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PBL in Higher Education: Empowering Students for the Industry Dynamics

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ABSTRACT
Problem-Based Learning (PBL) has garnered substantial attention in the field of higher education for its capacity to boost student learning and deliver work ready graduates on par with the industry needs. This study aimed to investigate the impact of PBL on enhancing essential employability skills in higher education students. Through a comprehensive literature review, the study examined the relationship between PBL and the employability skills of a cognitive nature, specifically critical thinking and problem-solving. The findings suggest that PBL can effectively develop these skills, thereby empowering graduates with the skills required to succeed in the contemporary job market. Furthermore, the study explored the factors that contribute to the successful implementation of PBL in higher education institutions. The implications of the findings for various stakeholder groups such as educators, policymakers, and employers are discussed, while additionally highlighting the potential of PBL to reform higher education and improve graduate outcomes.

Keywords*:* Problem-based learning, Higher education, Cognitive skills, Critical Thinking, Problem-solving, Work-ready graduates, Employability skills.

Background

Education and all its inherent practices around the world functioned in a conventional and knowledge-centric approach for a notable period of time. This has been challenged and now all educational institutions are urged to move towards a leaner-centric approach for the teaching-learning process along with all other significant elements such as assessment in the classroom (Hossen, et al., 2024). The delivery of the teaching-learning processes has gained great bearing given the technological advancements that allow educational programs in different layouts. A combination of delivery modalities makes programs more accessible and flexible, thereby offering further personalization of content. Innovation in terms of the convergence of pedagogical approaches such as the PBL, gamification etc., and collaborative/cooperative activities make learning innovative (Miranda et al.,2021).

Substantial research in the area of contribution of Higher Education Institutions (HEIs) to the society at large, back the idea that HEIs have a key part to play in the creation of responsible and employable individuals. Critically engaging with the process of defining graduate employability skills and competencies creates an opportunity for HEIs to become the champions of social transformation and impart education for positive outcomes (Guardia et al., 2021). Educators must be mindful in selecting appropriate teaching-learning pedagogical approaches that are on par with the changing needs of the learners, courses and industry needs. Businesses must constantly adapt to a rapidly changing environment, every part of an organization needs to evolve and improve to stay competitive and a highly skilled workforce is at the heart of such endeavours (Manikeswari et al., 2024). HEIs are tasked with the crucial responsibility of transforming students into employable graduates by honing their skills and preparing them for the real world.

The Problem-Based Learning (PBL) approach

Current research studies the impact of the PBL methodology on the development of cognitive skills, critical thinking and problem-solving.

The PBL curricula allows a guided learning opportunity for the students. PBL in the classroom, must ideally follow a logical order where students are presented with a problem (often from the real-world), followed by fact-identification and hypotheses formulation for feasible solutions. A common gap in this process is where, at times, the students are deficient in knowledge related to the problem and this is when self-directed learning using research or self-study takes place. In light of the new knowledge learnt, the students re-evaluate their hypotheses and validate the solutions. As such solutions are derived from Self-directed Learning (SDL), wherein students were able to manage their learning goals, the PBL forms the foundation for lifelong learning (Hmelo-Silver, 2004). The educator, on the other hand, is more of a facilitator, by helping students to enhance their cognitive, social and, in the current era, technological skills.

For the purpose of implementing PBL across multiple domains, varied models have been put forth. For example, the 8-step Alborg model is proposed for Project Management; the 7-step Maastricht model for Science, Healthcare, and Business; the 8-step Manchester model for Medicine and Engineering and last but not the least, the 7-step Samford model for Business, Education, and Pharmacy. (Zotou et al., 2020 as cited by Wang et al., 2023).

Methodology

The paper attempts to synthesize the existing literature on the practice of PBL approach to address the following research objectives:

(i) Examining the impact of PBL in enhancing learners' critical thinking skills.
(ii) Assess the impact of PBL in enhancing learners' problem-solving skills.

Literature review papers, though challenging, present a singular source of all significantly relevant and evidence-backed literature on a topic.
Employing the literature review methodology allowed the opportunity to review relevant literature that addresses the research objectives while also simultaneously creating the connection between the main aspects of the research.

Discussion

PBL – An effective pedagogical approach

PBL has been used around the world since the 1970s. In PBL, students work on real-world problems that can be complex and unclear. They break down these problems into smaller, more manageable parts called problem formulation. Students then create solutions, like designs, models, tools, or plans, to address these problems. (Dahl & Grunwald, 2022).

PBL is a pedagogical technique in which learning takes place in complex problem-solving environments. One of the indicators of useful problem-solving skills is the competence to apply reasoning strategies to new-found problems. It provides the opportunity for students to think about how the knowledge acquired relates to a certain problem. It accommodates for them to question what they need to know. PBL allows students the opportunity to reflect and become flexible thinkers who can apply prior knowledge to initiate action (Hmelo-Silver, 2004).

