

*Journal of Teacher Education for Sustainability,*  
vol. 25, no. 1, pp. 22–39, 2023

## Project-based Learning at a Saudi University: Faculty and Student Feedback

Hana Sulaiman AlRasheed and Amani K. Hamdan Alghamdi  
Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia

### Abstract

Education for sustainable development (ESD) flourishes with student-centered learning methods, including project-based learning (PBL). These methods are still new to Saudi Arabian university students who tend to experience teacher-centered approaches. Saudi Arabia's recent policy decision to shift to a knowledge-based economy that respects sustainability will benefit from PBL-enhanced learning. This small-scale qualitative study investigated faculty and students' feedback on their experience with PBL. Four faculty members (three female, one male in accounting, sports management, and information management) and six female students (financial sciences or accounting) from an Eastern Province university college were interviewed (45 minutes) in 2020–2021 using Zoom. Without exception, the instructors were in favor of PBL as a teaching strategy, and students' overall experience could be described as positive. A thematic analysis (89 % inter-rater reliability coefficient) generated three themes: (a) beneficial learning strategy, (b) beneficial but challenging learning strategy with room for improvement, and (c) sustained student support over the semester with exceptions. Saudi universities are encouraged to employ PBL in all courses and use assessment methods conducive to student-centered learning. Universities are encouraged to streamline the project approval process, which was quite involved herein. Communications with community partnerships are important, and faculty and students should be thoroughly in-serviced and oriented to PBL.

**Keywords:** Higher education, project-based learning, Saudi Arabia, student and faculty feedback, sustainability.

### Introduction

Sustainability is about growth and development that are not dependent on the depletion of nonrenewable natural resources. The gold-standard definition of education for sustainable development (ESD) is education that helps learners gain the knowledge, skills, values, and agency to confront and address challenging interconnected global issues – to shape a sustainable future (Khandakar et al., 2020; UNESCO, 2022). Done properly, ESD instills critical and creative thinking skills, communication skills, and collaborative decision-making skills (Khandakar et al., 2020), which coincidentally align with the 4Cs of 21<sup>st</sup> century learning (Alves et al., 2017).

UNESCO (2020) recently published an ESD framework called *ESD for 2030* and maintained that learning for sustainability would be more ensured if it involved project-based learning (PBL) (to be discussed) (Alkhayyal et al., 2019). The present paper delves into this premise using the Kingdom of Saudi Arabia (KSA) as a working example. KSA was chosen because it is a major oil producer for the world. Appreciating the unsustainable impact of this economic activity, KSA recently launched an initiative to shift from an oil-based economy to a knowledge-based economy (called *Vision 2030*). This national development plan partially depends on developing students' character (including respect for sustainability by reshaping the education system so that learners gain self-awareness and empowerment aligned with creating a sustainable economic system and nation (KSA, 2017).

KSA's transition to a sustainable, more diversified economy entails teaching its own citizens about ESD in a context that is dependent on oil for its prosperity. Enhancing Saudi university students' respect for sustainability is paramount to achieving *Vision 2030*, and higher education (HE) institutions play a key role in this imperative (Alghamdi & El-Hassan, 2019; Alkhayyal et al., 2019). This requires HE institutions to shift to a student-centered learning pedagogy (including PBL) despite longstanding adherence to teacher-centered approaches, to be discussed (Alkhatnai, 2017; Alkhayyal et al., 2019).

Another central objective of HE institutions is to educate and train students how to operate successfully in professional contexts with the understanding that student-centered learning will *sustain* them moving forward in their lives (which now demands a respect for sustainability vis-à-vis economic development and national development). For example, to function in a newly aligned economy and workplace, students must be equipped with an array of 21<sup>st</sup> century skills especially the so-called 4Cs: critical thinking, communication, collaboration, and creativity (Alves et al., 2017). Fortunately, PBL allows people to develop these skills and other competencies while they are still students. Furthermore, by working on authentic projects, university students can gain new and meaningful knowledge along with problem-solving and inquiry-learning skills (Alves et al., 2017; Guo et al., 2020; Lee et al., 2014; Lim et al., 2019).

PBL can be described as an innovative instructional method, wherein learning is organized around a challenging question or real problem (i.e., authentic) (Thomas, 2000). It can also be defined as an active-learning process (Alves et al., 2017) during which students are engaged in the creation of products in an authentic project (i.e., meaningful to their lives). It is this product that differentiates PBL from other instructional methods (Guo et al., 2020; Thomas, 2000). The authenticity of the problem and a resultant public product are key essentials of PBL as are sustained inquiry, students' voice and choice, and their reflections (Buck Institute for Education, 2019; Islam et al., 2022). Equally important is the imperative that PBL projects should be central to the curriculum and not peripheral or merely supplemental. The project helps students learn the content and intended skill sets included in the curriculum (Bradley-Levine & Mosier, 2014; Thomas, 2000).

The present paper explores the use of PBL in Saudi Arabia, an educational context that is historically teacher-centered but is transitioning to a more student-centered approach to educate graduates for the Kingdom's emergent knowledge-based economy's labor force as discussed (Alkhatnai, 2017; Alkhayyal et al., 2019). The study is significant because, although being a recommended pedagogical strategy for Middle Eastern countries (Du et al., 2020), a student-centered PBL is a relatively new approach that only a few

Saudi universities have embraced (Alkhatnai, 2017; Amulla, 2020). Given the sustainability imperative underpinning Vision 2030, learning from a PBL approach is a timely pedagogical innovation for the KSA higher education system.

## Literature Review

### Benefits and Challenges of PBL

A considerable body of research exists around students' perceptions of the benefits of implementing PBL in higher education. PBL allows students to construct new knowledge and learn new skills while working on authentic, real-life problems. It also helps them deepen and expand existing knowledge. PBL enhances their understanding of the course content while augmenting their ability to critically deal with a variety of information sources. PBL had been consistently found to improve oral and written communication, interpersonal skills, teamwork, time management, conflict management, research, leadership, presentation, and information technology (IT) skills (Alves et al., 2018; Carrasco Gallego et al., 2018; Dauletova, 2014; Havenga, 2015; Lim et al., 2019; Mysorewala & Cheded, 2013; Nguyen, 2017; Parrado-Martínez & Sánchez-Andújar, 2020). A strong link between PBL projects and prospective professional skills has also been reported as a boost in confidence (Dauletova, 2014).

