

Biotechopoly: A Serious Science Game for Raising Career Interest

Todd Smith (todd@digitalworldbiology.com), Digital World Biology, **Todd Smith**, Digital World Biology, **Sandra Porter**, Digital World Biology, **Margaret Bryans**, Montgomery County Community College, **Feather Ives**, Merritt College

The life science industry needs technicians to produce, manufacture, test, and package diagnostic tests, drugs, and vaccines. At the same time, technician shortages are plaguing the industry and biotech education programs are struggling to recruit students. A common explanation for these challenges is that students do not know what people do in biotechnology companies. Students are unlikely to be interested in careers that they don't know exist. Students, and some teachers, may also harbor misconceptions and believe these careers are too difficult to attain, require a PhD, or just don't seem interesting or important. Games are an attractive way to address this challenge. Games that focus on topics relevant to students' lives, can help them learn how biotech companies make products and the diverse types of career roles that are needed in order to shepherd a product through the life cycle and get it out the door. Four of the most important factors in student career choice (awareness, engagement, self-efficacy, and relevance) can be addressed by using games as learning tools and the use of games for increasing student engagement and interest is well supported by research.

In Biotechopoly[™] Antibody Edition players need to move a potential product through pre-clinical research, to phase I studies, to phase II/III studies, and to market. The first player to reach the market wins. As players role dice, to move their game token around the board, they have to raise money, hire personnel, collect data, and pay their bills. Along the way, players experience luck and karma, take risks, and encounter the trials and tribulations of developing biotechnology products. Students who have tested the game tell us Biotechopoly is fun, educational, engaging and, at times, harsh.

The first version of Biotechopoly focuses on antibody therapeutics. An initial prototype was advanced in Digital World Biology's Antibody Engineering Hackathon held August 8-11, 2022 (<https://antibody-engineers.org/event/antibody-engineering-hackathon-august-2022>). Since then, the game has been refined through sessions with individuals have both scientific, non-scientific, and game design backgrounds. From these experiences it is clear that games can not only provide engaging ways for student learning, but the development process has potential in building scientific collaborations.

Acknowledgements: This work is funded in part by NSF ATE grants (DUE 1764225 and DUE 2055036). We also want to acknowledge members of the hackathon team (Dua Hassan, Frances Weis-Garcia, Feather Ives, Margaret Bryans, and Sandra Porter) for their work in advancing basic game play and experimenting with online strategies.