.04$), H3 ($t(100) = 1.40; p = 0.08$), H4 ($t(100) = 2.40; p < 0.01$), H5 ($t(100) = 2.56; p < 0.01$), H9 ($t(100) = 1.37; p = 0.09$), H11 ($t(100) = 1.39; p = 0.08$), and H13 ($t(100) = 2.3; p = 0.01$) increased significantly more for the treatment group than for the control group. While the scores for H6 and H8 decreased for both groups, they decreased significantly less for the treatment group than for the control

group ($t(240) = -1.92; p = 0.03; t(240) = -2.50; p < 0.01$). The differences in the changes for the scores of H7 ($t(100) = 0.70; p = 0.24$), H10 ($t(100) = 1.10; p = 0.14$), and H12 ($t(100) = 0.77; p = 0.22$) were not significant.

Table 5. Means-difference t -tests between changes in scores of control group and treatment group.

Variable	N Control	Mn Control	N Treat.	Mn Treat.	Means Diff.
H1	55	0.47	46	1.00	0.53 ***
H2	55	0.25	46	0.50	0.25 **
H3	55	0.05	46	0.28	0.23 *
H4	55	0.58	46	1.00	0.42 ***
H5	55	0.37	46	0.83	0.46 ***
H6	144	-1.82	97	-1.26	0.56 **
H7	55	0.27	46	0.39	0.12
H8	144	-2.13	97	-1.38	0.74 ***
H9	55	0.11	46	0.26	0.15 *
H10	55	0.06	46	0.24	0.18
H11	55	0.09	46	0.30	0.21 *
H12	55	0.24	46	0.35	0.11
H13	55	0.05	46	0.41	0.36 **

Note: H1–13 = Hypothesis 1–13, N = sample size, Mn = mean, Treat. = treatment, Means Diff. = means difference.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Discussion

This study delivers a three-step process to develop a PBL assignment for an upper division business course, grounded in the existing literature. Using this process, we developed a PBL assignment to promote DEI and sustainability in the classroom and workplace, to which students move on after graduation. Organizations can also implement PBL in training programs to develop individuals' skills. We present this approach in this study, and evaluate its effectiveness implementing a pretest-posttest research design with a control group. The results offer important scholarly implications.

5.1. Scholarly Implications

First, the PBL assignment was highly effective in increasing students' problem-solving skills (e.g., [4,6–8]). Students who participated in the assignment reported an increased ability to identify and access relevant information to solve a problem. The ability to identify such information was significantly higher in the treatment group than in the control group. Students who experienced the PBL approach also demonstrated improvements in how they tackled problems. Their consideration of all available information to form an independent opinion increased over the course of the semester, and was significantly higher for the treatment group than for the control group. While students in both groups experienced similar increases in their confidence to critically think about all aspects of a problem and form an objective judgement, only students in the treatment group felt significantly more confident to come up with an innovative solution. These findings can also be observed as common themes in students' comments on what they liked about the PBL assignment:

- "how free the instructions were as it was up to me and my group members to solve problems"
- "researching companies to know the backstory to them"
- "collaborating and designating tasks individually; working on a real-life situation; being able to apply knowledge from class"
- "real problem-solving; creative solutions; whole semester to complete; open topics"
- "basic structure of the project was supplied but the subject was very open-ended"
- "our weekly discussions on new info found"
- "coming up with interview questions"
- "how we interact with others in this project because we had to look up interviews from different fields and their different objectives of the situation"

- “the class time we had to brainstorm”
- “together collaboration and come up with problem and solution”

Second, as a result of the PBL assignment, students showed stronger interest in topics related to DEI and sustainability, and making a difference in society. They reported increased awareness of the problems that contemporary organizations faced, increased knowledge about human behavior in organizations, and how this behavior affected organizational outcomes. All of these increases were significantly stronger in the treatment group than in the control group. This finding also means that the PBL assignment was more effective in achieving the course’s learning objectives than traditional assignments. Research across disciplines showed that PBL regularly outperforms traditional forms of instruction (e.g., [50,51]). However, ref. [6] pointed out the need to reinforce these learning outcomes. To maintain learning, students should be repeatedly exposed to PBL and important organizational issues. This means that several courses within an academic or professional training program should implement PBL and explore current issues. Students commented on the theme of learning that they liked:

- “learning about a new topic that I initially had little knowledge about”
- “researching a well-known company to understand what I do and do not want to represent in the future”
- “how it made me look into the problems of different companies I didn’t know about”
- “just learning about the issue of [company name] further; it was a very informative assignment”
- “finding diversity problems and learning each team member’s perspective to put into a presentation”

Third, despite increased learning in both groups, students did not feel confident to take on managerial responsibilities in an organization at the end of the semester. Specifically, students did not feel more prepared to take on the responsibilities of a manager (Hypothesis 6) and to solve conflict in workgroups or teams (Hypothesis 8). In fact, students in both the treatment and control groups reported higher confidence to take on managerial responsibilities at the beginning of the semester than at the end of the semester. Students also lost confidence in their ability to solve conflict in workgroups or teams. These decreases may be due to students experiencing a realistic job preview in upper division courses, or due to experiencing a realistic model of workplace reality which can differ from students’ initial expectations (e.g., [52–54]). However, the decreases in confidence were significantly stronger in the control group than in the treatment group. Hence, the PBL approach mitigated students’ loss of confidence in their perceived preparedness to be a manager.

Nevertheless, students of both groups reported improved interpersonal connections with their peers at the institution as a common theme. Interpersonal connections have been a major concern since the beginning of the COVID-19 pandemic, although public health concerns have eased in the meantime [3]. Forming interpersonal connections is an integral part of PBL and can take on different forms [27,51]. Traditionally, students can work in teams under supervision of the instructor as they did in the presented PBL assignment. Instructors can additionally encourage collaboration among teams. Study [27] suggested the formation of peer teams and appointment of class leaders. Such structures may help students become more confident in a variety of social interactions. Instructors should carefully consider which type of collaboration they want to implement for their PBL assignment. While more extensive forms of collaboration may provide a richer learning experience, they also may require more time or other resources. Students commented that they liked:

- “making new connections”
- “collaborating with my team; meeting other students”
- “putting ideas together with other people”
- “good team work”

- “all team members worked very hard and I learned a lot from each team member”
- “hearing other people’s ideas”
- “learning from others”
- “convening as a group and talking about our next steps”
- “collaborating and delegating tasks”
- “we were able to come together and actually work like a business”
- “how we had the freedom to pick the topic and how my team was very open and understanding and helpful”
- “that I was able to get closer to my group members; I was also able to do more engagement than I thought”
- “getting to know the team better; we didn’t only talk about the project, we talked about our personal lives”

5.2. Limitations and Future Research

The findings of this study are also subject to limitations. A limitation was that the results are based on survey data which were obtained directly from students. Students may be biased about their own skills and abilities [55,56]. However, students also have deep insight into their individual learning experiences, and can evaluate how they perceive learning approaches such as the PBL assignment that was at the center of this study. Research often overlooks students’ perceptions and evaluations of their competences, especially from a qualitative perspective [51].

Furthermore, the sample, including the treatment group and the control group, experienced attrition from the beginning of the semester to the end of the semester. The reason was regular fluctuation in course enrollment that resulted from students adding and dropping courses after the start of the semester. Future research may want to start collecting data only after regular course add- and drop-periods have ended. However, the sample size of this study was sufficiently large to conduct the reported analytic procedures (e.g., [18,19,44]).

In addition, students shared recommendations to improve the PBL approach, which should also be tested for their effectiveness by future research. Students shared the following suggestions:

- “I wish meeting together was easier, but made easier by doing some in class.”
- “I wish we had more time in class to work on the project.”
- “I wish we had more time in class to meet with our team members.”
- “I wish to have more people for a team project.”

These comments show that students appreciated the in-class time to collaborate with their team members. Since some students requested more time, instructors should evaluate whether they can reserve more than five in-class sessions for students to collaborate. Additionally, instructors may allow students to form teams of more than five members. However, research demonstrated that teams should not be excessively large [57]. Besides, other students were content with the PBL assignment as it was presented in this study:

- “I think it is really well thought-out. I don’t think I would change anything about the project in general. My specific project could have used some more work on the solutions.”
- “Nothing, I really enjoyed it.”

6. Conclusions

PBL is superior to traditional learning approaches. The experiential assignment that is presented in this study can be implemented in upper division business courses to promote DEI and sustainability in the classroom and workplace. It can be adapted to a variety of contexts, using the outlined three-step process to develop PBL assignments. A more active and engaged learning experience results for both students and instructors.