Along with benefits, the research shows that students report difficulties while learning through PBL. They experience challenges pertaining to time management, including juggling course work and the project, and arranging times for regular team meetings (Dauletova, 2014; Havenga, 2015; Nguyen, 2017). Students either found the topics of the projects unfamiliar (Nguyen, 2017; Mysorewala & Cheded, 2013), or they found it difficult to decide on a specific topic and determine the project scope (Havenga, 2015). Challenges arose from teamwork including dividing responsibilities, coordinating meetings during holidays, and handling issues of conflict (Havenga, 2015; Dauletova, 2014). Students said that PBL evoked feelings of competitiveness making them feel insecure (Nguyen, 2017). Some students noted their discontent with a lack of support from their partners (Dauletova, 2014).

Higher education course instructors have their own views about the benefits of PBL, which differ somewhat from students' views. Faculty members agree that PBL improves students' communication, teamwork, research, and collaboration skills. It enriches their learning experience by giving them a chance to develop their interest in the content area they drew on while working on the project (Lee et al., 2014; Mysorewala & Cheded, 2013; Nguyen, 2017).

Research also shows that faculty members tended to value PBL for its links with community, and they appreciated the critical role that community partners play in PBL (Lee et al., 2014). Community partnerships can be a key part of PBL. Connecting with communities ensures that students engage in authentic problems. They learn that they are part of something bigger, beyond the classroom environment. They get to bring classroom learning to the community and community life into their learning experience. Because PBL projects can have a deep impact on the community itself (positive and negative), it is important that the partnership is well-managed, well-communicated, and respected (Burns, 2019; Lee et al., 2014; Pan et al., 2021).

As with benefits, course instructors' views of the challenges using PBL differed slightly from the students' perspectives. Instructors lamented students' reluctance to engage with PBL, their lack of collaboration skills while working on projects, and their lack of interest when projects were not a mandatory part of the curriculum (Lee et al., 2014; Lim et al., 2019). Instructors also identified challenges pertaining to incorporating partners of the community into the PBL projects (Lee et al., 2014).

A guiding principle of PBL is that instructors should facilitate learning experiences wherein students learn autonomously and are encouraged to be self-reliant. Research shows that instructors felt students struggling to adapt to this change in the teacher's status, thus contributing to students' challenges (Dauletova, 2014). For teachers to facilitate PBL and promote this innovative method of teaching, they must make considerable, and foreign or unconventional, changes to instruction, assessment methods, and curriculum. This means that some challenges students experience when using PBL may reflect an ill-planned learning-environment that is not conducive to PBL. They experience obstacles not of their own making (Barron et al., 1998).

A persistent issue in the PBL literature in higher education is the role and type of assessment for evaluating students' success. The general consensus is to implement multiple assessment tools, both objective and subjective, direct and indirect, formative and summative, and conventional and alternative. Examples include pre- and post-assessment of students' opinions, homework, in-class clicker quizzes, embedded test questions, short-answer case study questions on exams, self-assessments, peer assessments, and overall project grade (Du et al., 2020; Torres et al., 2021). It is especially important that well-tailored assessment criteria are clearly communicated to students before the PBL project begins often via rubrics (Du et al., 2020).

### **PBL in Saudi Higher Education Context**

The advantages of PBL far outweigh its weaknesses. It can be applied at all levels of education both through the physical classroom and virtual learning environments. Due to its positive impact, PBL is now a recommended strategic priority in higher education (Guo et al., 2020; Havenga, 2015). Middle Eastern scholars recently "underscored the important role of self-regulated learning in a collaborative form and learning setting" (Du et al., 2020, p. 206) and recommended using PBL as a student-learning strategy in higher education settings (Du et al., 2020). That said, PBL is a relatively new approach to teaching that only a few Saudi universities have embraced (Alkhatnai, 2017; Amulla, 2020).

Alkhatnai (2017) was curious about whether PBL would be as effective in the Saudi teacher-centered learning environment as it was in other contexts. He said his study "has started the tradition of examining PBL's influence in Saudi context" (p. 92). Similarly, Almulla (2020) described his study at a Saudi university as "a groundbreaking attempt to employ the PBL approach with [Saudi] college students" (p. 10). Alrajeh (2020b) referenced the "lack of studies that covered the applications of PBL in higher education generally in Saudi Arabia" (p. 7). Despite the lack of research about how well it works in the Saudi context, "universities have encouraged the PBL approach including King Faisal University (KFU)" (Amulla, 2020, p. 10). Alkhatnai (2017) encouraged other scholars to "find the specifics in the Saudi culture which can shape PBL implementation" (p. 92).

Working to that end, Alkhatnai (2017) reported positive results but also acknowledged the challenges of using a student-centered approach in a traditionally teacher-centered context. He said Saudi “students were desperate to try something new. They were fed up with the lecturing class mode” (p. 92). After experiencing PBL, Saudi students reported marked improvement in their communication, editing, learning, presentation, teamwork, and listening skills (Alkhatnai, 2017). Alsamani and Daif-Allah (2016) also reported that PBL usage in a Saudi university “developed new study habits for learners by promoting self-directed, independent, cooperative learning as well as out-of-classroom learning” (p. 51).

In a study about Saudi undergraduate students’ use of PBL online, Alibraheim and El-Sayed (2021) likewise reported positive perceptions. The students scored high on improved problem solving, cognitive learning, and increased involvement in learning. PBL improved their motivation toward learning in general and self-learning, sense of achievement, confidence, self-esteem, and sense of responsibility for their own learning. Using quantitative research, Amulla (2020) found that the PBL approach improved Saudi university students’ ability to learn disciplinary content (cognitive), and it enhanced their engagement in learning. It also improved their collaborative learning, authentic learning, and iterative learning. Alromaih et al. (2022) reported that using PBL to teach Saudi early childhood pre-service teachers about the instructional design process was very successful. Learning via PBL made “the design process valuable and impactful, not just theoretical information, and helped students to gain real experiences rather than memorized information” (p. 1387).

Mysorewala and Cheded’s (2013) study found that course instructors and students were highly content with their PBL experience. Tamran (2019) examined the impact of adopting learning management systems supported by PBL on art teachers’ training at a Saudi university. Faculty and students viewed PBL as a beneficial teaching and learning method. Virtually (90 %) all participants had a positive perception of PBL especially its ability to help students acquire problem-solving skills.

