



ACCA5033 - CHANGEMAKERS: CREATIVITY AND VALUE CREATION

Assessment 1



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1. Introduction

The focus of this assessment is to help students gain the required skills to identify opportunities, develop ideas, tackle research analysis and critical thinking, as well as generate value today. As a student, at the end of this assignment, I will understand the connection between design thinking and research. As such, when used together, they can give rise to insightful value which generates positive impact for individuals and society. The main idea of this module is to gain the knowledge required to undertake the Emerging Trends & Independent Project modules in my final year of study.

2. Ideation & Mind Map

Nowadays, as human beings, we overlook the amount of technology and innovation which has shaped our world as we know it, mostly because we are used to what surrounds us without questioning where it came from, who invented it and most importantly, how much impact it had on our day-to-day lives.



On the mind-map above are some of what I think are the most important inventions which have helped to shape the world. Firstly, personal computers: since its first inception in 1971 before microprocessors were invented, the Kenbak-1 was the first digital/personal computer with only 256 bytes of memory which featured small and medium scale integrated circuits on a main circuit board [2].

DNA, also known as deoxyribonucleic acid or double helix, is one of the greatest discoveries of the 20th century. During the 1970s and 1980s, it helped to produce new and powerful scientific techniques, specifically recombinant DNA research, genetic engineering, rapid gene sequencing, monoclonal antibodies and techniques which are still being used in the ever-evolving biotechnology industry. Scientific advances such as genetic fingerprinting, modern forensics and the mapping of human genome find their origins in Watson and Crick's work [3].

As of today, artificial intelligence has taken the world by storm, from AI powered internet browsing to AI powered software solutions, the industry is rapidly growing towards a promising future. The biggest problem developers must face in this industry is technical progress on safety, alignment and control. Due to the nature of humans wanting to perfect this craft as quickly and productively as possible, we have had little time to think of safety measures and present robust systems to tackle AIs possible uncontrolled behavior in the future [4].

Digital health is another powerful tool of the 21st century, comprised of multiple technologies now integral to daily life, world's population and health experts have never been more intertwined with one another. Thanks to various advancements in equipment and devices, a health checkup is at people's fingertips. The World Health Organization (WHO) is the United Nations agency working to promote health, keep the world safe and serve the vulnerable. Their main objectives are comprised of 3 key points: 1. Translate latest data, research and evidence into action, which means using the organization's intelligence to promote standards and implement digital solutions which in turn helps in contributing to informed decision making. 2. Enhancing knowledge through scientific communities of practice. Whilst no longer limited by physical meetings, health experts around the world are brought together to voice their opinions on latest medical advancements and other topics of clinical and public health importance. 3. Assessing and linking country needs with supply of innovations. In the

past, the WHO developed products which the public ended up not using, that is why nowadays they have a different approach, meaning they tackle problems proactively whilst also promoting, co-developing and scaling innovations based on country needs [5].

With the age of technology evolving in many aspects of our day-to-day lives, digital tokens, namely cryptocurrencies, have seen a significant rise in the last 15 years. Although much more volatile than any other investment market, digital tokens are here to stay due to their different purposes. On one hand, some may use cryptocurrencies as a legitimate form of payment on the other hand, some others might use it as a token of exchange in the criminal world. The boom in interest has also led to massive growth in the computing power mainly used to solve the complex cryptographic problems which come with securing cryptocurrency networks. Despite the amount of attention they receive, many remain skeptical to the idea that digital tokens will ever replace traditional payment methods or national currencies. Cryptocurrencies find most of their usage as borderline casinos, investment to turn profits quickly and hard to trace payments for shady businesses or unlawful activity [6].

3. Aim & Objectives and Research area

3.1 Project Objectives

Since my area of interest is cybersecurity, my objective with this assessment is to find ways to modernize the way we deal with passwords daily and offer reliable alternatives and different approaches to how we store, use and interact with passwords. The main objectives for this project are: 1. To conduct a critical review of industry research on password vulnerabilities, user password behavior and current authentication standards. 2. To investigate alternatives to traditional passwords such as passwordless authentication, biometrics, multi-factor authentication (MFA)... 3. To develop evidence-based recommendations for improving password practices and for implementing more modern authentication methods. 4. Lastly, to reflect on material research and to process and identify areas for further investigation/improvement.

3.2 Research Philosophy

The most appropriate research philosophy to carry out this assessment would be pragmatism. The reason for that is because pragmatism focuses on practical solutions

and acknowledges that no single method or perspective can fully explain complex real-world problems. This method of research is particularly relevant in cybersecurity due to the involvement of both technical factors such as encryption strength and human behavior such as password reuse and convenience preferences. What's more, pragmatism supports a flexible methodology which allows researchers to draw on both qualitative and quantitative approaches depending on what best fits the aim of the research. For example, quantitative data can help evaluate authentication effectiveness, whilst qualitative insights can explore user experiences with password managers and/or biometric systems. This combination is valuable to this area of research because modern authentication challenges require understanding both technical feasibility and user acceptance. Pragmatism therefore aligns well with the goal of identifying usable, secure, and realistic authentication alternatives. It supports evidence-based decision-making and prioritizes solutions that can be implemented in real contexts rather than purely theoretical conclusions [7] [8] [9].



