Winter 2022

Biohacking Labs in Libraries

Awura-Adwoa Bonsu

Awura-Adwoa Bonsu
9704 Final Proposal Project

The Information Age continues to evolve. Technological advances with its innovations continue. Its impact on the individual and society continue unabated. The term biohacking is a combination of two words, biology and hacking. Hacking from the Oxford English dictionary can be used as a noun, like the name of a place, people, or sports etc(Oxford, 2022). In technology, hackers in the dictionary also have a sinister meaning. They are those who escape security to access unauthorised data such as on your phone, email, website, or computer. Biohackers are people who try to improve/optimise biological performance, which otherwise work normally, with technological intervention.

Biohacking is the process of exploring, tinkering, understanding the possibilities of biological building blocks and equipment, and expanding its potential with home experiments and do it yourself gear, merging body modifications with technology(Robbins, T., 2022). This is the new frontier in innovation at the confluence of technology and biology. The innovation is now with the body itself, to improve the body performance, to maintain a healthy lifestyle , through personal data acquisition, and open source medicine, and knowledge.

BACKGROUND

The scientific inquiry is derived from Greek philosophers who used reason and experimentation, not myths and stories, to explain nature. This has grown into publishing worth billions, and driven by data(Meyer et al., 2020). During the development of science there was a shift from open science to centralised institutional science in special places(research laboratories) and operated by special people, the research scientists.

For decades innovations have been carried out in conventional settings or institutions(research labs), by research scientists, with monetization affecting the ideals of the innovations and their applications. Biohacking involves ordinary people as well as scientists. Statistically about 25% are students, 75% male(Meyer et al., 2020). There are engineers, artists, natural scientists, philosophers and activists. More than 50% are fully employed in other jobs(Meyer et al., 2020). Innovations are in the hands of everyday people and experimentation is carried out at home, in garages they aim to develop off the shelf protocols at low cost(Gaspar et al., 2019). They have open access research and collaboration by creating individual pursuits of inquiry. They document and share protocols, equipment design, and experiences over the internet. They demonstrate a do it yourself approach at home, hence the synonym, Do-It-Yourself bio. Other synonyms used for the same concept are garage biology, DIY Genetics, DIY medicine, DIY Science(Meyer, et al., 2020). Innovation should not be in the domain of only university research places with their professors.

GROWTH OF BOIHACKING: UP TO THE PRESENT

Biohacking has been in three phases

Beginning in 2008-2012 the first labs were created. Rapid growth between 2013- 2015. About 10 labs were created per year. Finally relative stabilisation(Meyer, et al., 2020). From about 2015 onwards. The biohacking phenomenon spread to europe and other countries.

By 2025, the economic activity related to biohacking is projected to be around 2.5 billion dollars(Meyer, et al., 2020). It is expected to grow exponentially, biohacking is not an irritating fad. It is a distinct trend of novel innovation.

I find this approach very exciting and feel it will accelerate the democratisation of the scientific inquiry process. Its advocacy for open source knowledge, with easy accessibility to shared knowledge, intellectual freedom, privacy/confidentiality concerns, education and lifelong learning approach as well as sustainability, will contribute to the fulfilment of some core values of the library as an institution.

ALA CORE VALUES

The ALA core values are clearly articulated in the freedom to read statement. This includes

Access:

All information that is provided should be readily, equally and equitably accessible to all users. In this case the people who are interested in it and are seeking it(ALA Core Values of Librarianship, 2020).

Democratisation:

A free democracy includes an informed citizenry. What better way than to have open access to information on the web and share ideas and collaborate with one another. This will avoid costly copyright accessibility(ALA Core Values of Librarianship, 2020).

Education and lifelong learning:

The open access approach and easy means of shared information will promote creation, maintenance, and enhancement of a learning community. This will encourage people to work together for the greater good of the community. That is, support the public good(ALA Core Values of Librarianship, 2020).

Intellectual freedom:

As librarians the attempt to silence/censor biohacking cannot be condoned and biohackers and their research must not be disregarded as such though they are associated with risks(ALA Core Values of Librarianship, 2020).

BIOHACKING METHODS

These innovations are done in various ways:

Internally with wearables.

External devices, materials or substances.

Through hardware or software.

Brain machine interface.

Smart environment with digital or virtual approach.

These work by augmenting a biological function, through technological intervention. Hearing, vision and cognitive capacity can be augmented this way, defective genes could be targeted and improve its function as well(Meyer, et al., 2020).

RISKS

When J. Zayner tried to make muscle grow by using CRISPR-Cas9 system to disrupt the myostatin gene with himself as subject he did not pass through any of the institutional gatekeepers and that, unauthorised, unethical exploitation or altering human genetic material is against the law(Gaspar et al., 2019). This is not in alignment with the WHO guidelines nor with the WMA declaration in Helsinki that thorough knowledge of the literature with regards to the subject, adequate laboratory facility, animal, before human experimentation, the design, performance on human subjects should be carefully outlined(Gaspar et al., 2019).

Biohackers however argue that though there is robust regulation of professional scientists in the traditional setting it still fails scrutiny(Je kun He case) and that they are a poor regulator of themselves(Castelyn, 2020). The regulatory measures slow down innovation, that the data they collect are strictly personal, and that they exercise the right of autonomy by using themselves as informed subjects, and have a right to do science.
The public health concerns with biohacking are: intervention with poor safety or efficacy, introduction of unsafe and unproven therapies, lack of true informed consent(Šupa, & Kruopštaitė, 2021). It is private and there is no ethical review and also self funded, thus no accountability.