Alrajeh (2020a) reported that Saudi educators who advocated for PBL described it as a teaching method consistent with the nation’s new education policies. Faculty members acknowledged its positive effects on students, as it helped them acquire important 21<sup>st</sup> century skills. Conversely, although faculty members valued PBL, they often confused it with problem-based learning (Alrajeh, 2020a). While both are student-centered, project-based learning is multidisciplinary and usually involves authentic, real-world problems solved with general steps lasting for several weeks or months. Problem-based learning concerns a single discipline or subject matter and uses cases and scenarios that may not be related to the students’ lives and are solved using specific steps over a shorter time frame (Mills & Treagust, 2003). The essential difference between the two, which use the same acronym (PBL), is that project-based learning relies on active student engagement and participation in self-directed learning. Students, not teachers, decide on what and how to study to solve a real-world problem with an authentic project. *They* make decisions with teachers acting as facilitators and guides.

## **Research Question**

“What is the nature of the feedback from Saudi university faculty members and students who engaged with a student-centered, project-based learning (PBL) experience in a context normally focused on teacher-centered learning?”

## **Method**

A qualitative research design was used involving semi-structured interviews. Qualitative research presents the world as perceived by study participants. Its power is rich descriptions and detail about the phenomenon under study. It captures the nature, essence, and quality of the experience (McGregor, 2018), in this case Saudi faculty and students' experiences with problem-based learning.

## **Site Selection**

Students moving from Grade 12 to higher education (aged 17 to 20) are not always equipped with the ability to solve problems and think out of the box in both creative and analytical ways. Recognizing this reality, one college within a prominent Saudi Eastern Province university, conveniently chosen as the site for this study, took steps to improve education results and facilitate the transfer from teacher-based to student-based education. Starting in 2020, some courses at this college are now taught using PBL. The authors are professors at this university and interested in exploring feedback from some faculty and students who took part in PBL courses.

## **Participants and Sampling**

The research design involved purposive sampling in that faculty and students who were familiar with PBL in this college were approached by email to take part in the study. They were well positioned to provide information to answer the research question (McGregor, 2018). Four of 10 faculty members (Eman, Hani, Deema, and Manal – three women, one man) agreed to participate (40 % response rate). They had various levels of academic training, teaching experience, and they taught different courses. Eman (pseudonym) had undergraduate and graduate degrees in accounting with ten years of teaching experience. Hani held a PhD in sports management with 18 years of teaching experience. Deema and Manal, both with eight years of teaching experience, held Bachelor and Master degrees in management information systems. There was no conflict of interest between the faculty participants and the researchers.

Higher education in Saudi Arabia is gendered segregated with women and men studying at separate colleges or in different rooms at institutions which both men and women can attend. The gendered nature of the sample frame from a women's college was recognized as a study delimitation and limitation. That said, Vaz et al. (2013) affirmed that, at a higher education institution that had used PBL for 38 years, women graduates reported a higher percentage of positive impact from PBL than men (statistically significant at  $p < .015$  on 34 of 39 factors, Mann-Whitney  $U$  tests). Six Saudi female students (Amal, Hala, Hana, Nuha, Reem, and Samar – pseudonyms) from the same college agreed to participate in the study reported herein. This response rate (6%) during



COVID was understandable but also acceptable, as small sample frames were preferred for qualitative interviews (DeJonckheere & Vaughn, 2019). The participants were third-year undergraduate students majoring in either financial sciences or accounting. They experienced PBL in one of three courses: investment funding, accounting, or financial review.

### Data Collection

Conducted during tight COVID-19 restrictions, data were collected in 2020–2021 via semi-structured interviews using Zoom. The interviews were, in effect, a dialogue between researcher and participant, which was “guided by a flexible interview protocol and supplemented by follow-up questions, probes and comments. [Researchers were able to] collect open-ended data and explore participants’ thoughts, feelings and beliefs about a particular topic” (DeJonckheere & Vaughn, 2019, p. 1).

Both authors were involved in conducting the Zoom interviews using a respective roster of questions (DeJonckheere & Vaughn, 2019). Twelve questions queried faculty about such things as (a) how many courses included PBL, and when they were taught; (b) how PBL was incorporated and their experience with it (pros, cons) including perceived advantages; and (c) their assessment criteria. Students were queried (eight questions) about their (a) overall experience with PBL (difficulties, advantages, what they had learned); (b) level of satisfaction; (c) opinions on whether PBL augmented future skill sets; and (d) thoughts on the assessment criteria.

Participants could decline or withdraw at any time without penalty. The 45-minute, transcribed, audiotaped interviews were conducted in Arabic, adjusted accordingly after member checking, and then translated to English before analysis. Data will be stored for two years at the authors’ secure cloud system. Permission to conduct the study was received from the Dean of the college and the university’s Vice President, Office for Academic Affairs.

### Data Analysis

The data underwent a thematic analysis, which entailed iterative readings and coding of the transcripts to discern repeating patterns that pertained to answering the research question. Once identified, key threads of meaning were given names (themes) and pertinent excerpts (quotes) were assigned to provide evidence of the thematic claim (Braun & Clarke, 2006). The second author vetted the lead author’s first layer of analysis with an acceptable 89 % inter-rater reliability coefficient (Miles & Huberman, 1994).

### Findings

Without exception, the Saudi course instructors were in favor of PBL as a teaching strategy, and female students’ overall experience could be described as positive (per Vaz et al.’s 2013 study). Eman’s comment exemplifies faculty members’ reactions. *“I thought it was a very distinctive teaching strategy. I am happy to be part of the PBL initiative at the university. PBL makes learning enjoyable and beneficial at the same time.”* Student

Samar attributed the good experience to *“the positive interaction among the students.”* Another student, Hana, found it *“one of the best experiences in learning. ... This type of learning helped me rediscover myself.”* She was fully satisfied with the outcomes and thought that abiding by assessment criteria helped her a lot. Amal, a student, was *“happy with the project results and learning outcomes.”*

Before presenting the findings in full, it is essential to explain how the projects were administered. First, course instructors presented a PBL plan to students and used the first two weeks of the semester to familiarize students using instructional videos about PBL. After faculty had finished this learning-method orientation, they started to work with students to decide on a topic for their project. Some instructors selected possible topics and gave students a list from which to choose. Some preferred to leave it open to students with the latter choosing what they wanted to work on based on their background knowledge and interests (authenticity). Students were then divided into groups whose members had to sign a contract to reflect their seriousness and commitment and provide it to the course instructor. This contract contained the topic, intended product, timeline, and instruments needed to finish the project.

