Evaluating the Features of Scientific and Technological Research in *Frankenstein* by Mary Shelley Wollstonecraft

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Abstract

The present study is about the relationship between literature, science, and research. It is an attempt to highlight a view of scientific and technological research from the angle of creative writing. From a reader response perspective, the purpose of this article, is to look at a researcher's quest for scientific knowledge and the impact of his commitment on his personality. The article will also look at the method of scientific and technological research and its limits. The study has found that in representing science and technology, the author has depicted the lifestyle of a scholar moved by a thirst for scientific and scholarly skills but who lost his career path due to a lack of ethics. We have reached the evidence that once built on avowed traditions, science and technology can participate in human welfare but a venture into beaten tracks and non-scientific methods such as magic and alchemy will result in disaster as we can see in the protagonist's remorse and commitment to destroy his invention.

Keywords: science, technology, humanity, ethics, welfare

Résumé :

La présente étude porte sur la relation entre la littérature, la science et la recherche. Il s'agit d'une tentative de mettre en lumière une vision de la recherche scientifique et technologique sous l'angle de la création littéraire. Du point de vue du « Reader Response », l'objectif de cet article est d'examiner la quête de connaissances scientifiques par le chercheur et l'impact de son engagement sur sa personalité. L'article examinera également la méthode de la recherche scientifique et technologique et ses limites. L'étude a révélé qu'en représentant la science et la technologie, l'auteur a dépeint le style de vie d'un érudit animé par une soif de compétences scientifiques et érudites, mais qui a perdu son chemin de carrière en raison d'un manque d'éthique. Nous sommes parvenus à la conclusion qu'une fois construites sur des traditions avouées, la science et la technologie peuvent participer au bien-être de l'humanité, mais qu'une aventure sur des sentiers battus et des méthodes non scientifiques telles que la magie et l'alchimie aboutira à un désastre, comme nous pouvons le voir dans les remords du protagoniste et dans son engagement à détruire son invention.

Mots Clés : science, technologie, humanité, éthique, bien être

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Introduction:

The present study is a contribution to an international conference that pondered questions of current scientific research and innovation. The theme of the conference proved appealing enough considering the importance of scientific research, its enhancement, and how research results are made available to society, or consumers of intellectual property. Mary Shelley is part of a generation of 19th century novelists whose art of fiction has gone beyond the verge of mere imagination. Her "inventive mind was peculiarly primed to grapple with both literary and scientific controversy" (Holmes, 2016, p. 490). *Frankenstein* has been acclaimed as science fiction; however, it is the creative impulse of the novelist to examine some of the impasses her society finds itself in. Incidentally, scientific research provides a way out against situations in which society, "hesitates over how it must conceive itself. It feels pulled in all directions. When such conflicts break out, they are not between the ideal and the reality but between different ideals, between the ideal of yesterday and that of today." (Shamil, 2018, p. 38) It is therefore the venture of the researcher to identify possible answers that will help people remediate their predicament and move on with better perspectives, not otherwise.

Mary Shelley's *Frankenstein* stands as a seminal work in the realm of Gothic literature, offering readers a profound exploration of the consequences arising from unchecked scientific and technological pursuits. Written in the early 19th century, the novel delves into the transformative power of knowledge, the ethical responsibilities of scientists, and the perilous consequences of venturing into uncharted territories of scientific research and innovations. As we navigate the intricate schemes of the plot woven by Shelley in the novel, this study aims to delineate the features of scientific and technological research represented in the novel to unravel the intricate epitomes of a scholar's quest for knowledge, the ethical dilemmas, the societal implications of research, and the timeless cautionary tale it presents to those who dare to manipulate the boundaries of ethics and the natural order.

In its outlook as a science fiction, *Frankenstein* presents issues and incidents as omens that deliver beyond gothic details, as a matter-of-fact insight into the ethical considerations inherent in scientific and technological research. As we embark on this scholarly journey, we will dissect key features within the text, ranging from the protagonist Victor Frankenstein's relentless pursuit of knowledge to the

unintended consequences of his scientific experimentation. By examining the novel through the lens of ethical discourse, we aim to shed light on Shelley's critique of scientific hubris, the clash between enlightenment ideals and moral responsibilities, and the enduring relevance of these themes in contemporary discussions surrounding scientific and technological advancements.

In traversing the landscape of *Frankenstein*, we will unearth the novel's implicit warnings about the dangers of playing the role of creator without due consideration for the ethical implications of one's actions. Through a comprehensive analysis, this article seeks to contribute to the ongoing dialogue surrounding the responsible conduct of scientists, in scientific and technological research and the enduring lessons embedded in Shelley's cautionary tale. As we explore the intricacies of Victor Frankenstein's ill-fated ambitions, we invite readers to join us in a thoughtful exploration of the ethical dimensions inherent in the pursuit of scientific and technological knowledge, as revealed in the timeless pages of *Frankenstein*. The present study is subdivided into three sections. The first section looks at the method of scientific and technological research with a focus on how the first impulse and commitment to science and scientific research takes form and how the scholar as represented in *Frankenstein* is both the instigator of research and also a scapegoat having to endure the effects imposed by objective pursuit of results and research outcomes. In the second section, the study will look at the centrality of science and technology in the development of the story in Frankenstein, it is an attempt to show the contrast between Mary Shelly's depiction of science and technology as sullied instruments of human welfare and social welfare though that is not the original mission. Section three of this study sheds light on the aftermaths of disoriented or unethical scientific and technological research.

