Chaos Theory and Its Real Life Implications in Crichton's *Jurassic Park*

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Abstract

In the Web Application Development Lab at the Center for Advanced Research and Technology (CART), students were tasked with creating websites for Jurassic Park, pretending that the theme park of cloned dinosaurs was set to open in real life. Small teams of students focused on creating websites for specific services that would be provided within the fictional park. To prepare for the project, in their English class, students read Michael Crichton's 1990 novel, *Jurassic Park* and focused on the character, Ian Malcolm, who argues that science shows Jurassic Park as a business will fail due to the playout of chaos theory. Furthermore, learning life lessons through the chaos in *Jurassic Park* are explored as well as a discussion of how these lessons can be applied to one's everyday life. These lessons include playing close attention to details in order to avoid unexpected outcomes and to recognize and adapt to the nonlinearity of everyday life.

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Introduction

"Real life isn't a series of interconnected events occurring one after another like beads strung on a necklace. Life is actually a series of encounters in which one event may change those that follow in a wholly unpredictable, even devastating way" – Ian Malcolm. The aforementioned unpredictability is what is known as chaos theory, a concept explored deeply in Michael Crichton's *Jurassic Park*. Understanding chaos theory is crucial to understanding why the outcome of the novel is the way it is, but it is also crucial to understand and apply the implications of chaos theory explored in the novel to everyday day life. By paying close attention to details in order to avoid unexpected outcomes and recognizing and adapting to the nonlinearity of everyday life, readers can effectively apply the lessons learned about chaos from *Jurassic Park* in order to improve their everyday lives.

Scientific and Literary Origins of Chaos Theory/Butterfly Effect

Chaos theory is the study of seemingly random and unpredictable behaviors in deterministic systems. Because such systems can be tremendously sensitive to initial conditions, a small change in the beginning of an event can lead to great and apparently unpredictable changes as time passes (Augustyn, 2023). The area of study has its roots in the beginnings of modern science during the 17th century, when scientists such as Isaac Newton helped consolidate the causality principle. It took nearly a century before mathematician and astronomer Pierre-Simon Laplace was able to bring the concept of universal determinism to light using

scientific casualty, but with this development, the stage had been set for the birth of chaos theory that came with the discovery of sensitivity to initial conditions by Henri Poincaré. Finally, Edward Lorenz officially discovered chaos theory in 1963 while attempting to make calculations in order to predict the weather – varying how the numbers were rounded slightly at the beginning of his calculations drastically changed the final outcome. Lorenz's discovery continues to be used in various fields of science, correcting the previous notion that a small variation in the beginning of a calculation will induce a small difference in the final result (Oestreicher, 2007).

Chaos theory can be found in many works of literature, specifically those that showcase a small incident at the beginning of a story starting a wild chain of events. American Author Ray Bradury's short stories *The Pedestrian* and *A Sound of Thunder* greatly exhibit the implications of chaos theory. *The Pedestrian* follows the story of Leanord Mead, a man living in the dystopian society of 2053 where everyone is glued to their television screen while he enjoys his late night walks alone. "In ten years of walking by night or day, for thousands of miles, he had never met another person walking, not once in all that time." However, in the one night where he happens to cross paths with the only robotic police car left in the city, Mead's interrogation resulted in him being arrested and taken to a "psychiatric institution for regressive tendencies" (Bradbury, 1951). Chaos theory is especially shown in Bradbury's *A Sound of Thunder*, in which the protagonist Eckel takes up the opportunity to hunt dinosaurs provided by the time travel company Time Safari Inc. Eckel accidentally goes off the specified trail, stepping on a butterfly. When he returns to the present, Eckel is shocked to see signs written in a different language and a different outcome to the presidential election, exclaiming "not a little thing like that! Not a butterfly!" (Bradbury, 1952). Both of these literary works, with the latter to a greater extent, exhibit chaos theory by creating an unexpected chain of events from simple incidents.

Chaos Theory at Play in *Jurassic Park*

Ian Malcolm is the chief proponent of chaos theory in *Jurassic Park*, boldly claiming that the Park is destined to fail because of it. When readers are first introduced to Malcolm in the novel, he explains to the protagonist Alan Grant that the inability to predict weather accurately is because "the behavior of the system is sensitively dependent on initial conditions" (Crichton, 1990, p.74).Further in the novel, Malcolm uses the chaos theory he explained to Grant to discern that in contrast to the beliefs of the scientists and technicians stationed in the park, dinosaurs had escaped from the island. Malcolm argues that the data was too perfect – "scientists in the control room expect to see a natural world. As in the graph they just showed us." In such a complex system, Malcolm saw that achieving the intended results was actually worrisome, and he turned out to be right later in the novel when it was discovered that dinosaurs were exceeding expected populations through breeding. Nevertheless, the owner of the park, John Hammond, fiercely opposes Hammonds rants, claiming that "[the park has] no problem" in response to Malcom stating the park was in serious trouble (Crichton, 1990, p.133). Crichton's decision to portray Hammond as being ignorant to the implications of chaos theory hints at the future failure of the park, but is also reasonable at that point in the novel as Malcolm labeled the carefully planned park a failure before even visiting it.