Examples of some PBL projects are helpful. In one course, students worked with a Saudi chemical manufacturing company to improve a database. The project aimed to use database normalization to resolve the issue of a repetition in the database. Another project involved working with a Saudi bank to expand its database by diversifying storage media. The bank claimed that this would increase the speed and efficiency of its computers. Students in a health and fitness course worked on a project that raised community awareness about mental health and healthy lifestyle.

As noted, the interview data were iteratively read until common threads began to emerge. Resultant insights were collapsed and reported as three separate themes (Aronson, 1994; Braun & Clarke, 2006) reflecting participants' feedback about the PBL learning experience: (a) beneficial learning strategy, (b) beneficial but challenging learning strategy with room for improvement, and (c) sustained student support over the semester with exceptions.

### Theme 1: Beneficial Learning Strategy

Manal is an advocate of the self-study mode of learning. As a faculty member, she said that *“following such way of learning, students would be more creative as they must think and work on the project from scratch. By contrast, telling them what to do in detail would limit their creativity.”* Another instructor, Deema, found PBL *“helpful as it improves long-term retention of what students have learned. This is possible because PBL makes them more creative, whereas when they are taught traditionally, by lecturing, they tend to fail in retaining information. Writing a report and conducting research involves self-study and hence, creativity and knowledge retention.”* Manal further considered PBL to be *“valuable because it teaches students to be autonomous.”*

Course instructors also found PBL beneficial with respect to a variety of skills it helps students acquire, both soft and technical. Eman's comments exemplify faculty member's thoughts on this theme. She believed that PBL *“strengthens students' personalities as it sharpens communication skills. Students also acquire the skills of conducting research and interviewing, creating videos, and designing PowerPoint presentation. In other words, PBL pushes students to learn new skills.”* She added that, *“the most important*



*outcome of PBL is networking that links students to their future work environment. It paves the way for students to get connected to companies to which they can return finishing their training at a later stage."*

To Eman, PBL was also helpful because *"students are not confined to specific academic references to read as are guided research or academic writing. For PBL, the choices are rather open, and students can consult as many references as they want, thus it enables them to see things from different perspectives. It also boosts students' confidence. They must do everything by themselves, such as booking an appointment with a company to conduct an interview with an employer. All they need is to get an endorsement letter from the university before making any arrangement by themselves."*

The by-product of the traditional Saudi teacher's status as *the sage on stage* often exerts pressure on Saudi faculty members and shapes students' expectations (Alkhatnai, 2017). Students often take it for granted that teachers are responsible for their academic success. However, evidence in the data set suggested that PBL could help change students' learning expectations and attitudes for the better. By means of PBL, students can sometimes choose what topic they would like to work on as a project thereby placing them in a position of being responsible for their own success. To illustrate, Reem indicated that *"our team started consulting resources to list topics and identify issues about financial fraud. Later, these topics were discussed with the course instructor to decide on one topic."* Samar also said that *"it was our responsibility to identify issues in financial review to find solutions to using PBL."* This student-centered approach promoted students' autonomy, as it allowed them to be more accountable for their learning than in a lecture-format learning environment.

For some students, autonomy was not promoted, as they were asked to work on specific topics identified by their course instructor. For Hana, *"there was a list of topics from which we had to choose one."* Amal described her situation thus: *"We had no choice but to compare between two countries in terms of interests and economic status in order to suggest which country would best attract investment."* Similarly, Nuha commented that *"we had to analyze economic policies of two countries: Saudi Arabia and Argentina. We had to find out which country was expected to have an increase in share prices that would eventually let the investors earn higher profits."* Nuha explained that *"the course instructor was only guiding us if we needed help."* That said, evidence in the data also confirmed that, although these students did not have the chance to choose their topic, they discussed how free they were in planning and managing the project and presenting their final work.

Students' unanimously felt that PBL was helpful in other aspects as well. It boosted their confidence as exemplified by Nuha's comment: *"Regarding how this type of learning has helped us, it improved our confidence, accountability, autonomy, team-leading skills and cooperation."* Reem agreed that it *"helped us to be more accountable, and the whole group was cooperative."* Her group *"found PBL fruitful because continuous interactions between group members developed our personalities."* Samar also described how advantageous this type of learning was in practice. *"From a personal perspective, I became more tolerant and willing to build relationships and from a practical standpoint, it improved our planning skills, time management skills and accountability."* Hala described how she had *"become self-reliant, [and that this trait] was the most important thing that I learned via PBL."*

## Theme 2: Beneficial but Challenging Learning Strategy With Room for Improvement

Faculty member Manal explicitly said, *"It is not only the students who resisted the change, we also did the same at the beginning, but then we got used to it and liked it."* That said, while in favor of PBL as a teaching strategy, instructors noticed a few difficulties with its implementation including time, getting approvals, students' initial resistance, and difficulties with shifting to pandemic-mandated online learning. Instructors also noted that students faced their own difficulties including being overloaded with assignments from other courses, their struggle with searching for information and evaluating it, the challenges of unfamiliar teamwork, and the limited availability of non-human resources (e.g., lack of personal computers and limited access to books and materials).

To illustrate some of these points, Eman perceived time as a challenging factor. She taught an intensive course that demanded prolonged time, yet she still planned *"to set aside fifteen minutes every week to discuss PBL with students and check on their progress."* Finding time was challenging for students, too. Hala described her PBL experience as *"stressful because it required a very long time to carry out the project."* Amal, Reem, and Hana all had the same challenge. Hana indicated that *"the project took a very long time to complete, which was not reasonable as students had midterm as well as final exams."* She struggled to *"find time to study and finish the project at the same time."*

Another source of difficulty for faculty members was obtaining approval to perform some activities outside the university. Letters seeking approval had to be sent to the Dean, Vice Dean, police, municipality, and civil defense. Faculty members argued that it should have been the responsibility of the university's public relations (PR) department to ensure that every project had already received all approvals.

Because students were mandated to study online due to COVID-19, course instructors also indicated difficulties in communicating with students compared to doing so in person before the pandemic. Student Reem also said that *"one course instructor understood how difficult it was to communicate during that period and dedicated fifteen minutes of each lecture to help students with their projects by giving guidance."* From a different perspective, student Nuha said that, *"students studying online missed direct interaction from which they could learn."* And from yet another perspective, faculty members noted that communications were very challenging for projects that required community or private-sector partnerships.