I. Frankenstein and the Methods of Scientific Research

In *Frankenstein*, the main character embodies the features of Prometheus who has brought light to humanity. The novel tells the life story of a young scholar who out of a commitment to science and technology, rose as an epitome of modern scientists and what it takes to be accommodated in the class of academic, scientific; and technological researchers. In this section, an attempt will be made to look at scholars' personalities through the character of Frankenstein and his relationship to his family and the scholarly world. It is

commonly admitted that scientific research is undertaken on purpose to advance knowledge and provide answers to crucial issues facing humanity. It is, in this sense, committed to "enabling man to understand and appreciate the world he lives in." (Cockerell., 1994, p. 214) Humankind, therefore, is given a medium of enlightenment and a problem-solving asset to live a better and turn the world around into a better version of what may be appropriate to their welfare and progress. The view of scientific research as an academic exercise meant to improve science for awareness and human welfare is arguably, viewed by other thinkers who hold that scientific research is essentially undertaken for the increase of wealth. (Cockerell., 1994, p. 214). Through these excerpts, it is assumed that progress, development, and welfare in human society are the work of scientists who take it upon themselves to venture on unbeaten tracks, lay hypotheses, and test them to reach results through which alternatives of a better life are offered to mankind.

The seventeenth-century motif justifies Mary Shelley's art of fiction. *Frankenstein* indicates how the culture of seventeenth-century man is moved by a liking for science, scientific endeavor, and technological achievements. From the onset, Mary Shelley sets the mood for readers to apprehend what it takes to be a scholar. In *Frankenstein*, "Mary Shelly embraces the new paradigm of secular science." (Page, 2012, p. 100) Her construction of the main character is permeated by a strong passion for learning and rising to fame owing to his scholarly achievements. Indeed, in an incident of *Frankenstein*, the eponymous character states: "I ardently desire the acquisition of knowledge. I had often, when at home, thought it hard to remain during my youth cooped up in one place and had longed to enter the world and take my station among other human beings." (Shelley, 2020, p. 25) Here is proof of the passionate dedication of a scholar and researcher seeking to possess scientific know-how. He makes it a personal matter and engages his life to the quest of science, and his social insertion through hard work. Despite social and institutional implications, I assume that scientific research and its method are personal and require the definition of priorities and the results at stake.

To concentrate on his new life as a scholar, the protagonist enters a logic of isolation and breaks from social entanglement. Such a move is meant to achieve the prospects of building his career, and greatness among his likes. Little pessimism can be spotted in Frankenstein's determination and his career plans. As Shamil Taha A. would put it:

> Science as a vocation, Max Weber discusses the status of science and the commitment to the scientific work in the disenchanted world. Weber`s portrayal of the situation of the professional scientists is uniquely compatible with the characterization of Victor Frankenstein and Robert Walton in Shelley`s novel. (Shamil, 2018, p. 42)

The novel lays grounds to see the sacrifices a scholar has to make on his academic journey.

As represented in *Frankenstein*, scientific and technological research has induced a break or weakening of the social bond to devote oneself to the scientific method or practice towards the achievement of the expected career objectives. The plot of *Frankenstein* bluntly delves into such evidence as we see Frankenstein's eagerness to leave home in Geneva for Ingolstadt. As he leaves the family circle, he acknowledges his moral capacity to do away with all relationships unfitted for his new mission when he says: "I loved my brothers, Elizabeth, and Clerval; these were "old familiar faces" but I believed myself unfitted for the company of strangers." (Shelley, 2020, p. 25) It is clear that Frankenstein begins his process of disaffection from social bond. It is a scholar's loss of "compassionate care or appropriate relationships among, […] (Irene, 2021, p. 2)

He is emotionally operating a double break from social connections that may cause a supposed distraction against his study and research plans. Such is the foundation of his alienation from humane feelings to rigid scientific methods toward the attainment of his objectives. From Geneva to Ingolstadt, Frankenstein turns into the type of academic who out of his indulgence in research develops a loose connection to his social environment as he would invest much of his time elaborating and testing hypotheses towards results. His new world will make him turn out into "an uncouth man deeply imbued in the secrets of science." (Shelley, 2020, p. 25) Mary Shelly seems to foreshadow the growth of the protagonist into a scientist with little humanity in his achievements.

