

REIMAGINING PEDAGOGY IN HIGHER EDUCATION THROUGH INQUIRY AND COGNITIVE ENGAGEMENT: A BLOOM'S TAXONOMY AND SDG-ALIGNED APPROACH

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ABSTRACT

The need for pedagogical transformation in higher education has never been greater. As global challenges demand creative, competent, and critical thinkers, educators must adopt frameworks that transcend rote memorization and passive learning. By integrating Bloom's Revised Taxonomy with the innovative approaches of Inquiry-Based Learning (IBL) and Process-Oriented Guided Inquiry Learning (POGIL), this keynote explores how higher education can empower learners to become active co-constructors of knowledge. The pedagogical alignment with the United Nations Sustainable Development Goals, particularly SDG 4 (Quality Education), positions inquiry-driven teaching as a tool for equitable, inclusive, and sustainable educational reform.

1. INTRODUCTION

Higher education today stands at crossroads. Traditional didactic models centered on content delivery no longer meet the needs of a rapidly changing world (Barnett & Coate, 2005). During my postgraduate training in academic practice at King's College, London, I was introduced to the transformative pedagogical frameworks of IBL and POGIL. These approaches reshaped my view of teaching as not merely the transmission of knowledge but as the facilitation of inquiry, collaboration, and higher-order thinking.

2. RESEARCH METODOLOGY

Bloom's Taxonomy as a Framework for Cognitive Engagement

First developed in 1956 and revised in 2001, Bloom's Taxonomy provides a hierarchical model for cognitive development, evolving from *Remember* and *Understand* as lower order goals to *Apply*, *Analyze*, *Evaluate*, and *Create* (Krathwohl, 2002) which qualify as the higher order goals. Yet, as Anderson and Krathwohl emphasize, learning is most impactful when learners actively move toward the higher-order domains (Anderson & Krathwohl, 2001). In higher education, this can be achieved by redesigning questions, activities, and assessments to encourage synthesis, evaluation, and original knowledge construction.

3. RELATED RESEARCH/LITERATUR REVIEW

Inquiry-Based Learning (IBL) is an approach in which students explore meaningful questions, engage in systematic investigation, and construct conceptual understanding through active inquiry (Prince & Felder, 2006). Rooted in constructivist learning theory, IBL aligns closely with the higher levels of Bloom's Taxonomy—particularly *Analyze* and *Create*—where learners synthesize knowledge, test hypotheses, and generate original ideas.

A good Example for this can be taken that applies for the Life Sciences: Instead of simply describing the process of photosynthesis, students could be challenged to design an experiment investigating the effects of environmental variables on chloroplast function. Such a shift transforms learning from passive recall to active discovery.

Beyond deepening conceptual understanding, IBL cultivates autonomy, reflective habits, and engagement—attributes that are central to achieving SDG 4 (Quality Education), which promotes

inclusive and equitable learning opportunities, and SDG 10 (Reduced Inequalities), which emphasizes accessible and participatory education for all learners (UNESCO, 2017).

Through IBL, education becomes a platform for empowerment—enabling diverse learners to question, explore, and co-create knowledge that addresses real-world challenges.

4. RESULTS AND DISCUSSION

Process-Oriented Guided Inquiry Learning (POGIL) builds upon the principles of inquiry by integrating structured teamwork and defined student roles—such as manager, recorder, and presenter—to guide learning through collaborative exploration (Moog & Spencer, 2008). Within each POGIL session, students navigate content-specific inquiry cycles that develop both conceptual understanding and process skills, including communication, leadership, and metacognition.

POGIL not only supports the upper cognitive domains of Bloom’s taxonomy but also nurtures interpersonal competencies essential for the modern workforce, aligning strongly with SDG 5 (Gender Equality)—by ensuring inclusive participation and equitable voice in group settings—and SDG 8 (Decent Work and Economic Growth)—by cultivating teamwork, problem-solving, and adaptability required in sustainable economies.

By emphasizing collaboration and reflection, POGIL transforms the classroom into a microcosm of a sustainable society—one where shared responsibility, empathy, and inquiry coexist as core learning values.