Courtesy of the YouTube channel “Joko Gunawan, PhD” [10]

3.3 Search Tools, Databases, and Search Strategies

To identify relevant research in cybersecurity and more specifically authentication, a wide range of academic databases and specialized archives will be used. One of the most well-known search tools available today is Google Scholar, due to its accessibility and broad coverage across journals and conference papers. Google Scholar will serve

as the main tool used to gather information. After that, more specialized databases will be used with the purpose of gathering high-quality and technical information. These include IEEE Xplore and the ACM Digital Library, both of which provide peer-reviewed papers on authentication protocols, biometric systems, password security models and emerging technologies such as passkeys and hardware tokens. Other tools which will help in supporting searches for this assessment include ScienceDirect, SpringerLink and Scopus which primarily deal with security, usability and human-computer interaction [11].



Picture courtesy of localo.com [12]

When dealing with search strategies, my focus is to break the project topic into key concepts such as password security, authentication alternatives, passwordless systems, biometric authentication, MFA, hardware tokens, passkeys and lastly, user-password behavior. When conducting phrase searches, it is important to use quotation marks to ensure the finding of specific concepts is as accurate as possible. For example: “multi-factor authentication”, “hardware tokens” and so on... Another strategy to use to broaden searches where applicable is truncation, for example, instead of searching the word “authentication” it is better to search “authentica*” thus capturing more results instead of just the articles containing the word “authentication” [13].

<u>Structure</u>	<u>Actual Search</u>
Child*	Child Childs Children Childrens Childhood

This picture, courtesy of libguides.daemen.edu, is an example of what happens when we use truncation on a search engine [13].

<u>Less Precise</u>	<u>More Precise</u>
Global AND Warming	"Global Warming"

Example of how quotation marks work. It is important to know that some databases do not recognize quotation marks [13].

Another useful technique to implement when broadening searches is the use of wildcards. It is similar to truncation but instead the symbol is used within a word, and it replaces only one letter, this way we are telling the search engine to account for variations in spelling.

<u>Structure</u>	<u>Actual Search</u>
Wom!n	Woman Women
Colo?r	Color Colour

Example of how wildcards work. Some databases use different symbols; therefore, it is crucial to check a database's HELP section for additional information [13].

4. Research Strategies

4.1 Validity, Reliability, Generalizability, and Ethical Considerations

The main scope of this part of the assessment is to strengthen the overall quality of the research through implementing several strategies to enhance validity, reliability, generalizability and ethical rigor. Firstly, validity will be supported by designing data collection tools which accurately reflect the project aim; understanding how people use, store and interact with passwords, as well as analyzing alternative authentication methods. Due to the nature of this research, the use of surveys or interviews is a must, therefore, it is of high importance to avoid ambiguous words.

The way to improve reliability is through consistent processes when dealing with data collection and analysis. For example, if a survey is conducted, all participants will receive the same questions in the same order to ensure replication is possible. If qualitative data such as interviews are conducted, a well-structured interview guide will help maintain consistency. However, it is important to refine the data collection methods used to ensure they produce stable results.

Generalizability will be supported by selecting a wide variety of users such as students, employees, middle and old aged people or everyday technology users.

Ethical considerations are crucial to any project involving participants; therefore, strict guidelines will be placed with the idea in mind to store data securely, offer anonymity, withdrawal from the interviews or surveys at any time and clearly inform the participants about the purpose of the study [14][15].

4.2 Research Strategy, Data Collection Methods, and Pilot Design

Given the project's aim, a method combining quantitative and qualitative data is needed to understand both the behavioral and technical aspects of password practices. Quantitative data such as surveys can help measure trends whilst qualitative data like short interviews can capture deeper insights into why participants choose certain practices.

The main data collection method will be an online survey due to its efficiency in reaching a broad range of users. The survey will include closed ended questions measuring behaviors and attitudes, as well as open text responses exploring user

perceptions of passwordless authentication. Something important to keep in mind regarding online surveys is data protection. When dealing with personal data, it is crucial to store it using measures such as data encryption or Secure Socket Layer (SSL). Other means to ensure a survey is successful is by prohibiting unauthorized access to sensitive data and providing robust defense against possible data breaches.

A pilot study will be conducted with the idea of refining the survey until it's up to standard. The goal is to perfect the survey thus improving clarity, wording and relevance. The feedback gathered will help refine ambiguous items, remove unnecessary questions and ensure the surveys are answering key questions, as well as staying in line with the research objectives [16].

4.3 Types of Quantitative and Qualitative Analysis

When analyzing quantitative data, statistics such as percentages and frequencies can be used to summarize participants' password practices and familiarity with authentication methods. For example, what percentage of users are aware of what a passkey is or what percentage of participants engage with passwordless authentication alternatives. The use of inferential tests such as correlations or chi-square tests may help to identify relationships between factors such as age, technology confidence and authentication behaviors.

When dealing with qualitative data, the main goal is to identify patterns via open ended responses or interviews. This means reading through written answers or interview comments, highlighting key points and grouping similar ideas together. These groups help show what participants commonly think or feel about relevant research objectives. Content analysis can also be used to understand how often certain ideas appear, which in turn helps in giving structure to users' opinions and shows which preferences are most common [17][18].

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