Author Contributions: F.M.R. and J.U.N.V. contributed equally to conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, writing, and project administration. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of California State University, Sacramento (protocol code: Cayuse-22-23-10; date of approval: 8/1/2022).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available to protect the anonymity and confidentiality of the participants.

Conflicts of Interest: The authors declare no conflicts of interest.

References

- Deci, E.L.; Ryan, R.M. Self-determination theory. In *Handbook of Theories of Social Psychology*; Van Lange, P.A.M., Kruglanski, A.W., Higgins, E.T., Eds.; Sage Publications Ltd.: Newbury Park, NY, USA, 2012; pp. 416–436. [CrossRef]
- Kloppenborg, T.J.; Baucus, M.S. Project management in local nonprofit organizations: Engaging students in problem-based learning. *J. Manag. Educ.* **2004**, *28*, 610–629. [CrossRef]
- SHRM. Workplace Loneliness Has Broad Implications for Mental Health. Available online: <https://www.shrm.org/hr-today/news/hr-news/pages/workplace-loneliness-has-broad-implications-for-mental-health.aspx> (accessed on 28 November 2023).
- Fisher, G.G.; Matthews, R.A.; Gibbons, A.M. Developing and investigating the use of single-item measures in organizational research. *J. Occup. Health Psychol.* **2016**, *21*, 3–23. [CrossRef]
- Glazewski, K. Problem-based learning. In *The SAGE Encyclopedia of Out-of-School Learning*; Peppler, K., Ed.; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2017; pp. 617–620. [CrossRef]
- Boelt, A.M.; Kolmos, A.; Holgaard, J.E. Literature review of students' perceptions of generic competence development in problem-based learning in engineering education. *Eur. J. Eng. Educ.* **2022**, *47*, 1399–1420. [CrossRef]
- Michaelsen, L.K.; Watson, W.E.; Black, R.H. A realistic test of individual versus group consensus decision making. *J. Appl. Psychol.* **1989**, *74*, 834–839. [CrossRef]
- Harvard Business Review. The Failure of the DEI-Industrial Complex. Available online: <https://hbr.org/2022/12/the-failure-of-the-dei-industrial-complex> (accessed on 28 January 2024).
- The Guardian. The Link between Mental Health and Social Conditions. Available online: <https://www.theguardian.com/society/2022/sep/08/the-link-between-mental-health-and-social-conditions> (accessed on 28 January 2024).
- Xu, E.; Wang, W.; Wang, Q. The effectiveness of collaborative problem solving in promoting students' critical thinking: A meta-analysis based on empirical literature. *Humanit. Soc. Sci. Commun.* **2023**, *10*, 1–11. [CrossRef]
- Bigelow, J.D. Using problem-based learning to develop skills in solving unstructured problems. *J. Manag. Educ.* **2004**, *28*, 591–609. [CrossRef]
- Liu, Y.; Pásztor, A. Effects of problem-based learning instructional intervention on critical thinking in higher education: A meta-analysis. *Think. Ski. Creat.* **2022**, *45*, 101069. [CrossRef]
- Wanous, J.P.; Reichers, A.E.; Hudy, M.J. Overall job satisfaction: How good are single-item measures? *J. Appl. Psychol.* **1997**, *82*, 247–252. [CrossRef] [PubMed]
- Hanover Research. How College Contributes to Workforce Success: Employer Views on What Matters. Available online: <https://dgm81phvh63.cloudfront.net/content/user-photos/Research/PDFs/AACUEmployerReport2021.pdf> (accessed on 28 January 2024).
- Mărginean, A.E. Gen Z perceptions and expectations upon entering the workforce. *Eur. Rev. Appl. Sociol.* **2021**, *14*, 20–30. [CrossRef]
- Norman, G.T.; Schmidt, H.G. The psychological basis of problem-based learning: A review of the evidence. *Acad. Med.* **1992**, *67*, 557–565. [CrossRef] [PubMed]
- Sherwood, A.L. Problem-based learning in management education: A framework for designing context. *J. Manag. Educ.* **2004**, *28*, 536–557. [CrossRef]
- Coombs, G.; Elden, M. Introduction to the special issue: Problem-based learning as social inquiry—PBL and management education. *J. Manag. Educ.* **2004**, *28*, 523–535. [CrossRef]
- Kerr, B. Creative problem solving. In *Encyclopedia of Giftedness, Creativity, and Talent*; Kerr, B., Ed.; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2009; pp. 189–191. [CrossRef]
- Alt, D.; Raichel, N. Problem-based learning, self-and peer assessment in higher education: Towards advancing lifelong learning skills. *Res. Pap. Educ.* **2022**, *37*, 370–394. [CrossRef]