As any young scholar, Frankenstein gets introduced to scientific traditions and quickly builds on them to shape his way and bring light to his society. Through an introspect monologue he states: "So much has been done exclaimed the soul of Frankenstein – more, far more, will I achieve: treading in the steps already marked, I will

pioneer a new way, explore unknown powers, and unfold to the world the deep mysteries of creation." (Shelley, 2020, p. 28) The novel exposes one of the strictures of scientific research which requires a commitment to originality built on tradition. The young scholar commits to making a contribution to science and academia when he seeks to excel over the beaten tracks and reveal hidden facts about creation.

To achieve this, he first assumes the status of a student disciple to eminent scholars such as M. Waldman, and M. Krempe. Here is an illustration of assistantships in universities, which allow seasoned scholars to breed the scientific minds of scholars. Owing to his acquaintance with Waldman and Krempe, Frankenstein methodically got acquainted and even measured the limits of thoughts laid by philosophers and scientists such as Cornelius Agrippa, Parcelsus. (Shelley, 2020, p. 28) Building on philosophical treaties of chemistry he decided he had won credit with Mr. Waldman who attests:

> I am happy," said Mr. Waldman, to have gained a disciple and if your application equals your ability, I have no doubt of your success. Chemistry is that Branch of natural philosophy in which the greatest improvements have been and may be made; it is on that account that I have made it my peculiar study, but at the same time, I have not neglected the other branches of science. A man would make but a very sorry chemist if he attended to that department of human knowledge alone. If your wish is to become really a man of science, and not merely a petty experimentalist, I should advise you to apply to every branch of natural philosophy, including mathematics. (Shelley, 2020, p. 29)

In the academic and the research field, the novel dramatizes and genuine discussion between master and disciple or a student and his supervisor. M. Waldman are metaphoric representations of how scholars and their students interact and we can see that Frankenstein is entering a process of academic co-opting by a supervisor who indicates the interdisciplinary study and research he would soon engage in. It needs to be noted that prior to the nineteenth century, the eighteenth century was marked by economic specialization that required that scholars choose and limit the extent of their field of study to skills required for specific trades, professions, and economic

production. M. Waldman attracts the attention of Frankenstein to the need to extend his knowledge and awareness to fields required to make him a complete scholar in his field.

In addition, the interchanges between M. Waldman and Frankenstein echo the stage of interview that young scholars take before being taken on board as researchers after their degree studies. The interviews are determinant as they help the supervisor and the researcher agree on the landmarks of the study or research. The novel reveals that after this meeting with M. Waldman, Frankenstein's study and research plans became all set. As we can read:

> He then took me to his library and explained to me into his laboratory and explained to me the uses of his various machines and, instructing me as to what I ought to procure, and promising me the use of his own when I should have advanced far enough in science not to derange their mechanism. He also gave me the list of books which had requested, and I took my leave. Thus ended a day memorable to me: it decided my future destiny. (Shelley, 2020, p. 29)

The process of mentorship and supervision alluded to in this extract is telling enough about the guidance given to Frankenstein for the success of his study and research which is expected to be innovative and groundbreaking. The results of his labor were quick to come, for young Frankenstein brilliantly completed his education and delved into deep research and experimentation on chemical instruments and organic matter. He also observed the process of life and its combination with organic matter. Through sleepless nights, "… at the end of two years, I made some discoveries in the improvement of some chemical instruments, which procured me great esteem and admiration at the University." (Shelley, 2020, p. 30) In addition to this gain of popularity, he has been methodical enough in his research and experiments that another breakthrough comes his way, as he says:

> "Some miracle might have produced it, yet the stages of discovery were distinct and probable. After days and nights of incredible labor and fatigue, I succeeded in discovering the cause of generation of life, nay more I became myself capable of bestowing animation upon lifeless matter." (Shelley, 2020, p. 31)

Frankenstein's testimony is the lot of many scholars who out of hard work and method, test and prove the results of their hypotheses towards inventions. Mary Shelley has made a deft representation of the process of scholarly maturation and discovery which calls up modern academic mechanisms through which science grows and can provide answers to human needs for a better life through scientific discoveries and technologies.

However, owing to the time spent doing research and the rigorous scientific method, there occurs an emotional benumbing of the researcher who can lose a sense of empathy for the people around or even the nefarious effects of the research on the society around. Indeed, Frankenstein could no longer think about anything else but the result of his experiments and the new tools he made to improve his manipulation of organic matter. Weighed down by method and logic in his experiments he falls into a kind of social alienation that results in estrangement from people around him. While it is argued that Victor created a monster, it is worth noting that, the supposed monster is the projection of Frankenstein and his impervious and deformed personality due to much focus on his study and research objectives. I infer that Frankenstein has grown with a lack of empathy and moral obligation to his fellow members of society. Frankenstein's cold mindset has not allowed him to stretch a compassionate hand to other fellow human beings, or the creature he made with his experiments. In line with the rules of ethics that underscore practices in scientific research, it is evident that Frankenstein represents the mainstream attitude of researchers who stay focused on testing their hypotheses and push the work to expected results. He sticks to the methodology and the logic that will not deviate from his objectives. Young scholars have a resource in Mary Shelley's character's success and his shortcomings, for as Mellor would say: "Frankenstein is our culture's most penetrating literary analysis of the psychology of modern 'scientific' man, of the dangers inherent in scientific research, and of the exploitation of nature . . . in a technological society" (Smolka, 2007, p. 43)

