Challenge Based Learning

A Comprehensive Survey of the Literature

Executive Summary

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May 2023

Overview and Methods

Challenge Based Learning (CBL) is a relatively new contribution to the pedagogical landscape, emerging in the early 2000s. Recently the interest in CBL and, correspondingly, the amount of published literature has increased significantly. This literature survey builds on existing literature reviews and identifies additional publications to provide deeper and more comprehensive insight into CBL.

Starting with a focused review of the academic databases: Scopus and WoS, a broad collection of CBL publications were identified and analyzed. The survey then identifies and reviews additional documents connected to these publications, resulting in an extensive review of the existing CBL literature.

Findings

Four key themes from the literature provide structure for discussing the findings.

The definition, origins and components of CBL
The existing literature offers valuable insights that contribute to defining CBL as a distinct educational framework. This body of work encompasses various aspects, such as defining CBL, delineating its components, and highlighting factors that set it apart from other pedagogical approaches. Moreover, the literature illuminates the inherent qualities of CBL, situating it within established educational philosophies such as progressivism, constructivism, experiential learning, and service learning. However, there is a need for a comprehensive investigation into the philosophical origins and foundational principles underpinning CBL.

The motivations for adoption and implementation
A range of motivations drives the adoption of CBL. Higher education institutions (HEIs) embrace CBL to address increasing societal challenges that demand new competencies and

skills for graduates. CBL also aligns with the ever-evolving requirements of contemporary workplace environments, which demand increased self-regulation, creativity, critical thinking, collaboration and lifelong learning skills. Traditional approaches to education fall short of addressing these evolving demands. The motivations for incorporating CBL are not as specific in pre-university settings. However, they revolve around three primary themes: student engagement, improved achievement, and developing vital soft/professional skills.

Current strategies for implementation
The literature shows that while CBL works across various contexts and scales and can cater to both small and large student cohorts, until recently, it was still mostly on the periphery of the curriculum as a supplement to existing structures rather than embedded curriculum practice. Some literature, especially in HiEd, suggests a movement towards making it an embedded and transformative curriculum practice at an institutional level. By adopting a strategic approach to CBL, institutions can transform their educational programs into more open, flexible, and learner-centered models, benefiting students, faculty, other stakeholders, and society. Examples of large-scale transformative adoption of CBL at the organizational level are present across different continents and acknowledged in the literature.

The impact of CBL
The literature survey demonstrates numerous benefits of implementing CBL. The findings highlight how CBL enhances student engagement, motivation, and self-directed learning while promoting the development of vital skills such as problem-solving, creativity, and deeper understanding and application of knowledge. Longitudinal studies have indicated positive perceptions of CBL among teachers and students, with reports of improved collaboration, critical thinking, communication skills, and higher levels of motivation and learning outcomes. Shorter-term studies across different educational levels and content areas have also reported positive results, such as increased reflective and metacognitive practices, enhanced scientific literacy, mathematical creativity and spatial abilities.
Additionally, CBL positively impacts the entrepreneurial skills and mindset of students and the development of skills in industry networking, start-up creation, and multidisciplinary teamwork.
The literature also suggests that implementing CBL at an institutional level can positively impact the learning environment and contribute to broader goals, such as fighting poverty and addressing the United Nations SDGs (Sustainable Development Goals).
The current findings underscore the potential of CBL as an impactful educational approach that equips students with the necessary skills and knowledge to make a positive difference in their communities and navigate the complexities of the modern world.

Conclusion

This literature survey presents an informative perspective of the global CBL landscape. The published literature presents CBL as a unique and promising pedagogical approach used effectively in classroom integration and transformative large-scale implementations.

Limitations

While there is evidence of successful case studies, experiences, and implementations of CBL, the research landscape still needs to be developed, with additional longitudinal and quantitative studies.

Recommendations

The literature survey raised new questions, and additional rigorous research is needed to deepen the knowledge base and gain a broader perspective on the effectiveness and role of CBL. Some of the areas recommended for additional research include:

• what a "Challenge" represents within CBL;
• pre-university education in CBL literature, including its impact on younger learners and traditional school settings;
• CBL in non-STEM areas, particularly the humanities, and interdisciplinary approaches crossing boundaries between humanities and STEM;
• longitudinal studies on CBL to understand its long-term impact;
• the role of technology in CBL and its impact on learning, reflection, documentation, and sharing;
• reflection and metacognition: their importance in the CBL process, barriers to implementation;
• neuroscience and brain-based learning research with the CBL framework, including the role of emotion in engagement and optimal learning environments;
• barriers to the adoption and implementation of CBL and ways to mitigate them, including perceptions of formal learning, teacher adoption barriers, and institutional structural barriers; and
• assessment methods for CBL in formal learning environments.

Full Literature Survey
Perna, S., Recke M.P. & Nichols, M.H. (2023). Challenge Based Learning: A Comprehensive Survey of the Literature. The Challenge Institute. https://www.challengeinstitute.org/CBL_Literature_Survey.pdf

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Moritz Philip Recke is a media technology engineer and learning experience designer, managing the day to day operation, and implementation of the technical curriculum through Challenge Based Learning (CBL) at the Apple Developer Academy at University of Naples Federico II. He has a Ph.D. in sociotechnical imaginaries and public policy, degrees in Next Media, and Media Technology, and held executive positions in the digital media industry, while publishing 100+ apps as an iOS developer. Moritz is Managing Director at imaginary institute.

Mark H. Nichols has 40+ years of experience in public and private p-20 education, including decades of working with and for Apple. As an integral part of the original ACOT2 team that developed the Challenge Based Learning (CBL) concept, he co-authored the CBL white paper and managed the pilot and implementation projects. Mark has degrees in political science and economics, theology, education, and public policy. He continues his work with CBL as CEO of the Challenge Institute and the lead pedagogical consultant for Apple Developer Academies.

The Challenge Institute supports the research and praxis of Challenge Based Learning (CBL) worldwide. The mission of the Challenge Institute is to help people, organizations and institutions to become effective learners prepared for personal, local and global challenges. challengeinstitute.org

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