Students also reported that their positive experience with PBL was not always seamless. They found it difficult to search for and then evaluate information. Nuha thought that *"the information we found about Argentina was insufficient. We had to deduce information in an indirect way so we could compare the Saudi economy with Argentina's."* Similarly, Hala highlighted the difficulty of insufficient information, indicating that *"the data were incomplete for some economic indicators."* Another student, Hana, acknowledged her *"lack of critical thinking skills. It was easy to search for information but evaluating these ideas, whether they were valid or not, was not something I was capable of."* She said they *"needed to consult a financial expert, who was not easy to contact during the pandemic."*

Another source of challenge stemmed from the nature of teamwork. Amal, a student, found it *"challenging to coordinate among five team members especially when we had different views."* Samar similarly described her experience. *"We had different views, but we had to negotiate to reach an agreement at the end."* Reem, a PBL student-group

coordinator, complained of *“receiving work too late from other team members and the unexpected responsibility of accelerating work that was placed on me.”*

Moreover, both faculty and students came to realize that PBL required certain non-human resources whose availability helped students finish a PBL project (especially computer applications and instruments). Hana, a student, explained how *“their unavailability for some students negatively affected their work.”* Nuha also pointed out that *“our labs were closed due to COVID. Sometimes, we had to go to the university library to use the computers there, but the computer processors were slow. They were also limited in number. Availability of computers would make it easier for us to work on our projects after lectures.”*

Although course instructors reported positive experiences with PBL, they too said there was room for improvement. Manal suggested that PBL *“should be gradually implemented into most of the university’s courses by carefully selecting several for PBL implementation.”* She added that *“students could have the same project for more than one course.”* Manal was convinced that *“students are creative, and they can merge requirements of three courses into one PBL project.”* From a different perspective, Deema recommended reconsideration of the traditional number of assignments and exams in each course. *“Limiting assignments in the courses with PBL would be more manageable as students always complained of an overload of course work and exams.”* Moreover, she encouraged implementing PBL with specific courses, including *“online marketing, because this course is dynamic and largely depends on discovery of new trends of online marketing that makes it appropriate for PBL strategy.”*

### Theme 3: Sustained Student Support Over the Semester With Exceptions

Faculty members said they provided, and students said they received, sustained support for the PBL learning experience over the semester. Examples of faculty support can be seen in Eman’s comment: *“The videos I presented to students showed that PBL requires teamwork for which they need a variety of skills to finish the project by the end of the semester.”* She continued, saying that *“sometimes they misunderstood PBL. They thought it was a research activity. PBL is not theoretical research; it is rather practical.”* Manal observed that *“students were resistant to such kind of learning at the beginning. However, we tried our best to assure them that we were always there to help. In addition, step-by-step clarification was given of the projects.”*

Students’ reports of available support were in accordance with faculty members’ accounts. Students felt that support was available in many ways. Prior to the start of the project, the course instructors specified the assessment criteria. Students had to conduct both peer-assessment for their colleagues’ projects and self-assessment for their own projects. Instructor Nuha explained that *“all group coordinators had a meeting with the course instructors in advance to discuss the project and assessment criteria. Students were also asked to use these criteria to assess their projects by themselves before handing them in for the instructor’s evaluation.”* Reem, a student, confirmed that *“the criteria were the first thing sent to students and were uploaded to the (BlackBoard LMS).”* Samar (student) believed that *“clarity of the criteria was a positive aspect of PBL.”*

To elaborate more on the assessment criteria aspect of support, both traditional and progressive assessment strategies were employed in the courses. To illustrate, Eman indicated that her approach was *“multidimensional.”* She *“assessed the project plan, its*

*implementation, and the final product.*” She also required students to assess themselves using peer assessments and self-evaluation. In contrast, Professor Hani indicated that students usually had quizzes and final practical and theoretical exams. He allotted 40 % for the final exam and only 20 % for the project. When prompted during the interview if he thought this approach might limit maximum benefits of PBL, he answered *“we must comply with college policies in administering final exam in all courses. However, while I was negotiating with one of my colleagues over the marks allocated for projects, I suggested allocating more marks for the PBL.”*

Most students reported that their course instructors were usually supportive, but several students had issues with not being able to ask the course instructor for guidance and that doing so would lower their score. As an aside, despite PBL requiring teachers to be facilitators (Dauletova, 2014), instructors in this study created a PBL ground rule that students would lose points if they asked the course instructor for guidance. Hala said she *“wished it was okay to ask the course instructor for guidance. To us, PBL was a new experience, and we felt lost.”* When prompted about the project guidelines, Nuha replied, *“Yes, we were told that seeking help from the course instructor and asking questions about the project would lower our scores.”* Amal explained that *“we were not allowed to ask the course instructor any questions about the project. Our course instructor kept reminding us that doing this would lower our score. Despite this, however, she answered some of our questions without deducting our scores. She was responsive.”*

Faculty members were aware of this dynamic but from a different perspective. To illustrate, Instructor Manal said that *“even in terms of asking for guidance, students are more cautious in asking questions because they do not want to lose marks.”* She was convinced that *“PBL and this rule are valuable because they teach students to be autonomous.”*

## Discussion

Course instructors and students in this study were highly content with their PBL experience, an outcome that mirrored Mysorewala and Cheded (2013) and Tamran’s (2019) work. Our findings join the nascent literature on the use of PBL in Saudi HE settings (Alibraheim & El-Sayed, 2021; Alsamani & Daif-Allah, 2016; Amulla, 2020). Our study is significant because, although a recommended pedagogical strategy for Middle Eastern universities (Du et al., 2020), PBL is a relatively new approach that only a few Saudi universities have embraced (Alkhatnai, 2017; Amulla, 2020; Islam et al., 2022). Achievement of Vision 2030 depends on student-centered learning leading to self-awareness within the evolving economic context, especially sustainability issues.

Saudi faculty member’s perceptions of the benefits and challenges of PBL correlate with previous Saudi-based research (Alibraheim & El-Sayed, 2021; Alsamani & Daif-Allah, 2016; Amulla, 2020). Participants herein said that PBL augmented students’ confidence, autonomy, critical and creative thinking, long-term retention, communication skills, networking process, research skills, and it enabled them to see things from different perspectives. From a challenge perspective, faculty commented on time, getting approvals, students’ initial resistance, and difficulties with pandemic-mandated online teaching.

