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Perspective

Natural law theory resolving equity-excellence debates: Reimagining mathematical giftedness at the heart of sustainable education

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Abstract: Although South Africa committed itself to the achievement of the United Nations (UN) sustainable development goals, progress in education has been hampered by controversies about equity and excellence. Although some believe that the equity vs. excellence tension will and should never be resolved, this paper's point of departure is that learner achievement will be made less difficult when equity and excellence are prioritized correctly. The paper proposes that prioritization is possible through the natural law theory, yet few if any studies have explored that perspective in South Africa. Four research questions then shape the arguments. Following a dialectical approach, the paper shows that since Aristotle's time, the notion of natural law has been accepted as one of the most fundamental concepts of our civilization. Through the natural law theory, equity is not only viewed as the highest form of law but is also the highest form of any good or pleasure, hence excellence. This implies that in education, without actualizing learners' potential or excellence of their nature, equity has not been achieved for them. Through the theory, the paper shows South Africa's behaviors that violate natural law. However, this is not sustainable as it only provides the nation with temporary happiness instead of true happiness in accordance with nature. This according to Aristotle's natural law theory is hedonic happiness instead of eudemonic happiness. Contrary to beliefs that violators of natural law go scot-free, nature is red in tooth and claw and its punishment is evident in the vicious cycles, such as a low happiness index, high crime rates, high unemployment rates and poor service deliveries that plague South Africa. In terms of theory, the natural law theory allows for more precise definitions of equity and sustainable development which are currently lacking in all the previous debates. In terms of practice, both the natural law theory and sustainable development converge in the capability approach to education. The relation between the capability perspective and education is acknowledged in the 2002 UNESCO Report "Education for all", and its distinctive feature, the human capability approach is its assessment of policies not on the basis of their impact on incomes, but on whether or not they expand the real freedoms that people value. This approach and its conversion argument say that these internal converting capabilities are highly diverse among people, which weakens the supporting argument for a resource-based equality. The conversion argument says that the importance of primary goods or resources [external conversion factors] is derivative of the individual capability [internal conversion factors] to convert them into valued functionings. A recommendation coming from such observations is that our future depends crucially on how we educate the next generation of gifted people, especially in the mathematical sciences. The paper concludes by providing an example of how a critical mass of gifted people or excellence could create equity as knowledge cascades down in an organization or society. Singapore is an example that achieves equity through its gifted education programs. The paper recommends a similar approach if South Africa were to achieve the equitable and sustainable education it aspires for its learners.

Keywords: equity; excellence; natural law; gifted education; sustainable development

1. Background context of the study

The concept of sustainable development has been on the international agenda since the United Nations Conference on Human Environment (UNCHE) in Stockholm in 1972. In 2015 South Africa signed the United Nations Educational, Scientific & Cultural Organization (UNESCO), Sustainable Development Goals (SDGs) at the Sustainable Development Summit in New York. The 17 UNESCO SDGs have been at the forefront of global development discourse since their inception in 2012. However, various reports suggest that despite their broad scope and ambition, many countries, including South Africa are still far from achieving the goals; hence there is a need to recalibrate and reimagine the SDGs if some countries were to tackle the persistent challenges of poverty, health disparities, and climate change.

Admittedly, other researchers have reimagined these goals in various ways, but this paper takes off from where the prioritization of education left off. The author agrees that the existing SDGs are laudable for placing SDG4 on education at the intersection of all the other 17 SDGs, as it enables the cycle of poverty to be broken, inequality reduced, and individuals empowered to lead sustainable lives. However, in South Africa and other countries that prioritization falls short, particularly in its incompatibility with the "all things matter" approach to education. "All things matter" is a phrase that means everything is important or that everything is of consequence, e.g., all schools matter, all subjects matter, or all students matter. Yet prioritization suggests that "some things matter" hence the two are incompatible and [1] draws our attention to the problem arguing that the optimistic but mostly unrealistic expectations of education (of the all things matter approach) result in an exaggeration in the equalization of everything from resources, subjects, and students to teachers. The approach and its subsequent relaxation of criteria for selection are myths that form part of some philosophies of education that are just too impractical to implement in the modern world [1].