Indeed, while the young scholar dived deep into his research, a representative voice of the society that forged his character, rang the alarm in him but proved vain. As he confesses at a stage of his application to research and experiments,

> I knew well therefore what would be my father's feeling, but I could not tear my

> thoughts from my employment, loathsome in itself, but which had taken an irresistible hold of my imagination. I wished, as it were, to procrastinate all that related to my feelings and affection until the great object, which swallowed up every habit of my nature, should be completed. (Shelley, 2020, p. 33)

Here is the confession of a scholar who displays clues of alienation from values in a society that builds him on the psycho-affective framework. The voice of his father could have made him ethically alert, but it was in vain that he would remember his father's moralizing entreaties. One can also perceive ominous signs of alienation that justify the disastrous results of his research that resulted in the making of the creature. Scientific research cannot be on the brink of social strictures lest it falls into unethical practices or ruins progress rather than work for it. Shelley keeps a scholar's possible waywardness in check the protagonist acknowledges that:

> A human being in perfection ought always to preserve a calm and peaceful mind, and never allow passion or a transitory to disturb his tranquility. I do not think that, the pursuit of knowledge is an exception to this rule. If the study to which you apply yourself tends to weaken your affections and to destroy your taste for those simple pleasures that no alloy can possibly mix, then that study is simply unlawful, that is to say, not befitting the human mind. If this rule were always observed, if no man allowed any pursuit whatsoever to interfere with the tranquility of his domestic affections, Greece would not have been enslaved; Ceasar would have spared his country, America would have been discovered more gradually, and the empires of Mexico and Peru had not been destroyed. (Shelley, 2020, p. 34)

Uncontrolled scientific research and practices can be disastrous for the scholar and society. Most alienating is when the method adopted leads the researcher into adulterated practices and irreversible results as Frankenstein's monster.

II. The Place of Scientific and Technological Research in *Frankenstein*

Science and technology are assets in human day-to-day life. They are also the source of innovations and inventions that bring added value and quality of life in human communities. In addressing crucial problems, scientists provide grounds for citizens to overcome some of the ordeal nature or the global economies impose on them.

It is undeniable that nature under the scrutiny of science is and will remain the fulcrum of progress and breakthroughs in growing or globalizing economies. The centrality of Victor Frankenstein and his achievements tell volumes about Mary Shelley's warnings about scientific and technological progress. It transpires from incidents in the novel that Shelley wields her art on purpose to present the outlook of science and the results of its method. In Hutton's view,

> Mary Shelley's *Frankenstein* gives vivid expression to what many regard as the evils of modern science – dehumanizing, destructive, mechanistic, malevolent – a monstrous, masculine birth of the male mind. This dystopian image of science struck a chord with her contemporaries and has dominated the scientific imaginary ever since. (Hutton, 2011, p. 17)

Hutton offers a holistic tableau of science and technology and helps see why Frankenstein's success carries a tint of disaster. Science works for material results that can be both useful and harmful. Such judgmental pieces of evidence are due to the reception of scientific breakthroughs by society or the consumer. It is worthwhile to look at the issues from the angle of how the invention or innovations, as in the case of Frankenstein's creature, stand amenable to the needs and values of the people.

Scientific and technological motifs inform Mary Shelley's book when Hunter states that:

> at the beginning of the nineteenth century these questions resonated with a reading public that was being faced with similarly discomforting scientific revelations. The natural philosophers of the previous century had produced a

> succession of discoveries that argued for a conception of natural and social progress governed not by divine intercession, but by the drive of physical laws. (Hunter, 2008, p. 133)

Hunter's view justifies Shelley's paramount interest and her choice to represent the life of a scholar in the question of scientific savvy and his attachment to principles and methods inherent to the field. It is of great interest to see how the lives and attitudes of prominent scholars are made to participate in the unfolding story. The role played by natural philosophers in the growth of Frankenstein's career is unneglectable for, they contributed to building the scholar who will instill life into organic matter. Beyond the claims that Shelley's novel is science fiction, one needs to rely on evidence that it builds on nineteenth-century and the future of science and technology as motifs.