Faculty said students initially resisted PBL. A full shift in the way students have been traditionally taught can be problematic, even if they are tired of the lecture format (Alkhatnai, 2017). Student-centered learning that significantly increases expectations

for students to own their own learning can generate resistance (Pluskwik & Wang, 2020). The session orienting students to PBL must thus acknowledge this pedagogical shift.

Also, previous research did not mention the challenges of obtaining so many layers of institutional approval for PBL projects (in this case: “*the dean, vice dean, police, municipality, and civil defense*”). In other contexts, students often initiate contact on their own scaffolded with scripts and preapproved protocol (Burns, 2019; Pan et al., 2020). Perhaps the approval aspect of PBL projects and community partnerships is unique to the Saudi context. If so, it warrants further study. Alkhatnai (2017) encouraged other scholars to “find the specifics in the Saudi culture which can shape PBL implementation” (p. 92).

The benefits that student participants identified from their PBL experience closely matched those reported in nascent Saudi-based literature: increased confidence, self-reliance, time management skills, accountability, team-leading skills, group-work skills, and even their personalities (e.g., Alibraheim & El-Sayed, 2021; Alsamani & Daif-Allah, 2016; Amulla, 2020; Mysorewala & Cheded, 2013). Students reported challenges with time management; the lack of non-human resources; finding information related to their PBL topic; inadequate critical thinking skills; and challenges with teamwork dynamics (managing meeting times, unanticipated pressure of responsibility, and members not contributing equally). These same concerns were often reported in aligned studies (Dauletova, 2014; Havenga, 2015; Mysorewala & Cheded, 2013; Nguyen, 2017).

These student-related findings have two implications. First, pragmatically, those organizing future efforts to implement PBL at this institution are encouraged to include information about these concerns in the students’ orientation session. Second, Saudi HE institutions using PBL can take heart that PBL works in their context, a concern voiced by Alkhatnai (2017) who was curious about whether PBL would be as effective in the Saudi learning environment as it is in other contexts. This finding matters because achieving Vision 2030, so the economy is more diversified and sustainably accountable, can benefit from PBL in HE courses.

Assessment of PBL experiences was another issue. One faculty participant described her assessment protocol as “*multidimensional*.” Another participant expressed concerns about having to administer final exams even in courses with PBL projects. Although research affirms that multiple assessment strategies to evaluate PBL courses are preferred (Torres et al., 2021), initial findings suggested that this issue was not yet settled at this university setting. If the university is to apply PBL best practices, it should consider empowering faculty to design their evaluation schemes, as this would allow them to choose assessment methods that maximize the benefits of PBL. As active participants in implementing PBL, they could adopt new approaches to assessment that are compatible with PBL (Barron et al., 1998) albeit unconventional in the Saudi context (Alkhatnai, 2017; Alkhayyal et al., 2019).

Confining assessment to traditional exams also lessens the enhancement of students’ PBL learning in dimensions (e.g., perceptions and opinions) other than cognition. Faculty and students said that the PBL experience affected students’ personalities both strengthening and developing them. Amulla (2020) reported that PBL improved not only cognitive skills but iterative learning as well. The latter entails repeatedly comparing one’s work with other team members’ work as the project unfolds. This aspect of the learning process requires interacting personalities, which cannot help but impact an individual’s



personality development. Multifaceted assessment strategies that include objective and subjective assessments (Torres et al., 2021) are better equipped to capture this aspect of student's performance during a PBL experience.

On a final comment about assessment concerns, in this study, faculty members had agreed to use student-centered PBL in their courses but were still required to honor university policies in administering traditional teacher-centered final exams. Two course instructors articulated suggestions for university administration with this regard: (a) implement PBL in most of the university courses instead of only a select few (and support this decision university wide); and (b) permit other methods of PBL assessment to adequately measure the objective cognitive gains and the subjective, emotive gains. PBL cannot be used in dissociation with appropriate assessment methods (Torres et al., 2021).

Exploring community partners' involvement in PBL was beyond the scope of the study. However, reference to their role in PBL was evident in the data with faculty members expressing concern about how challenging it was to communicate with external associations involved in the PBL projects. This concern intimates their respect for these partnerships. Previous research has affirmed that instructors value PBL for its links with community, and they appreciate the critical role that community partners play in PBL (Lee et al., 2014). Community partners tend to be very effective stakeholders, and their views should be investigated in further Saudi studies not only to ensure that students' work with them represents a win-win deal to all partners, but also to help instructors decide on the projects' efficiency in preparing students for the job market.

Amulla (2020) believed that instructors should receive formal training in PBL because, otherwise, their understanding develops while using the PBL approach, and students can become confused about the process. This seemed to have been the case in this study, wherein instructors told students they would lose points if they asked for guidance, a policy that contradicts the instructors' role during PBL as facilitator (someone who makes things easier by offering advice and guidance) (Alkhatnai, 2017). In fairness to the instructors, they did say that this ground rule was intended to help students become autonomous learners, but it also reflected an underdeveloped understanding of PBL (AlRajeh, 2020a).

Faced with this finding, the authors subsequently confirmed that the faculty members who had participated had not received formal training – only a meeting to introduce them to PBL and guidelines for implementing it. Islam et al. (2022) recognized that PBL might not be easy to implement in all courses. They strongly recommended that faculty members receive practice, training, and patience from the university. The university in our study had put in place a committee to oversee and monitor how PBL was being delivered. We recommend that this committee spearhead efforts to explicitly orient faculty members to PBL and clarify how PBL differs from more familiar problem-based learning, which faculty members can confuse (AlRajeh, 2020a; Islam et al., 2022).

On a final note, AlRajeh (2020a) and Islam et al. (2022) recently reported that Saudi educators who advocated for PBL described it as positively effecting students' ability to acquire important 21<sup>st</sup> century skills: critical thinking, communication, collaboration, and creativity (Alves et al., 2017). The 4Cs are also a key component of ESD (Khandakar et al., 2020). If we are to describe these skills that students have acquired as a result of taking part in project-based learning, then they can be described as 'transferable and useful in other aspects of life' (Wahid et al., 2020, p. 84). Although participants herein acknowledged PBL ability to improve these 4C skills, they did not frame them as 21<sup>st</sup> cen-



tury skills, which would help graduates contribute to a knowledge-based economy (per Vision 2030's intent to create a diversified economy that respects sustainable production and consumption). Given that it is highly recommended to teach 21<sup>st</sup> century competencies in a culturally adapted learning environment (Kohl & Hopkins, 2020), the newly formed university committee that is overseeing the implementation of PBL should also prepare in-service material on the importance of instilling 21<sup>st</sup> century skills through PBL experiences.