Ian Malcolm possesses a deep understanding of chaos theory as its chief advocate in the novel, however, Alan Grant seemed to have possessed a basic understanding, in contrast to characters like Hammond, Donald Genarro, Henry Wu, and Dennis Nedry. Alan Grant's inherent curiosity allowed him to overlook the seemingly perfect management of the park and entertain

the possibility that dinosaurs were breeding on the island. In sharp contrast, Henry Wu turned a blind eye to this increasingly obvious conclusion by relying on his knowledge of the genetic makeup of the dinosaurs. Furthermore, Dennis Nedry must have known full well how sensitive computers are to initial conditions, yet he saw nothing going wrong with his apparently simple plan to steal dinosaur embryos. Lastly, Hammond and Gennaro's ignorance towards Malcolms rants were because they did not understand how his theoretical explanations could affect the park's future. Although Ian Malcolm was the only character in the novel with a complex understanding of chaos theory, characters like Malcolm failed to grasp Grant's basic understanding of chaos theory.

Consequences of Chaos Theory

The failure to understand the implications of chaos theory is what resulted in characters Henry Wu and Dennis Nedry creating chaos that started the downfall of the park. Dennis Nedry had created himself a plan that he thought would be incredibly simple – disable the park's security and deliver stolen embryos, all within the span of a couple minutes. This proved to be a fatal mistake, as the electric fences keeping dinosaurs in their enclosures were disabled, leading to the demise of Nedry with the park. Henry Wu, however, possessed a model scenario for the workings of chaos. Introducing amphibian DNA to fill in genetic gaps unintentionally gave dinosaurs the ability to breed, even though Wu had created them all to be female. Together, both of these characters are directly responsible for the destruction of the park, all because they lacked an understanding of chaos theory.

During the chaos that happened after the security systems were disabled in the park, the unexpected behaviors of the dinosaurs further complicated the situation. The T-rex's sensitivity to movement was not figured out until the transportation of the cast was destroyed and Gennaro was killed. Additionally, the intelligence of the velociraptors turned the entire park into a hunting ground, with much of the struggle towards the end of the novel being the avoidance of these dinosaurs as they found their way into buildings. Furthermore, the small Dilophosaurus managed to overwhelm an unsuspecting Nedry, a disastrous loss for the crew in the park because he was the only one that knew how to get the park's systems running again. As if the chaos in the park was not enough, the unexpected behaviors exhibited by dinosaurs during the novel further plummeted the park towards destruction.

Lessons Learned from Chaos

Two lessons learned as a result of the chaos in Jurassic Park are playing close attention to details in order to avoid unexpected outcomes and to recognize and adapt to the nonlinearity of everyday life – both of which can help improve the lives of readers. Learning from Henry Wu's mistake of carelessly using amphibian DNA, readers can make sure to pay attention to details in all aspects of their lives, especially when creating something. This is a lesson that any aspiring programmer, for example, should take to heart in order to prevent errors that slow or halt production down the line. But if there is anything that readers can infer from chaos theory in Jurassic Park, it is that chaos is unavoidable. However, by expecting the unexpected, readers can adapt and overcome any obstacle in their lives. A great day or streak of great days could quickly go bad when you receive the news about the death of a loved one as an example, but readers can prepare themselves to mentally tackle such scenarios beforehand. Taken together, these lessons

learned about chaos from Jurassic Park improve readers' lives by preventing unexpected outcomes but also preparing them to deal with such scenarios should they occur.

Conclusion

The impact of chaos theory in both real life and works of literature is clear, showing itself when small incidents lead to an unexpected chain of events greater in many orders of magnitude than that of the initial incident, as described in Ian Malcolm's quote that was used at the beginning of this paper. Understanding this is important to be able to understand the reasoning behind why what happened in Michael Crichton's *Jurassic Park* occurred as it did. Once a reader can understand chaos theory and its effect in works of literature like Jurassic Park, a reader can also use the real-world implications of chaos theory to improve their lives. By paying close attention to details in order to avoid unexpected outcomes and recognizing and adapting to the nonlinearity of everyday life, readers can effectively apply the lessons learned about chaos from *Jurassic Park* in order to improve their everyday lives.

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