PBL and cognitive skills

PBL is a pedagogical method that is mainly student-centered and can potentially enhance the learners' critical thinking and problem-solving skills.

A study conducted in 2006-2007 at Universiti Utara Malaysia (UUM) to see how PBL worked in a Financial Accounting Principles course revealed that students in the PBL class did better than those in a traditional class. Students also said PBL helped them improve their leadership, IT, presentation, and teamwork skills. (Manaf et al., 2011).

Conventionally, subject matter learning forms the focal point in teaching, however, this does not allow learners to cope with the world's challenges that require problem-solving skills. According to Cho et al., (2015), instead of an instructor-centered approach that is primarily a content-oriented, decontextualized teaching and/or learning mode, PBL offers a learner-led, and contextualized learning approach that is problem-driven, problem-solving and prepares students for real world challenges.

The PBL model has a constructive influence on learners to advance problem-solving, critical and creative thinking abilities (Sa'dijah, 2016, Selcuk, Caliskan & Sahin, 2013, as cited in Arifin et al., 2020). The PBL model can be applied as an effort to enhance students' critical thinking skills, problem-solving capabilities using creative and critical thinking

when compared with the Direct Instruction (DI) learning method. At Higher education level, the use of PBL places the obligation for learning with the students, thereby encouraging independent learning

The PBL learning model was found to have a significant impact on the problem-solving skills and scientific writing skills of learners as part of a study conducted with 62 participants from the Geography Education Program at Kanjuruhan University of Malang, Indonesia. Additionally, it was found that PBL and problem-solving skills together had a significant impact on the scientific writing skills of learners (Sari, 2021).

Tursynkulova et al., (2023), through their study found that a PBL course helped students improve their cognitive skills, like critical thinking, problem-solving, logical reasoning, and creativity, when it came to solving geometry problems. Applying 6 case-based activities through the Palisade @RISK software in a risk management classroom, Prakash & Ambedkar (2024) through their study, illustrated how the gap between theory and practice could be bridged through the production of results that possibly demonstrated every feasible outcome thereby allowing students to weigh in the repercussions and make informed decision through the application of their critical thinking and problem-solving skills.

Recommendations

PBL is an impactful tool for enhancing critical thinking and problem-solving skills among students. Through the use of authentic, real-world problems, collaborative work, and self-directed learning activities, PBL can endow students with the competencies required for success in both academic and professional endeavours.

PBL can help students improve their ability to think critically, which includes analyzing information, evaluating arguments, making good decisions, solving problems, and thinking creatively. Additionally, it is also a pedagogical approach that is specifically designed to enhance students' problem-solving skills. By providing students with authentic, real-world problems and encouraging them to actively engage in the learning process, PBL creates a rich environment for developing and honing problem-solving abilities. It challenges students with real-world problems and encourages them to use their knowledge and skills to solve them. This helps students learn how to approach problems systematically, which includes identifying the problem, thinking of possible solutions, choosing the best one, trying it out, and seeing if it works.

With the rapid growth of online learning and the need for innovative instructional strategies, several educators now attempt to use PBL in the delivery on online courses. While doing so, it is essential to consider the adaptation of PBL to the specific course and how it may require a significant extent of modification based on the highly dynamic context of local and global contexts. Other crucial factors to consider include the proficiency of students in terms of language skills, support required through guidelines, method of presentation of the problem (audio, visual, kinesthetic) and technological expertise.

Using PBL in online learning lets students experiment with various tech tools for problem-solving. This creates a lot of data that can be analyzed using learning analytics (LA). LA can provide valuable insights to stakeholders like educators, helping them understand student progress better. (Wang et al., 2023).

While PBL has been shown to be effective in the classroom, implementing it can be challenging for institutions transitioning from traditional to learner-centered approaches. These challenges often involve shifts in organizational culture, changes in teachers' beliefs and values, and adjustments to the institution's structure (Camacho, et al., 2020). Empowering educators with all possible required resources primarily including access to literary and research sources, time allocation and technology are quintessential to the success of PBL.

Scope for future research

Future research as an extension on this topic could be aimed at ascertaining the effectiveness of PBL as an independent pedagogical methodology while simultaneously studying its potential when employed in conjunction with other notable pedagogical methods. Specific and extensive studies on the application and benefits of PBL across various disciplines could also lead to the discovery of ground-breaking findings that could optimize its utility in the field of higher education.

Conclusion

To fully realize the benefits of PBL in higher education, institutions should invest in professional development programs for educators. These programs should equip teachers with the knowledge and skills needed to effectively implement PBL in the classroom. Simply discussing the research-backed benefits of PBL isn't enough to convince educators to adopt the method, even if they believe in its potential. Empowering educators and learners with the adequate resources to explore and reap the benefits of PBL in the classroom is necessary for enhancing the learners’ skills and work-ready attributes.

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