21. Daunic, A.P.; Merrill, K. Social problem solving. In *The SAGE Encyclopedia of Classroom Management*; Scarlett, W.G., Ed.; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2015; pp. 753–755. [[CrossRef](#)]
22. Gravetter, F.J.; Wallnau, L.B. *Statistics for the Behavioral Sciences*, 9th ed.; Cengage Learning: Boston, MA, USA, 2013.
23. Miller, J.S. Problem-based learning in organizational behavior class: Solving students' real problems. *J. Manag. Educ.* **2004**, *28*, 578–590. [[CrossRef](#)]
24. Schmidt, H.G.; De Volder, M.L.; De Grave, W.S.; Moust, J.H.; Patel, V.L. Explanatory models in the processing of science text: The role of prior knowledge activation through small-group discussion. *J. Educ. Psychol.* **1989**, *81*, 610–619. [[CrossRef](#)]
25. Campbell, D.T.; Stanley, J.C. *Experimental and Quasi-Experimental Designs for Research*; Houghton Mifflin: Boston, MA, USA, 1963.
26. Salam, S. A systemic review of problem-based learning (PBL) and computational thinking (CT) in teaching and learning. *Int. J. Humanit. Innov.* **2022**, *5*, 46–52. [[CrossRef](#)]
27. Smith, G.F. Problem-based learning: Can it improve managerial thinking? *J. Manag. Educ.* **2005**, *29*, 357–378. [[CrossRef](#)]
28. Norman, G.R.; Schmidt, H.G. Effectiveness of problem-based learning curricula: Theory, practice and paper darts. *Med. Educ.* **2000**, *34*, 721–728. [[CrossRef](#)] [[PubMed](#)]
29. Inside Higher (Ed.) What Employers Want. Available online: <https://www.insidehighered.com/news/2021/04/06/aacu-survey-finds-employers-want-candidates-liberal-arts-skills-cite-preparedness> (accessed on 28 January 2024).
30. Renz, F.M.; Vogel, J.U.N. Learning through play: Developing and customizing business games. *J. High. Educ. Theory Pract.* **2020**, *20*, 199–216. [[CrossRef](#)]
31. Onyon, C. Problem-based learning: A review of the educational and psychological theory. *Clin. Teach.* **2012**, *9*, 22–26. [[CrossRef](#)] [[PubMed](#)]
32. Shibly, S.A. Mapping the holistic impact of realistic job preview—Pre-recruitment phase, post-recruitment phase and marketing spillover effect. *J. Organ. Psychol.* **2019**, *19*, 70–78.
33. Sustainable Business Forum. The 3 Most and Least Sustainable Businesses of 2022. Available online: <https://sustainablebusinessforum.com/1020/3-most-and-least-sustainable-businesses/> (accessed on 28 January 2024).
34. Tabachnik, B.G.; Fidell, L.S. *Using Multivariate Statistics*, 6th ed.; Pearson Education, Inc.: Upper Saddle River, NJ, USA, 2013.
35. Mackey, T. Problem-based learning. In *The SAGE Encyclopedia of Online Education*; Danver, S.L., Ed.; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2016; pp. 912–914. [[CrossRef](#)]
36. Perusso, A.; Baaken, T. Assessing the authenticity of cases, internships and problem-based learning as managerial learning experiences: Concepts, methods and lessons for practice. *Int. J. Manag. Educ.* **2020**, *18*, 100425. [[CrossRef](#)]
37. Peterson, T.O. So you're thinking of trying problem-based learning?: Three critical success factors for implementation. *J. Manag. Educ.* **2004**, *28*, 630–647. [[CrossRef](#)]
38. The Brink. Depression, Anxiety, Loneliness are Peaking in College Students. Available online: <https://www.bu.edu/articles/2021/depression-anxiety-loneliness-are-peaking-in-college-students/> (accessed on 28 January 2024).
39. Greiff, S.; Martin, R. Assessment of problem solving and higher order thinking. In *The SAGE Encyclopedia of Educational Technology*; Spector, J.M., Ed.; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2015; pp. 51–53. [[CrossRef](#)]
