

“Within areas of knowledge, how can we differentiate between change and progress?”

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“Change does not necessarily assure progress, but progress implacably requires change” is a quote by Henry Commager, an American historian. This is precisely the idea that the title chooses to spotlight. It, however, assumes that change and progress have to be differentiated in the first place, which implies two arguments that can be formed, as to the differentiation between them. Hence, a relevant knowledge question could be, to what extent can we differentiate between change and progress? Meaning they either can or can't be differentiated, implying their definitions are either equal or unequal. It would be useful to be free from the strictness of equality, since the question is how they can be differentiated. Hence it can be said that perhaps at certain times they can either be differentiated to a greater extent, and at other times to a lesser extent. Therefore, change can be defined as an alteration of the present state of being of a given environment, and progress defined as an alteration made to the present state of being of a given environment to reach a predefined and determined end state. Given these definitions and subsequent methods, this essay will examine the extent to which change and progress can be differentiated in mathematics and the arts.

Within the AOK of mathematics, the concepts of change and progress can be seen to be almost synonymous with one another. Modern mathematics can be said to depend on a certain set of logical truths called axioms with which mathematicians construct conjectures, and proofs. Therefore it's in the nature of mathematics that one will construct proofs, theorems, and conjectures, which can be perceived to be the constant nature of mathematics. Using the definition of progress as stated previously, since the end state is the same no matter what, to write conjectures and proofs, this implies that there is no change to the environment within mathematics because the need to change an environment would be null if the end state is reached already. Hence, by the definition of change, there is an implication that there is no change within mathematics. An example of this is the proof of Fermat's Last Theorem, which was proved by the mathematician Andrew Wiles in 1995. Fermat's Last Theorem was a conjecture made by Pierre de Fermat in 1637 which stated that $x^n + y^n \neq z^n$ $\forall x, y, z \in N, n > 2$ (O'Conner & Robertson). This shows how conjectures can be worked

on for long periods of time, yet have the same goal. Therefore, it can be seen that differentiating between change and progress can be done merely to a minimal extent within mathematics.

It can be said however that differentiation between change and progress can be done to a much greater extent within the area of mathematics. Mainly, it can be said as a counterargument that the strong basis mentioned previously, is incomplete. As the end state is conjecturing and proving, increasing the rate of this process and/or altering mathematics in such a way that this process is amplified is an end state which is not that of the present. Hence, by the definitions of change and progress as previously outlined, there would be an implication of a clear distinction, hence allowing them to be differentiated. The example of Euclid's Fifth Postulate, an axiom within the study of geometry shows this (Joyce). This postulate was proposed by Euclid in his book *Elements* and has remained unproven for thousands of years. As this postulate formed a critical part of Euclidean geometry, some mathematicians chose to think about other geometries where specifically the Fifth Postulate simply wasn't true. This shows an example within which had humans simply accepted Euclidean geometry to be self-evident, then this greater rate of conjecturing and proving could not have occurred, implying the statements made previously that change and progress can clearly be differentiated to a great extent.

It's useful to perhaps consider certain implications of change and progress in order to fully explore connections to other WOKS and AOKs. It's true that the present system of mathematics has been developed by logical constructions of humans, and hence it would be reasonable to connect reasoning as a WOK to this debate. Reason allows humans to come to conclusions without relying on senses, which is a powerful tool in mathematics, since its how deductions are made from existing axioms. However, the question then is whether or not the system of axioms is complete or not which would allow for reason to play an even bigger role within this debate. Some clear connections can be made between the natural sciences and mathematics, in that many ideas and hypotheses can be tested and verified by simply observing the physical world. But, in the sense of change and progress, the argument goes in the same way, as an idea is either right or wrong, and hence whenever an observation that works is presented, it can easily be adopted into the pool of shared knowledge already developed.

Although the concepts of progress and change within the knowledge framework of the Arts might appear as separate concepts, they are one and the same. Within the arts, it's natural to wonder perhaps about the true nature of the end goal of the AOK itself. The type of knowledge produced within the arts is that of artworks, whether it be a musical piece, painting, sculpture, it falls under the category of the arts and as a result knowledge produced within it. It can be argued further that no matter the content of a specific piece of produced knowledge, its true that the end goal of the individual producing it was to capture in an artistic manner an idea and or feeling to be viewed by other individuals in society. This is the constant within the arts, the end goal. From this, it can be argued quite evidently from definitions of change and progress, that, since the end state is the same no matter what is being produced within the arts, progress can be classified as constant as long as it can be freely interacted with. Hence it can again be seen by the definition of change, there simply is no alteration being made at all within the nature of the AOK of the arts. Implying that it's quite hard in fact to differentiate between the ideas of change and progress to a great extent. This is encapsulated within the example of the artist Banksy, and his works (Who is Banksy?). Although the content of his works can be quite different, it is the ideas which the artworks convey which he is trying to encapsulate. This is the exact case outlined within the argument, and therefore a clear demonstration of this phenomena.

It can also be argued that change and progress within the arts can be greatly differentiated. Namely, what is ignored by opposing arguments is that produced knowledge contributes to shared knowledge in the arts because of its ability to be interacted with. As individual artists should be able to use any knowledge within the arts as a part of their own artworks, denying access to previous works would indefinitely hinder the production of knowledge within the arts. If the case of hindering was present, the end goal of the arts would change, in this case altering solely to the wishes of the producer of that knowledge. Hence, change and progress would be able to be differentiated to a great extent in the arts. An example of this is a court case involving the band, Led Zeppelin and blues singer Willie Dixon. Led Zeppelin had used some lines from Willie Dixon's songs to honour him, but Dixon instead decided to take them to court, and eventually settled for a large sum of money from the band (Runtagh). Dixon's songs were being honoured by the band, but Dixon's disagreement made them or any other artist unable to interact with his produced knowledge. This is congruent to the previously made argument and the same argument follows hence for the ability to greatly differentiate between change and progress.

Certain additional implications are made by the respective definitions of change and progress and in the AOK of the arts itself. It can be said the knowledge produced itself is quite subjective in its nature, whether that be a piece of music, artwork, play, whether that work is liked or disliked lies entirely on the purview of the individuals viewing that work. This ties into the idea of the role of perspective, and more specifically to the WOK of sense perception.

To sum, the concepts of change and progress within the AOKs of mathematics and the arts can be argued to be either differentiable to a great extent or to a lesser extent. With a lot of factors affecting the respective definitions of change and progress, the implications of these factors were discussed in effective detail. To fully answer the question which the title poses, it's certain that change and progress cannot be differentiated to a great extent, simply to a small extent. One can see this by the definitions of both change and progress outlined to be an alteration of the present state of being of a given environment, and an alteration made to the present state of being of a given environment to reach a predefined and determined end state respectively. Since the explored AOKs of mathematics and the arts, both present definitions which result in the implication that these two definitions are largely the same.

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