Let us try and reimagine a consistent logical argument of the prioritization principle and see where it would have taken us. For example, even though UNESCO drafted 17 SDGs, according to [2], SDG4 stands out as it will determine the ability to accomplish the other SDGs and countries that can improve their schools can look forward to substantial gains in economic welfare and can begin moving toward accomplishing all 17 SDGs. Indeed, there is general concord (including the UNESCO) about the importance of education as a key determinant of success for the individual, the corporate and national economies in the 21st century, suggesting that education has a well-recognized role as an enabler for many areas under the SDGs. This implies that 'not all SDGs matter' (at least in the same way), but if we follow the same logic, we might further ask: Do all school subjects matter or at least in the same way? Researchers such as [3] defined the output of the education sector as the effect of education on the level of knowledge, skills, and competencies of students which is also referred to as investment in human capital by OECD. Borrowing results from a number of studies, it has been shown that the returns to education are not homogenous but rather heterogeneous across the population, suggesting that different student abilities impact the economy differently [4]. Hence, although all school subjects matter, more than ever before, today the Fourth Industrial Revolution [4IR] provides

compelling policy arguments for the economic importance of multiple disciplines of Science, Technology, Engineering and Mathematics (STEM) subjects, here referred to as Mathematical Sciences. Post-democratic South African Department of Education (DoE) and the Department of Basic Education (DBE) share this same view, as they have been consistent in emphasizing that the ability of all learners to succeed in today's technically oriented work environment is dependent on their understanding of mathematical sciences and their application in practical situations [5–7]. Applying the same logic as before, we ask further but do all STEM subjects matter or at least in the same way? Although these sciences are essential, data drawn by the International Association for the Evaluation of Educational Achievement (IEA) on the Trends in International Mathematics and Science Study (TIMSS) show that there is a strong positive correlation between the Human Development Index (HDI) and mathematics achievement, suggesting that mathematics matters more in the 21st-century knowledge-based economy [8]. This is understandable given that mathematics operates at the interface of multiple disciplines of STEM subjects. But does mathematics matter for every learner or at least in the same way? Although mathematics is essential for all learners as it enables an induction into science and technology, it is more critical for those preparing for the skills needed in the 4IR. Drawing from a 25-year longitudinal study of elite STEM graduates, [9] wrote a paper entitled: *Who shines most among the brightest?* From their analyses of STEM skills and their relevance in the 21st-century knowledge-based economy they have accumulated enough evidence to show that truly extraordinary advances in STEM inventions have not been the work of typical or average individuals. Rather, mathematically talented and committed individuals (such as Bill Gates, Mark Zuckerberg, Michael Dell just to name a few) have produced such advances [9]. Terman's Genetic Studies [10] and the [11] longitudinal Studies of Mathematically Precocious Youth [SMPY] are arguably among the most comprehensive longitudinal studies in psychology to date that have tracked mathematically gifted youth for more than five decades with the aim of affirming this thought. Results from these studies have confirmed beyond any reasonable doubt that mathematically talented males and females indeed became the critical human capital needed for driving modern-day, conceptual economies. These studies are instructive in that the identification of such potential is non-negotiable in the KBE and Bill Gates applied the same logic to select Ph.D. level scientists for Microsoft Research Asia in Beijing; by administering successively more difficult IQ, mathematics, and computer science tests, he eventually selected 20 people out of an initial pool of 2000! Therefore, a comprehensive and well-implemented gifted education in mathematics could offer the possibility of cultivating a society's most promising talents into a source of exceptional human capital and creative capacity [12]. These recent considerations mean that the inclusion of gifted students' programs in order to improve their academic and well-being outcomes is increasingly regarded not as an option but as a necessity [13]. In responding to the demands of the 4IR against the perennial poor performances in mathematical sciences, South African stakeholders argued in a similar way that the "obvious solution" to the mathematics crisis was to give additional learning opportunities to exceptionally gifted children and youths from previously disadvantaged backgrounds [6]. If then we peel

the prioritization onion off starting from the UNESCO 17 SDGs down to the core, we end up with a conceptualization as shown in **Figure 1**.