40. Simon, H.A. Information-processing theory of human problem solving. In *Handbook of Learning and Cognitive Processes*; Estes, W.K., Ed.; Psychology Press: New York, NY, USA, 1978; pp. 271–295.
41. Goltz, S.M.; Hietapelto, A.B.; Reinsch, R.W.; Tyrell, S.K. Teaching teamwork and problem solving concurrently. *J. Manag. Educ.* **2008**, *32*, 541–562. [[CrossRef](#)]
42. Nilson, L.B. *Teaching at Its Best: A Research-Based Resource for College Instructors*, 3rd ed.; Jossey-Bass: San Francisco, CA, USA, 2010.
43. Nurkhin, A.; Pramusinto, H. Problem-based learning strategy: Its impact on students' critical and creative thinking skills. *Eur. J. Educ. Res.* **2020**, *9*, 1141–1150.
44. Van Knippenberg, D.; Nishii, L.H.; Dwertmann, D.J. Synergy from diversity: Managing team diversity to enhance performance. *Behav. Sci. Policy* **2020**, *6*, 75–92. [[CrossRef](#)]
45. BBC News. What is Climate Change? A Really Simple Guide. Available online: <https://www.bbc.com/news/science-environment-24021772> (accessed on 28 January 2024).
46. Ahmad, F.; Jhaji, A.K.; Stewart, D.E.; Burghardt, M.; Bierman, A.S. Single item measures of self-rated mental health: A scoping review. *BMC Health Serv. Res.* **2014**, *14*, 398. [[CrossRef](#)] [[PubMed](#)]
47. Ang, L.; Eisend, M. Single versus multiple measurement of attitudes: A meta-analysis of advertising studies validates the single-item measure approach. *J. Advert. Res.* **2018**, *58*, 218–227. [[CrossRef](#)]
48. Giovenco, D.; Shook-Sa, B.E.; Hutson, B.; Buchanan, L.; Fisher, E.B.; Pettifor, A. Social isolation and psychological distress among southern U.S. college students in the era of COVID-19. *PLoS ONE* **2022**, *17*, e0279485. [[CrossRef](#)] [[PubMed](#)]
49. Allen, M.S.; Iliescu, D.; Greiff, S. Single item measures in psychological science. *Eur. J. Psychol. Assess.* **2022**, *38*, 1–5. [[CrossRef](#)]
50. Allen, D.E.; Donham, R.S.; Bernhardt, S.A. Problem-based learning. *New Dir. Teach. Learn.* **2011**, *2011*, 21–29. [[CrossRef](#)]
51. Brownell, J.; Jameson, D.A. Problem-based learning in graduate management education: An integrative model and interdisciplinary application. *J. Manag. Educ.* **2004**, *28*, 558–577. [[CrossRef](#)]
52. GRI. Most Companies Align with SDGs—But More to Do on Assessing Progress. Available online: <https://www.globaleporting.org/news/news-center/most-companies-align-with-sdgs-but-more-to-do-on-assessing-progress/> (accessed on 28 January 2024).

53. Seibert, S.A. Problem-based learning: A strategy to foster generation Z's critical thinking and perseverance. *Teach. Learn. Nurs.* **2021**, *16*, 85–88. [[CrossRef](#)] [[PubMed](#)]
54. Sullivan, L.E. *The SAGE Glossary of the Social and Behavioral Sciences*; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2009. [[CrossRef](#)]
55. Arnold, H.J.; Feldman, D.C. Social desirability response bias in self-report choice situations. *Acad. Manag. J.* **1981**, *24*, 377–385. [[CrossRef](#)]
56. Donaldson, S.I.; Grant-Vallone, E.J. Understanding self-report bias in organizational behavior research. *J. Bus. Psychol.* **2002**, *17*, 245–260. [[CrossRef](#)]
57. Aubé, C.; Rousseau, V.; Tremblay, S. Team size and quality of group experience: The more the merrier? *Group Dyn. Theory Res. Pract.* **2011**, *15*, 357–375. [[CrossRef](#)]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.