On a scientific ground, the protagonist first walks on the paths set by M. Waldman, Cornelius Agrippa, Paracelsus, and M. Krempe. He feeds on the teachings of natural philosophers and gets involved in a series of tasks delineating the intricacies of scientific manipulations and experiments. From the onset, we get a hint of the protagonist's interest in scientific issues as he says:

> One of the which had attracted my attention was the structure of the human frame, and, indeed, any animal endued with life. Whence, I often asked myself, did the principle of life? (sic) […] I revolved these circumstances in my mind, and determined, thenceforth to apply myself particularly to those branches of natural philosophy which relate to physiology. (Shelley, 2020, p. 30)

The extract evokes the protagonist's choice to invest his research and studies in human anatomy, and physiology. We also perceive that he is committed to deciphering the components of organic matter, and finding where the mystery of life begins. Frankenstein endeavors to reach for how life might be made to spring from organic matter. This implies undertaking laboratory experiments to test or identify the components in play in organic matter. Results of his early experiments were quick to come when he says: "After days and nights of incredible labor and fatigue, I succeeded in discovering the cause of generation of

life, nay, more, I became myself capable of bestowing animation upon lifeless matter." (Shelley, 2020, p. 31)

At this stage in the development of the story, the reader is acquainted with an instance of scientific discovery that conjures the many discoveries that stood as landmarks of the Industrial Revolution in the year 1800s. Victor's achievement epitomizes such breakthroughs as the invention of anesthesia by Horace Wells through the use of Nitrate Oxide and Ether. It also has an echo in "the achievements and

discoveries of the likes of vaccine pioneer Edward Jenner, James Lind, the cause of scurvy, and William, who is credited with introducing digitalis to medical science" (Jackson, 2003, p. 1056) The scientific propensity of Victor's endeavor lies in the processes through which he was capable "of infusing life into an inanimate body." (Shelley, 2020, p. 35) It is clear that to achieve this he had to combine or dissemble materials stemming from organic matter and testing them on purpose to finds where life can spring or be entertained to help raise cells or keep them operating like naturally created beings. It needs to be noted that Victor Frankenstein's achievement tells of the contemporary construction of robots and android human beings that follow whole processes and combinations of chemicals and materials.

I contend that Shelley drives the issues home by devoting elaborate details to fictive replicas of a researcher and scientist's day-to-day life and their determination to contribute to the progress of science and technology. To many extents, Frankenstein's creature "is the first of a new species – a robot, or more specifically, an android, programmed to destroy all whom its creator outwardly loves" (Tropp, 2007, p. 13). As such, it poses the genuine question of the place of science in human societies. Tropp pinpoints the evidence that the results of science can both be destructive and useful, however, there is a need to keep science in check beyond its indisputable uses and how it participates in better living conditions and welfare among human communities.

Soon after, Victor is done with his experiments and the creature starts blinking, his attitude turns from optimism to a judgmental stance. When he says: "Learn from me, if not by my precepts, at least by my example, how dangerous is the acquirement of knowledge…" (Shelley, 2020, p. 31). Frankenstein quickly realizes that something is amiss. He has come to terms with the shortcomings that fueled his engagement to create what he now agrees to name a monster. When he refers to the 'danger in the acquirement of knowledge', he talks about, uncontrolled science

and the disaster it can cause practitioners of scientific researchers' experiments "pursued nature in her hiding-places" (Shelley, 2020, p. 33). In this process, "Frankenstein`s hamartia lies in his non-compliance with this eccentricity of modern science. Frankenstein is a disciple of the old paradigm alchemists whose systems and principles are out of fashion." (Shamil, 2018, p. 40) One can also read a reference to the Hegelian philosophy about human conscience and how it might push man to disaster and wretchedness due to bad choices. The protagonist made purely academic choices that were adulterated by the scientific school he took to. Frankenstein followed the paths of Agrippa who did not limit himself to science and scientific manipulations. As Poel says well enough, "Heinrich Cornelius Agrippa (1486-1535) is both a historical figure and a myth. To the modern reader, he is first and foremost the archetype of the Renaissance man, the pre-Enlightenment physician, the superstitious astrologer and black magician who tries to overcome the bonds of earthly existence" (Poel, 1997, p. 1) The excerpt implies that Frankenstein's experiments border alchemists' manipulations following Agrippa scientific method. Frankenstein has combined science and magic in his endeavor. The creature that Victor appears to have methodically caused to be, is "Articulate, intelligent, and sensitive, the Monster argues eloquently for its rights to exist [thus] If Victor Frankenstein`s frenzied discovery of the 'new alchemy' makes him the first mad scientist, the existence of the Monster presents him with the first and most enduring symbol of modern technology" (Tropp, 2007). However, the reader quickly gets a hint that, Victor abhors his invention because it turned out to be the image of "…the demoniacal corpse…a thing such as even Dante could not have conceived." (Shelley, 2020, p. 33). In Tropp's terms, Victor's invention has the tint of perfection that shocks composure. One could not be indifferent at the sight of such a creature that has both human and daunting features. The result of Victor's hard work is due to his fouled method that employed magical rather than purely experimental manipulations in the making of his invention.

