Week 2: Challenges within Constructive Research

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# Challenges within Constructive Research

Constructive design is one of the most common research methods for information systems and technology (Silvestrini & Sammito, 2012). The methodology revolves around building artifacts, studying outcomes, and then deriving novel observations. During this process, the researcher needs to be cognizant of ethical and quality challenges. When the authors fail to address those risks, their efforts conclude with unacceptable and unusable results.

# Ethical Challenges

Researchers need to manage ethical challenges that arise from their work. These issues originate from societal norms and internal biases. While several frameworks exist to guide the conversation, they can be ambiguous or focus on a subset of the problem.

## What are ethics

Ethics are a system of moral principles that dictate the norms of a group. Societies implement these systems through social constructivism, enabling and constraining the group’s actions (Burr, 2015). Communities leverage this mechanism to assign truths and infer values about concepts (Gergen, 2010). Consider a project that seeks to prove that men are superior to women. Within a chauvinistic cohort, these results align with their world views and are ethical. However, a diverse group would chastise the very idea, regardless of methodology. Further complicating the matter, ethical identities are dynamic and evolve (or regress) over time.

Scholars need to understand their audience and the group’s customs. Breaking these social contracts limits the researcher’s influence and ability to solicit their work. These implicit rule sets vary between cohorts, making it impossible to remove these subtle biases entirely.

## Influence of Bias

Researchers need to understand their internal biases. Everyone has historical and cultural defaults that lead to prejudices. These subtle classification differences influence language and construct our reality (Owen, 2017). Picture two people, one fat another thin. Then change those definitions to obese and anorexic. Did all four imagined people have the same gender and race? Words matter and one needs to choose them carefully. These biases sneak into our written and verbal communication. They cause us to gloss over issues of Diversity, Equity, and Inclusion (DEI). For instance, the terms such as whitelist and blacklist have a racial connotation. These modifiers become a sub-conscience reinforcement that one’s worldview is the only perspective.

## Sources of Ethical Frameworks

Numerous professional, regulatory, and advisory groups create frameworks that outline strategies for approaching ethical designs. These professional standards can contain conflicts of interest, hidden agendas, and inconsistent moral standards (Tan, 2021). The Belmont Report (1979) famously defines three core principles: respect for persons, beneficence, and justice. These tenants ask researchers to treat everyone fairly and avoid harm. However, even this simple statement has ambiguity.

## Limitations

After forty years, the ethical code requires modernization to align with the evolving worldviews. Adashi et al. (2018, p. 1347) argue that the Belmont Report’s “distinction between research and practice is disappearing within the commercialization of present-day research.” Businesses actively debate the definition of “harm” and propose a notion of “harm versus setback.” This worldview states that any action that is not directly harmful is, at worse, an indirect setback. Roberts (2021, p. 15) proposes that researchers “must focus on risks of the research process itself, not outcome-related risks as downstream consequences are beyond the purview of ethical gatekeeping.” Facebook has a moral (and potentially legal) mandate to protect its user’s privacy. Under Robert’s definition, the social-media juggernaut can ethically track relationships between billions of people. However, it is not bound to prevent malicious auxiliary use-cases (e.g., election interference). While this position resonates with specific cohorts, it faces fierce opposition from others.

# Quality Challenges

Constructive research builds artifacts to study a business challenge. Each phase within this process (e.g., declaring the problem statement and measuring success) requires quality controls.

## Framing the Problem Statement

High-quality research must pass three litmus tests, specifically, that it is non-obvious, elegant, and practical (Zeller, 2014). Regardless of the methodology, a professional group would laugh at studies like *Sitting in chairs helps people rest* compared to *Reducing carpal tunnel from ergonomic chair design*. The second topic proposes a business problem and concrete use-case. In contrast, the first subject is unlikely to provide new insights nor contribute to the body of knowledge.

Properly framing the problem enables the researchers to review the existing literature, recommend the next iteration, and find additional applications. Bryar and Carr (2021) outline a formal methodology for defining the problem statement called Working Backward. Their framework begins with identifying customer’s needs, determining outputs that cause that eventuality, defining processes that lead to those outputs, and finally, selecting the inputs into that system. This approach can be an effective tool for choosing a topic that passes prerequisites.