### Limitations

The small sample size does not allow for generalization, but faculty and students' feedback is encouraging and could inspire employing this method across all university courses not in just one college. This small-scale study should be replicated in more disciplines, colleges, universities, and Saudi provinces (13 in total). A mixed methods research design would be appropriate to gather richer and more diverse data to answer the research question. Student-gendered comparisons are recommended as well, as Vaz et al. (2013) reported that women, compared to men, tended to view PBL as having a more positive impact. Ideally, PBL should be positive for both sexes.

### Conclusion

Findings affirmed that project-based learning was well received at this Saudi college setting. Both faculty and students recognized its benefits and challenges and appreciated that there was room for improvement. Findings further augmented the nascent literature about using PBL in Saudi HE settings that are traditionally teacher centered. This is a burgeoning area of study in Saudi Arabia given the important role HE is expected to play in economic development and labor market alignment pursuant to a diversified, knowledge-based economy that respects sustainable production and consumption.

Our findings affirmed the strength of the PBL learning strategy and its ability to bolster Saudi students' self-autonomy, self-confidence, and accountability along with their ability to communicate and think critically. Any struggles they encountered (notably access to non-human resources) may well have been exacerbated by COVID-related learning conditions. All said, PBL is strongly recommended as an important student-centered learning strategy that prepares Saudi graduates for the 21<sup>st</sup> century knowledge-based economy.

### References

- Alghamdi, A. K. H., & El-Hassan, W. S. (2019). Raising Saudi students' (energy) sustainability awareness through ESL – teachers' thoughts. *Journal of Teacher Education for Sustainability*, 21(1), 137–154. <https://doi.org/10.2478/jtes-2019-0011>
- Alibraheim, E. A., & El-Sayed, S. A. (2021). Exploring female undergraduate education students' perceptions of collaborative online project-based learning (COPBL). *EURASIA Journal of Mathematics, Science and Technology Education*, 17(8), em1993. <https://doi.org/10.29333/ejmste/11079>
- Alkhatnai, M. (2017). Teaching translation using Project-Based-Learning: Saudi translation students perspectives. *Arab World English Journal for Translation & Literary Studies*, 1(4), 83–94. <http://dx.doi.org/10.24093/awejtls/vol1no4.6>

- Alkhayyal, B., Labib, W., Alsulaiman, T., & Abdelhadi, A. (2019). Analyzing sustainability awareness among higher education faculty members: A case study in Saudi Arabia. *Sustainability*, 11(23), Article 6837. <https://doi.org/10.3390/su11236837>
- Almulla, M. A. (2020). The effectiveness of the project-based learning (PBL) approach as a way to engage students in learning. *SAGE Open*, 10(3). <https://doi.org/10.1177/21582440209387>
- Alrajeh, T. S. (2020a). The value and use of project-based learning in teacher preparation programs. *Cypriot Journal of Educational Sciences*, 15(5), 989–1010. <https://orcid.org/0000-0002-2462-3224>
- Alrajeh, T. S. (2020b). *University faculty members perceptions regarding the level of the value and use of project-based learning in teacher preparation programs: A mixed methods study* (Doctoral dissertation). Available from Proquest Dissertations and Theses database. (UMI No. 28149836).
- Alromaih, M. A., Elsayed, S. A., & Alibraheim, E. A. (2022). Study of project-based learning to improve the instructional design process of pre-service early childhood teachers. *International Journal of Information and Education Technology*, 12(12), 1381–1389. <https://doi.org/10.18178/ijiet.2022.12.12.1762>
- Alsamani, A. A. S., & Daif-Allah, A. S. (2016). Introducing project-based instruction in the Saudi ESP classroom: A study in Qassim University. *English Language Teaching*, 9(1), 51–64. <http://dx.doi.org/10.5539/elt.v9n1p51>
- Alves, A. C., Leão, C. P., Moreira, F., & Teixeira, S. (2018). Project-based learning and its effects on freshmen social skills in an engineering program. In M. Otero-Mateo & A. Pastor-Fernandez (Eds.), *Human capital and competences in project management* (pp. 9–26). InTech. <https://doi.org/10.5772/intechopen.72054>
- Aronson, J. (1994). A pragmatic view of thematic analysis. *The Qualitative Report*, 2(1), 1–3. <https://doi.org/10.46743/2160-3715/1995.2069>
- Barron, B. J., Schwartz, D. L., Vye, N. J., Moore, A., Petrosino, A., Zech, L., & Bransford, J. D. (1998). Doing with understanding: Lessons from research on problem- and project-based learning. *Journal of the Learning Sciences*, 7(3–4), 271–311. <https://doi.org/10.1080/10508406.1998.9672056>
- Bradley-Levine, J., & Mosier, G. (2014). *Literature review on project-based learning*. University of Indianapolis Center of Excellence in Leadership of Learning. <https://pdf4pro.com/view/literature-review-on-project-based-learning-1af3.html>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp0630a>
- Burns, T. (2019, March 11). Community partners and project based learning [Web log post]. <https://www.magnifylearningin.org/project-based-learning-blog/community-partners-and-project-based-learning>
- Buck Institute for Education. (2019). *What is PBL?* <https://www.pblworks.org/what-is-pbl>
- Carrasco Gallego, A., Donoso Anés, J. A., Duarte Atoche, M., Hernández Borreguero, J. J., & López Gavira, M. R. (2018). The effectiveness of the project-based learning (PrjBL) approach in undergraduate accounting education. *Educade*, 9, 65–83. <http://dx.doi.org/10.12795/EDUCADE.2018.i09.05>
- Dauletova, V. (2014). Expanding Omani learners' horizons through project-based learning: A case study. *Business and Professional Communication Quarterly*, 77(2), 183–203. <https://doi.org/10.1177/232949061453055>