Pedagogy and the UN Sustainable Development Goals

The integration of **inquiry-based approaches** such as **Inquiry-Based Learning (IBL)** and **Process-Oriented Guided Inquiry Learning (POGIL)** in higher education extends far beyond classroom innovation—it embodies a powerful commitment to the **United Nations Sustainable Development Goals (SDGs)**. These pedagogies cultivate reflective, autonomous, and socially responsible learners who are equipped to engage with the complex challenges of the 21st century. Through inquiry, collaboration, and critical reflection, education transforms from the transmission of knowledge to the *co-construction of understanding for sustainable global progress*.

SDG 4 – Quality Education

Inquiry-based pedagogies directly advance **SDG 4: Quality Education**, which aims to ensure inclusive and equitable access to learning opportunities for all. By encouraging students to question, explore, and create, IBL and POGIL shift education from rote memorization toward deep, conceptual learning rooted in *critical thinking and problem-solving*. These methods foster **learning environments where students actively construct meaning** and link disciplinary knowledge to real-world contexts—exactly the kind of transformative learning UNESCO identifies as essential for sustainability education. Thus, educators not only teach content but also nurture *lifelong learners* capable of addressing social, environmental, and ethical challenges.

SDG 5 – Gender Equality

IBL and POGIL classrooms promote **gender inclusivity and equity**, fulfilling the vision of **SDG 5: Gender Equality**. In POGIL’s structured group model, every student assumes an active role—such as manager, recorder, or presenter—ensuring balanced participation and equal voice. This framework dismantles traditional hierarchies and empowers all learners, particularly women and marginalized groups, to engage as leaders and collaborators. By modeling **equitable participation, respect, and**

shared responsibility, educators foster attitudes that transcend the classroom—helping to build workplaces and communities grounded in fairness and mutual respect.

SDG 8 – Decent Work and Economic Growth

Inquiry-driven learning prepares students for the rapidly changing demands of the global workforce, directly supporting **SDG 8: Decent Work and Economic Growth**. By developing **transferable 21st-century skills**—communication, creativity, collaboration, adaptability, and ethical reasoning—students become equipped for meaningful employment and entrepreneurship in knowledge-based economies. Moreover, inquiry-based classrooms mirror professional environments, emphasizing teamwork, leadership, and innovation—skills essential for building a sustainable and inclusive economic future.

SDG 10 – Reduced Inequalities

Both IBL and POGIL create spaces for **equitable learning experiences**, thus contributing to **SDG 10: Reduced Inequalities**. Through inquiry, diverse learners engage with content at their own pace and from their own perspectives, ensuring that learning is inclusive rather than hierarchical. POGIL's team-based approach encourages the exchange of diverse ideas, helping students recognize the value of varied cultural, social, and intellectual contributions. By cultivating empathy, respect, and collaboration, educators help bridge gaps between learners—promoting not only academic equity but also a mindset of social justice and inclusion.

SDG 17 – Partnerships for the Goals

Inquiry-based pedagogies inherently promote **collaboration and global partnership**, which align closely with **SDG 17: Partnerships for the Goals**. Educators and institutions that adopt IBL and POGIL often engage in **interdisciplinary and international collaborations**, sharing best practices, co-developing curricula, and building pedagogical capacity across borders. These collaborative frameworks create a **global community of practice**, uniting educators, researchers, and policymakers in advancing transformative education for sustainable development. In essence, inquiry-based teaching exemplifies the SDG 17 spirit: partnerships rooted in shared knowledge, innovation, and mutual empowerment.

Pedagogy as a Pathway to Sustainable Transformation

By implementing **Bloom's Taxonomy** through **IBL** and **POGIL**, higher education becomes a **catalyst for social and environmental transformation**. These approaches engage the *head* (cognition), *heart* (values and empathy), and *hands* (action and practice), nurturing graduates who think critically, act ethically, and innovate sustainably. In this way, pedagogy itself becomes a **driver of the SDGs**—empowering students not only to understand the world but to improve it.

5. CONCLUSION

Today's learners do not merely need information—they need engagement, reflection, and opportunities to create. Through deliberate pedagogical design based on Bloom's Taxonomy and informed by inquiry models such as IBL and POGIL, educators can reimagine higher education as a process that does not "fill empty vessels," but instead "ignites minds" capable of critical and creative

thought. Such a transformation is not only desirable but necessary for the achievement of the global education and sustainability agendas of the 21st century.

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