## Measuring Success

After deciding the project will “build a better widget,” there needs to be a strategy for assessing the effort’s success. This assessment can range from a list of User Acceptance Tests (UAT) to more formal performance objectives. While collecting those results, there need to be formal strategies for mitigating internal, external, statistical conclusions, and construct validity (Parker, 1993). These threats can originate from inaccurate instruments, selection bias, weak controls, and other reasons across the experiment’s lifecycle.

## Explaining Results

Constructive research produces innovative purposeful artifacts (Hevner et al., 2004). Those artifacts are not necessarily production quality but must be explainable to peers. Projects that lack this characteristic will face healthy skepticism. Part of that explanation often comes with statistical data that backs any claims. Choosing appropriate tests is a challenging problem that many publications misstate (García-Pérez, 2012). Those errors make observations non-reproducible and raise questions about the author’s diligence.

## Project Management

Lastly, researchers must be cognizant of the finite resources available and scope the engagement appropriately. Teams need to leverage standard project management processes like task tracking and identifying milestones. For instance, Northcentral University follows an eight-week schedule, ample time to write a great Operating System (OS) driver, not the entire OS. Always remember that a good project is a completed project.

# Addressing these Challenges

Risks from misaligned ethics and quality control can undermine the entire research project and nullify its value. These challenges amplify when the research involves health and safety, personal privacy, and controversial subjects.

## Health and Safety

Medical research historically uses white males as their default study group (Roberts, 2021). Aside from introducing a selection-bais into the sampling process, the practice may violate ethical norms. Without a strong business reason, modern research needs to assume that “people are people” and treat them equally. This requirement could necessitate double-blind methodologies, where the researchers cannot determine specific racial profile information. Other research projects might encounter the opposite problem. The Health Insurance Portability and Accountability Act (HIPPA) and Health Information Technology for Economic and Clinical Health (HITECH) provide legal recourse against negligent handling of medical records (Grimes & Wirth, 2017). These regulations may restrict access to necessary patient data and comprehensive assessments.

## Personal Privacy

Artificial intelligence can accurately predict human behavior because people generally have low entropy. Famously, the retailer Target discovered a teen girl’s pregnancy before her parents (Hill, 2012). After a decade of innovation, this remarkable feat is a commodity within the Machine Learning as a Service (MLaaS) community. These situations create significant privacy concerns as increasingly sophisticated algorithms require fewer personal details to model our decisions.

Researchers need to approach these challenges with governance and security controls. Europe’s General Data Protection Regulation (GDPR) outlines the fundamental rights their society expects, like the right to be forgotten. While these requirements focus on data handling for European citizens, their principles are more broadly applicable.

## Controversial Subjects

Many academic and business communities are embracing Diversity, Equity, and Inclusion (DEI) concepts. These ideas are becoming mainstream, and that will cause them to become shared truths and social norms. Researchers that fight against this force are likely to find exclusion and isolation. Instead, they should adopt the social norm and assume “people are people.” However, this is often easier said than done. Human data sets contain several highly correlated variables (e.g., race and income). These statical properties prevent merely dropping an individual column and making the results racially neutral. Researchers can explicitly call out the risk in their findings, but fully addressing this situation is an open problem.

# Conclusions

Constructive research studies a topic through the creation and exploration of artifacts. Those artifacts and outcomes must meet ethical and quality norms. Ethical identities are dynamic and vary between different societies. When research does not adhere to those social expectations, it will fall on deaf ears. Instead, authors need to learn about their audiences and internal biases. There are multiple frameworks to guide these conversations. However, they are rife with limitations due to societal changes and ambiguous direction.

There are several risks to the research project’s overall quality. First, the problem statement needs to be novel, elegant, and valuable. Scholars can follow the Working Backward methodology as a formal process for constructing the business problem and its purpose. Second, a mechanism for measuring success is necessary. Those measurements build the foundation for explaining the outcome and supporting any claims. Finally, overpromising and underdelivering will negatively impact the project’s quality. Researchers must implement project management processes and budget resources.

Ethical and quality concerns are a risk to every project. Those challenges are more pronounced when health and safety, personal privacy, and DEI are involved. Researchers can start with The Belmont Report’s tenants of respect for persons, beneficence, and justice. Next, teams should ask themselves, would we want this on the front page of the New York Times? Perhaps not a perfect test, but it covers much ground.

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