In *Frankenstein*, Mary Shelley appeals to researchers not to fall into the traps of Frankenstein, through the misused methods he has deprived science of its mission to participate in progress. The pitfalls of Frankenstein's rebuked breakthrough lie in his methods. He is a genuine example of a fallen hero out of misjudgment and poor ethics. He suffers from Faustism or the blind pursuit of science without ethical control. The methods of science are built on objectivity, therefore the researcher

has to avoid navigating and even digging into beaten tracks, or methods that are not scientifically proven. Such are some of the traps Frankenstein falls into. The novel indicates that against all entreaties by Krempe, Frankenstein obstinately continued to walk on Agrippa's path. In scientific and technological research, methodology shapes result through the treatment of data and experimentation. In the case of Victor Frankenstein, his endeavor prospered in a deformed mold and could but generate the hideous creature as result.

Victor was made aware but could not listen to M. Krempe, who upon remarking on the early deviance of the young scholar, proved blunt enough to tell him where his steps would lead him. Indeed, M. Krempe

> Good god! In what desert land have you lived, where no one was kind enough to inform you that these fancies which you have so greedily imbibed are a thousand years old and as musty as they are ancient? I little expected, in this enlightened and scientific age, to find a disciple of Albertus Magnus and Paracelsus. My dear sir, you must begin your studies entirely anew. (Shelley, 2020, p. 27)

The scholars M. Krempe refers to are proponents of a method that is not only outdated but also subject to mere cumulative science which modern science regards as regardless. However, Frankenstein did not listen to Krempe and therefore determined to follow the way Krempe warned him against. For as he would confess,

> As a child, I had not been content with the results promised by modern professors of natural science. With a confusion of ideas only to be accounted for by my extreme youth, and my want of guide on such matters, I retrod the steps of knowledge along the path of time and exchanged discoveries of recent enquirers for dreams of forgotten alchemists. Besides, I had a contempt for the uses of modern natural philosophy …; but now the scene was changed. (Shelley, 2020, p. 26)

The scene alluded to is the field of scientific research, and while he acknowledges things were different, he does not seem to live up to the

trends of his time. Victor suffers from almost the same fantasies as Dr. Faustus who is moved by the obtuse pursuit of fame. While he holds his wayward search for knowledge as the work of immaturity, the reader should rather see his alienation due to faulted and outdated methods that are no longer adapted to modern science.

Such is the nature of the scientific and technological research that sits in the core events of Shelley's novel. Far from being a practice that would participate to progress, it rather worked for a puzzling outcome because the creature turned into a monster that could finally not help any purpose nor man in the society. Frankenstein's monster turned into a threat which its creator sought to get rid of. It is my approach that science and technology have to be tuned to the current and emerging needs of the society that needs it. The researchers and practitioners of science and technology have to take initiatives that highlight them as individuals but as actors and contributors to the welfare of their society. If Frankenstein had looked at issues from a utilitarian angle, he would have committed himself to more useful research by listening to Professor Waldman and Krempe who warned him against infringing the right way and getting lost as a researcher.

III. Aftermaths of Uncontrolled Science and Technology in *Frankenstein*

This section looks at Mary Shelley's novel from the point when the creature is made and starts interchanging with human beings. In an article titled, "Should science proceed uncontrolled", one reads that:

> Scientists do not venture forth into schemes of research without some indication that they will ultimately be successful in their work. This generally means two things: that their research must be completed in a reasonable amount of time by a reasonable number of people, and that it will not involve too many steps into the unknown at once. (Maddox, 1973, p. 1)

The evidence of success in scientific endeavor can be misleading as it is dramatized by Shelley through the protagonist of the novel. The certainty about the outcomes needs to be bent down to ethical considerations and checked in advance. Uncontrolled science might be a scourge to actual scientific breakthroughs and the advancement of society. If science and technology must serve humanity, they have to be

put on lead. Supervising research requires a measurement of the implied outcomes and also the orientations that the method and hypotheses laid by the researcher take. In addition, it is peremptory that the institutions in charge of scientific and technological research keep an eye on what goes on in laboratories, and research teams and how experiments can participate in development and progress in mainstream society.

As a result of great investment and sleepless nights, Victor has achieved his study and research purposes which consisted in discovering "the cause of generation and life;" (Shelley, 2020, p. 31). It is therefore in celebration of this that he says:

> The astonishment which I had first experienced on this discovery soon gave place to delight and rapture. After so much time spent in painful labour, to arrive at once at the summit of my desires, was the most gratifying consummation of my toils. But this discovery was so great and overwhelming, that all the steps by which I had been progressively led to were obliterated, and I beheld only the result. What had been the study and desire of the wisest men since the creation of the world was now within my grasp. (Shelley, 2020, p. 31)

The extract presents the excitement that follows rewarded study and labor. It predominantly indicates that the scholar's efforts were not made in the framework of a universally justified need but on personal ambition and desires to access knowledge and be a renowned scholar. Frankenstein appears to be more of an alchemist that Krempe chastised and rebuked because he could not build a career on such practices. When Frankenstein resolves "to make the being of a gigantic stature; that is to say, about eight feet in height, and proportionably large." (Shelley, 2020, p. 32) The reader gets evidence that he is already out of tune.