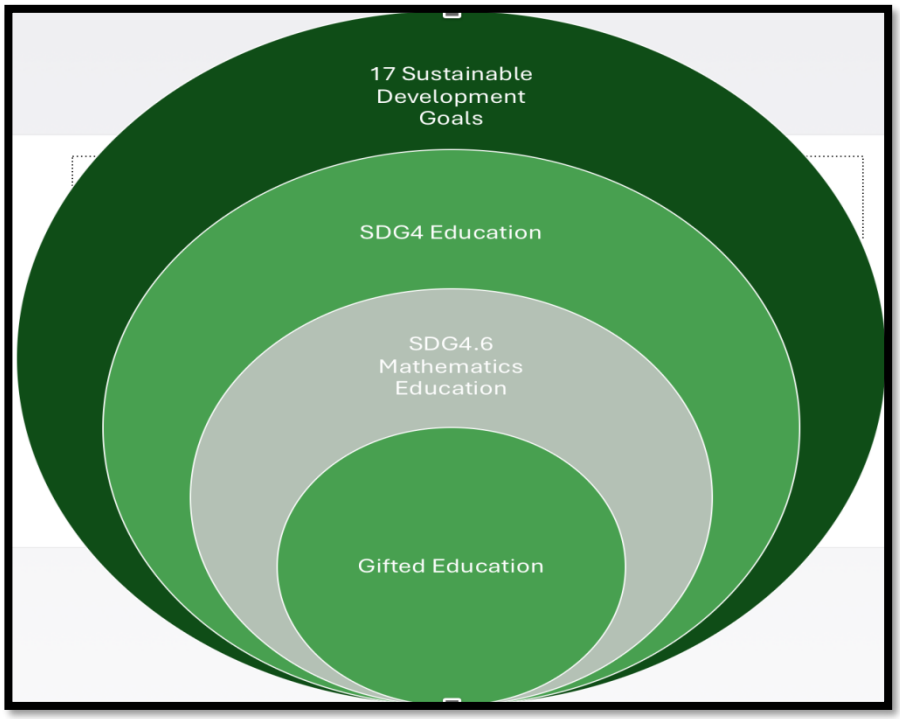

Figure 1. Conceptualizing gifted education at the heart of sustainable development.

According to [4], ignoring this economic dimension of education would not only endanger the prosperity of future generations, but it would also have extensive backlash for poverty, inequality, social exclusion, and sustainable development. Yet according to the [14] report, in many countries government and other stakeholders are still a long way from aligning their efforts with such findings, resulting in a wastage of resources and a proliferation of initiatives that are too small to have meaningful impact. So, if this conceptualization has a global appeal and seems so obvious to stakeholders in South Africa, why has it not happened and how could it be made possible?

2. Problem statement

In order to better understand the problems bedeviling South Africa in terms of achieving sustainable mathematical sciences education, it would make better sense to search for a pattern from its participation in the International Large-Scale Assessments (ILSAs). South Africa has participated in Trends in International Mathematics and Science Studies (TIMSS), Progress in International Reading Literacy Study (PIRLS) both organized by The International Association for the Evaluation of Educational Achievement (IEA), and The Program for International Student Assessment (PISA) which is run by the Organization for Economic Co-operation and Development (OECD). Professor Arthur Foshay was one of the experts present when IEA was established in 1958. Since then, Prof. Andreas Schleicher was once director for IEA but is currently the director and special adviser on education policy at the OECD who

also initiated PISA. It would be interesting to hear what the two experts (Foshay and Schleicher) say about the initial aims and objectives of these ILSAs. According to Foshay for the scholars at IEA in 1958, comparing educational systems using large-scale quantitative data was driven by an intellectual objective and clear research question summed up as: *If custom and law define what is educationally allowable within a nation, the educational systems beyond one's national boundaries suggest what is educationally possible [15]*. Similarly, according to Schleicher: *PISA does not venture into telling countries what they should do, but its strength lies in telling countries what everybody else around is doing and with what success [16]*. It should be clear from these two statements that ILSAs were designed to allow participating nations to monitor their local educational achievements as a "collaborative inquiry" which involves stakeholders generating and engaging with evidence of what was educationally possible in other successful nations which in turn would provide models for the respective participants' national improvement. Other scholars have shown how global standardization corresponds to abstract universal principles, rather than national history or circumstance [17], indicating that a world society's cultural authority precedes and sets the stage for national decision-making. However, in the past two decades, there has been a significant shift for some countries in the purpose of participating in these ILSAs from originally addressing distinct research questions to more recent participation for the sake of educational governance [18]. Hence the research-oriented rationale was replaced by a more policy-oriented rationale, one that is more linked to accountability and sadly back to international competition with no developmental benefits to participants.