COMMUNITY

People might forego traditional therapy. The adverse effect of the intervention cannot be ignored as well as its effect on the environment(Šupa, & Kruopštaitė, 2021).

Innovation is a conversation about the new technology. What better way to allow for free discussion on the web, tinker with the idea in your/group's own laboratory/space, rather than be hindered by copyright issues. The impact of this innovative approach will affect the innovators, the library and society as a whole.

FINAL GOAL OF BIOHACKING

Biohackers do not want the general public to view them as pariah, an anti-establishment community. The development of the personal computer started in a similar fashion and now has grown into smart phones etc. Recent research showed that biohackers showed an ambivalence relationship to legal and informal normative realms. Technological counterculture are the focal points where norms are reinvented around novel social practices.

Hopefully their ideas and entrepreneurial endeavours will cause them to be accepted in the community.

Guidelines are being drafted to help self-regulate the practice which should eliminate the risks to the experimenters and to the community. The future prospects are good and with the rise of open source, medical help can come to people more readily. It needs more and better communication with the general public so people can know what they are doing. After all it operates as an open system, the public must therefore know and adjust to the possibilities.

REFLECTIONS

The topic of biohacking was chosen because it was an innovative idea to me. When I delved further into it I realized that there was much to discover and a very exciting and growing field. Though exciting innovations are being initiated, it is also scary. The challenges of finding information about the topic and the amount of materials I had to cover was enormous. In writing this paper I first had to understand what biohacking was before I could move on from there. It changed my concept of the scientific method as confined to institutions done by special people. If biohacking can spread into other biological realms it will also help to solve some of the issues facing mankind. Recently there was a publication about gene changes in eggs that allowed all eggs to hatch as females. That means more eggs to feed the world. Greek mythology talked about Daedalus who created wings made of feathers and wax for his son, a boy called Icarus who flew too close to the sun and fell to his death as the wax melted. Although this was done to save his son this unproven biohacking technique led to disaster. The topic of biohacking will have an impact on librarianship. As research and experiments can be conducted by amateurs the library will be a place were information can be gathered to either begin the research or try to understand the results. It can

also be a place where the results can be stored for future use by other biohackers. Although, it would not be ethical for there to be a biohacking lab within the library itself and could potentially cause liability issues the librarians themselves would be a great source for the hackers to use in order to conduct their biohacking. A challenge with biohacking will be whether the scientific community will take their findings seriously as there is no oversight or checks.

People frowned on biohacking because of the self experimentation, without any clear knowledge of the outcome and the side effects on the victim as well as the community and its environment. On the other hand that is how some modern innovations begun, like computers, that eventually grew into a technology that has transformed the world.

Biohacking with its open concept is a great idea. Information is shared readily and openly, allowing for quicker learning curves and innovation. This certainly is welcomed by the library with its goal of free and unfettered access to information, The hindrance of regulations are overcome and innovation is achieved quickly. This is a good point by these biohackers.

The initial scientific method of the Greek mind was an open concept. In the process of growth it developed into centralized institutions with eventual monetization. This compromises the scientific process and brings in a lot of bias in the research. This is also done by special people under special rules. This certainly slows down innovation. Some of the rules are circumvented anyways when it suits them.

Biohackers believe there is no special people for scientific research, and you do not need an institution to do that, everyday people, at everywhere place can do the same. Collaboration is quick and progress faster. There is no limit to the improvement in human biological function. The only limit will be when we move to another level of existence.

There is a saying that not many people like changes and what may seem as odd, eventually become the norm.

I think with the growth of biohacking, people will become aware of its innovative ideas and their originators will become accepted. Some self regulatory processes will certainly be helpful and good communication within and outside their community will accelerate the process. The new frontiers of knowledge with man as the subject is now on its way. How it will end depends on how it is managed.

References

Admin. (2020, September 28). *Core values of librarianship*. Advocacy, Legislation & Issues. Retrieved December 15, 2022, from https://www.ala.org/advocacy/intfreedom/corevalues

Castelyn, C. (2020). Oversight of biohacking when the stakes are high: Ethics police or FBI? *Voices in Bioethics*, 6. https://journals.library.columbia.edu/index.php/bioethics/article/view/5898/2938

Gaspar, R., Rohde, P., & Giger, J. C. (2019). Unconventional settings and uses of Human Enhancement Technologies: A Non-systematic review of public and experts' views on self-enhancement and DIY Biology/biohacking risks. *Human Behavior and Emerging Technologies*, *1*(4), 295–305. https://doi.org/10.1002/hbe2.175

Meyer, M., & Vergnaud, F. (2020). The rise of biohacking: Tracing the emergence and evolution of DIY Biology through online discussions. *Technological Forecasting and Social Change*, *160*, 120206. https://doi.org/10.1016/j.techfore.2020.120206

Šupa, M., & Kruopštaitė, I. (2021). Deviance and ethical considerations in online biohacking communities. *Deviant Behavior*, *43*(10), 1245–1266. https://doi.org/10.1080/01639625.2021.1976606

Team Tony. (2022, July 23). *What is biohacking and how does it work?: Tony Robbins*. tonyrobbins.com. Retrieved December 15, 2022, from https://www.tonyrobbins.com/health-vitality/biohacking-for-beginners/