The reader gets a hint of the waywardness of Frankenstein's efforts and his creation when in a description of it he says:

> I beheld the wretch – the miserable monster whom I had created. He held up the curtain of the bed, and his eyes, if they may be called, were fixed on me. His jaws opened, and he

> muttered some inarticulate sounds, while a grin wrinkled his cheeks. He might have spoken, but I did not hear; one hand was stretched out, seemingly to detain me, but I escaped, and rushed downstairs. I took refuge in the courtyard belonging to the house I inhabited; where I remained during the rest of the night, walking up and down in the greatest agitation, listening attentively, catching and fearing each sound as if it were to announce the approach of the demoniacal corpse to which I had so miserably given life. (Shelley, 2020, p. 36)

The excerpt denotes bewilderment due to the incapacity to understand the nature of the creature Frankenstein has against his eyes. The mere mention of it as "wretched", and "monster", delineates rebuke of the shadowy outcomes. There is a hint that the scholar has lost control of the required research method and ventured into barren fields that could not contribute to progress. Though he invested much effort into research built on natural philosophy, chemistry, and anatomy, the protagonist appears to have fallen into the same traps as Faustus who took his knowledge and powers from unknown mysterious forces. The result of his work contradicts his intentions because his method was inaccurate. Frankenstein appears to have given way to uncontrolled passions that led him to the dire results he dreads and runs away from. He lost control over his wits and method at the very he mostly needed to keep watch on them.

Besides, his study and research were not made to conform to the mainstream trends designed by the community of researchers. Frankenstein would have achieved better if he teamed up with other fellow scholars. His passions would have been tamed and subdued to the ethics of the scientific community. However, Frankenstein's got him lost and could not be redeemed. "The scientific attitude is experimental as well as intrinsically communicative" (Dewey, 1999, p. 172). This implies that the scientist shares aspects of his study and research with peer researchers. The success of his research lies in the way he tests and manipulates hypotheses towards proven evidence. Frankenstein falls prey to his seclusion and secrecy. In addition, he did not listen to the monitoring lectures of his masters in the names of Krempe and Waldman. Had he acted as a scholarly disciple, he could have achieved greater results than he has.

The community of researchers has ethical codes of conducts that are passed down to young emerging scholars. These codes of conduct pave the way for traditions that make science and technology continue to hold their portion in the welfare and progress of society. Frankenstein's achievement is to many extents, a waste of energy, time, and resources because he made a personal matter. As opposed to many of his contemporaries, Frankenstein did not choose to collaborate with other scientists in the field or contemplate the work of researchers who have contributed to progress. His method and experimentations were uncontrolled and could result in nothing else but disaster. He is the typical imagery of the alchemists and apothecaries who lived a life of seclusion and would not share their quest for the philosopher's stone with anyone. For Dewey,

> No scientific inquirer can keep what he finds to himself or turn it to merely private account without losing his scientific standing. Everything discovered belongs to the community of workers. Every new idea and theory has to be submitted to this community for confirmation and test. (Dewey, 1999, p. 172)

This goes without saying that, the entire works of Frankenstein were secret and not shared with his mentors or other folks in the same field. Victor made no one aware of what he was doing. Even Frankenstein's best friend, Clerval was not abreast with anything going on in his laboratory. If he did, the test processes could have been checked against strict control to reshuffle and orient the work towards utilitarian social standing and use. Once the creature was made, Frankenstein displays the features of the science and scientist Rabelais chastised when he puts that Science without conscience is but a ruin of the soul. In the context of our study, the soul in question here is both the individual and collective soul of the community Frankenstein belongs to which ought to have been accommodated by his intended study and the purposes of the invention.

The failure to opt for academic collaboration and live up to societal expectations stood as the root cause of the havoc by Frankenstein's creature. Evidence from the novel highlights how Frankenstein's creature was out of place and even turned into a threat to Frankenstein, his family, and the community at large. The protagonist's failure

teaches a lesson to young scholars, scientists, and experimental practitioners as to the necessity of teaming up and also bending every scientific endeavor to ethics and the welfare of the community. It also transpires that scientific and technological breakthroughs ought not proceed through a mere accumulation of scientific evidence without checking how the evidence collected participates in the growth of science and the welfare of society. Scientific study and research should seek to innovate to feed progress for social welfare.