- DeJonckheere, M., & Vaughn, L. M. (2019). Semistructured interviewing in primary care research: A balance of relationship and rigour. *Family Medicine and Community Health*, 7(2), e00057. <https://doi.org/10.1136/fmch-2018-000057>
- Du, X., Naji, K. K., Sabah, S., & Ebead, U. (2020). Engineering students' conceptions of collaboration, group-based strategy use, and perceptions of assessment in PBL: A case study in Qatar. *International Journal of Engineering Education*, 36(1), 296–308.
- Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International Journal of Educational Research*, 102, Article 101586. <https://doi.org/10.1016/j.ijer.2020.101586>
- Havenga, H. M. (2015). Project-based learning in higher education: Exploring programming students' development towards self-directedness. *South African Journal of Higher Education*, 29, 135–157. <https://hdl.handle.net/10520/EJC182452>
- Islam, M. S., Halim, S., & Halim, T. (2022). Implementation of project-based learning (PBL) in teaching skills courses at the tertiary level: How effective is it for all types of learners? *Journal of Tianjin University Science and Technology*, 55(7). <https://doi.org/10.17605/OSF.IO/B5XDY>
- Khandakar, A., Chowdhury, M. E. H., Gonzales, A. J. S. P., Touati, F., Emadi, N. A., & Ayari, M. A. (2020). Case study to analyze the impact of multi-course project-based learning approach on education for sustainable development. *Sustainability*, 12(2), Article 480. <https://doi.org/10.3390/su12020480>
- Kingdom of Saudi Arabia. (2017). *Vision 2030*. [https://vision2030.gov.sa/sites/default/files/report/Saudi\\_Vision2030\\_EN\\_2017.pdf](https://vision2030.gov.sa/sites/default/files/report/Saudi_Vision2030_EN_2017.pdf)
- Kohl, K., & Hopkins, C. (2020). Learnings from the #IndigenousESD global research: Twenty-first century competencies for all learners. *Journal of Teacher Education for Sustainability*, 22(2), 90–103. <https://doi.org/10.2478/jtes-2020-0018>
- Lee, J. S., Blackwell, S., Drake, J., & Moran, K. A. (2014). Taking a leap of faith: Redefining teaching and learning in higher education through project-based learning. *Interdisciplinary Journal of Problem-based Learning*, 8(2), Article 2. <https://doi.org/10.7771/1541-5015.1426>
- Lim, Y. M., Lee, W. P., & Lim, T. M. (2019). *Entrepreneurial and commercialization pathway through project-based learning in higher-education*. Paper presented at the IEEE International Conference on Engineering, Technology and Education, Indonesia. <https://doi.org/10.1109/TALE48000.2019.9225964>
- McGregor, S. L. T. (2018). *Understanding and evaluating research*. Thousand Oaks, CA: Sage.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.
- Mills, J. E., & Treagust, D. F. (2003). Engineering education: Is problem-based or project-based learning the answer? *Australasian Journal of Engineering Education*, 3(2), 2–16.
- Mysorewala, M., & Cheded, L. (2013). A project-based strategy for teaching robotics using NI's embedded-FPGA platform. *International Journal of Electrical Engineering Education*, 50(2), 139–156. <https://doi.org/10.7227/IJEEE.50.2.4>
- Nguyen, T. T. (2017). Developing important life skills through project-based learning: A case study. *The Normal Lights*, 11(2), 109–142.

- Pan, G., Seow, P. S., Shankararaman, V., & Koh, K. (2021). Essence of partnership management in project-based learning: Insights from a university's global project programme. *Journal of International Education in Business*, 14(2), 297–319. <https://doi.org/10.1108/JIEB-04-2020-0031>
- Parrado-Martínez, P., & Sánchez-Andújar, S. (2020). Development of competences in postgraduate studies of finance: A project-based learning (PBL) case study. *International Review of Economics Education*, 35, Article 100912. <https://doi.org/10.1016/j.iree.2020.100192>
- Pluskwik, E., & Wang, Y. (2020, June 22–26). *Student responses to active learning strategies: A comparison between project-based and traditional engineering programs*. Paper presented at ASEE's Virtual Conference (Paper #28955). <https://cornerstone.lib.mnsu.edu/cgi/viewcontent.cgi?article=1041&context=ie-fac-pubs>
- Stover, S., & Holland, C. (2018). Student resistance to collaborative learning. *International Journal for the Scholarship of Teaching and Learning*, 12(2), Article 8. <https://doi.org/10.20429/ijstl.2018.120208>
- Sutrien, A. (2013). Two project methods: Preliminary observations on the similarities and differences between William Heard Kilpatrick's project method and John Dewey's problem-solving method. *Educational Philosophy and Theory*, 45(10), 1040–1053. <https://doi.org/10.1111/j.1469-5812.2011.00772.x>
- Tamran, A. (2019). *Potential impact of project-based learning (PBL) using Learning Management Systems (LMS) on the training of female art teachers in Saudi Arabia* (Unpublished doctoral dissertation). Saint Joseph's University.
- Thomas, J. W. (2000, March). *A review of research on project-based learning*. The Autodesk Foundation. [https://tecfa.unige.ch/proj/eteach-net/Thomas\\_research\\_review\\_PBL.pdf](https://tecfa.unige.ch/proj/eteach-net/Thomas_research_review_PBL.pdf)
- Torres, A., Sriraman, V., & Martinez Ortiz, A. (2021). Comprehensive assessment of a project-based learning application in a project management course. *International Journal of Instruction*, 14(3), 463–480. <https://doi.org/10.29333/iji.2021.14327a>
- UNESCO. (2020). *Education for sustainable development: A roadmap (#ESD for 2030)*. <https://unesdoc.unesco.org/ark:/48223/pf0000374802.locale=en>
- UNESCO. (2022). *What is education for sustainable development?* <https://www.unesco.org/en/education/sustainable-development/need-know>
- Vaz, R. F., Quinn, P., Heinricher, A. C., & Rissmiller, K. J. (2013, June 23–26). *Gender differences in the long-term impacts of project-based learning*. Paper presented at the American Society for Engineering Education Conference, Atlanta, GA. <https://peer.asee.org/gender-differences-in-the-long-term-impacts-of-project-based-learning>
- Wahid, M., Lee, W. K., & Baharudin, F. (2020). Implementing project-based learning for sustainability management course at postgraduate level. *Asian Journal of University Education*, 16(2), 84–92. <https://doi.org/10.24191/ajue.v16i2.10300>

Correspondence concerning this paper should be addressed to Prof. Amani K. Hamdan Alghamdi, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. Email: [akhalghamdi@iau.edu.sa](mailto:akhalghamdi@iau.edu.sa)