Conclusion:

In light of the discussions above, this study has looked at scientific and technological study and research in Mary Shelley's *Frankenstein, or the Modern Prometheus*. With an emphasis on the life journey of the protagonist Victor Frankenstein, the study has shown that scientific and technological research takes a lot of individual and emotional commitment as the novel represents the protagonist's break from his family relationships to invest his time and life in the quest for knowledge and scientific innovation. The study has also found that in quest of originality and inventiveness, the researcher must adopt a strict organization of his time and lifestyle. Such are the processes through which Mary Shelley relates to science and the process of invention in her novel. In the second session of the study, an attempt has been made to highlight the part given to scientific research and its practices. It therefore transpires from evidence in the novel that far from being science fiction, *Frankenstein* is a novel about science and its actual place in the life of humankind. This section has shown that science must remain fundamentally an agent of progress and should participate in the building of welfare and progress in human communities. Evidence for this has been highlighted in the primary intentions of the protagonist who sought to pioneer new ways and venture into fields unknown to bring out discoveries that would make him a prominent scholar and scientist. Frankenstein did stride on the paths laid by scientists and scientific methods before tripping on his way. The study has also found that scientific and technological research must be monitored, kept, and under watch. To achieve this, the study has shown that it is through collaboration and exchange of experiences among scholars and scientists that outstanding breakthroughs can be achieved. Frankenstein is successful in pioneering a new way, but his invention is of no use because he did not associate with any other scholar and was under the effect of his passions when doing most of his experiments. He worked for results and did not heed any ethical considerations. The results of

his hard work would have been of great use if he bent them down to ethical considerations and also sought to fit the results of his endeavor to progress and the societal needs of his time. The progress of science and technology contributes to human welfare but it is peremptory to stay in the limits of ethics.

References

Baldick, C. (1987). Frankenstein's Shadow: Myth, Monstrosity, and Nineteenth-Century Writing. In R. Richard, *The Monster Speaks: Mary Shelley's Novel* (pp. 30-34). Oxford: Clarendon Press.

Baron, F. (2013). Faustus of the Sixteenth Century: His Life, Legend, and Myth. In J. M. Weeks, *The Faustian Century: German Literature and Culture in the Age of Luther and Faustus* (pp. 46-66). New York : Camden House .

Blumberg, J. (1993). *Mary Shelley's Early Novels.* Iowa City: University of Iowa Press.

Cockerell., T. D. (1994, August 12). Scientific Research. (J. E. Roberts, Ed.) *Nature, 154*, p. 214.

Dewey, J. (1999). *Individualism Old and New.* New York: Prometheus Books.

Durkheim, E. D. (1995). *The Elementary Forms of Religious Life. New York: The Free Press.* New YorkThe: Free Press.

Harkup, K. (2018). *Making the Monster, the Science Behind Mary Shelley`s Frankenstein.* London, UK: Bloomsburg Publishing .

Holmes, R. (2016, July 28). "The Science that Fed Frankenstein". *Nature, VoL.5 3 5*, pp. 490-492.

Hunter, A. (2008). Evolution, Revolution, and Frankenstein's Creature. In A. C. Hunter, *Frankenstein`s Science: Experimentation and Discovery in Romantic Culture 1780-1830* (pp. 133-150). Hants, UK: Ashgate Publishing Limited.

Hutton, S. (2011). Before Frankenstein. In J. A. Hayden (Ed.), *The New Science and Women`sLiterary Discourse: Prefiguring Frankenstein* (pp. 17-28). New York: Palgrave McMillan.

Irene, C.-B. E.-E. (2021, February 23). Frankenstein; or, the modern Prometheus:a classic novel to stimulate the analysis of complex

contemporary issues in biomedical sciences. (J. MacMillan, Ed.) *BMC Med Ethics, 22*(17), pp. 2-8. Retrieved November 26, 2023

Jackson, T. (2003, november 1). What the Industrial Revolution Did for Us : Modern Medecine. *Reviews, 327*, 1054-1057.

Keefer, M. (2013). Cornelius Agrippa`s Double Presence in the Faustian Century. In J. M. Weeks (Ed.), *The Faustian Century: German Literature and Culture in the Age of Luther and Faustus* (pp. 67-92). New York: Cammden House .

Maddox, J. (1973, November 2). Should science Proceed uncontrolled? (J. Maddox, Ed.) *Nature, 246*(9), p. 1.

Page, M. R. (2012). *The Literary Imagination from Erasmus Darwin to H. G. Wells: Science, Evolution, and Ecology.* New York: Routledge, Taylor & Francis Group. .

Poel, M. (1997). *Cornelius Agrippa: The Humanist Theological and his Declamations. Leiden, The.* Leiden: The Nederlands Bill.

Shamil, T. A. (2018). *The Moulding of the Scientist Individual in Frankenstein.* Osmaganzi: Eskisehir Osmaganzi Universitei. doi:10.17494/ogusbd

Shelley, M. W. (2020). *Frankenstein.* New York: Dover Drift Editions Inc.

Smith, J. (1996). *Mary Shelley Revisited.* New York:: Twayne Publushers.

Smolka, M. (2007). *An Echo of Social Alienation in Mary Shelley's Frankenstein.* Masaryk: University Brno.

Tropp, M. (2007). The Monster. In H. Bloom, *Bloom's Modern Critical Interpretations: Mary Shelley's Frankenstein* (pp. 13-28). New York: Chelsea House, an imprint of Infobase Publishing.