In South Africa it was stated that participation in TIMSS was an opportunity to assess and benchmark the country's mathematics and science performance in an international study [19]. However, over the 25 years of South Africa's participation in ILSAs, there has been a recurrence of at least two inseparable problems, which according to [17] conceal crucial deficits that the country ignores at its peril. The first one is that of participation for accountability and competition instead of a collaborative inquiry into what other successful countries are doing as a model for national improvement. Let us look at the evidence of this problem more closely. Since 1995, South Africa has been taking part in TIMSS whose benchmarks describe the abilities fourth- and eighth-grade learners demonstrate or what learners know in mathematics and science on an achievement scale from 0–1000 points, with 500 as the center point. A score of 400 or below on the TIMSS scale indicates that a student has not achieved the minimum proficiency level for basic mathematical or science knowledge. From its initial participation, South Africa's Grade 8 learners, for example, showed a declining achievement rate as follows: 276 in 1995, 275 in 1999, 264 in 2003. Against this downward trend, critics argued that the government did not want to 'expose itself to further humiliation' [20]; hence South Africa did not participate in TIMSS 2007, but the official reason was given as: *We wanted to allow time for the many educational interventions that were being implemented, to improve mathematics and science, to take effect before testing again.* However, that reason becomes less convincing when one considers that immediately after that four-year window, stakeholders went on to field Grade 9 learners for Grade 8 tests from 2011 onwards. They also set their own local targets for mathematics as follows: for 2011 [target was 300] (achieved 352); for

2015 [target was 340] (achieved 372); for 2019 [target was 380] (achieved 389); for 2023 [target was 420] (achieved 397); for 2027 [target is 500]. In the TIMSS 2019 report, South African mathematics set targets for 2011–2019 that are described as having been achieved and students' averages have been described as having "improved" from "very low" (1995, 1999 and 2003) to "low" (2011, 2015, 2019 and 2023). Clearly setting targets below 400 was not aimed at improving learners' performance per se, and neither was the fielding of above appropriate age learners; instead, there is evidence to show that it is about accountability and competition. For example, according to [19],

> *'... the country breathed a sigh of relief when we reported that the TIMSS 2011 Grade 9 mathematics achievement scores improved by 67 TIMSS points between TIMSS 2003 and TIMSS 2011. This was the first piece of robust evidence to demonstrate that educational quality and outcomes were improving. DBE's Action Plan to 2019 called these results 'the most significant news about the system in recent years [21].*

But who are the stakeholders trying to impress by 'sigh of relief' when in fact learners have not achieved the minimum proficiency level for basic mathematical or science knowledge. While the Department of Basic Education (DBE) remains in this celebratory mode, the fact of the matter remains that (a) three-quarters of South African learners had not acquired even the minimum set of mathematical skills by Grade 9; (b) the country's targets as well as achieved averages are below the TIMSS 400; (c) the country opted for an easier version of the TIMSS tests; and (d) the years of "improvement" coincide with the years when the country fielded Grade 9 learners for Grade 8 tests. A shift from testing Grade 8 learners to testing Grade 9 learners was justified as enabling a better match between the content knowledge presented to learners in TIMSS and the curriculum coverage in South Africa [19]. In their paper, [22] draw the reader's attention to a book written by Darrell Huff entitled "How to Lie with Statistics". In that book, [23] outlines the art of 'statisticulation' which he describes as the misuse of statistics and/or errors in the interpretation of statistics, and where the secret language of statistics, … is employed to sensationalize, inflate, confuse, and oversimplify thereby creating incorrect conclusions or 'semantic nonsense.' However, all this is clear in the South African way of reporting on educational matters. In simple terms, the DNA evidence belies the validity of the claims that stakeholders are making. This is worrisome given that behind this facade of 'a system on the rise,' a recent 2023 report by the Centre for Development & Enterprise [CDE] used various indicators to conclude that almost half of all South African schools are cognitive wastelands.

A similar practice of participating for accountability and competition is also evident when National Senior Certificate (NSC) examination results are announced every January. For example, at the release of the 2021 NSC results, the DBE report of January 2022 started by outlining, as usual, the criteria for a pass at NSC level as follows: For admission to Bachelor Studies—a candidate must obtain at least 40% for the candidate's Home Language (this is compulsory); must obtain at least 50% for the candidate's four (4) other subjects, excluding Life Orientations; must obtain at least 30% for the language of learning and teaching (LOLT) of the Higher Education

Institution; must obtain at least 30% for one (1) other subjects; and must pass at least six (6) of the seven (7) subjects [24].The report went on to say:

> *… we must state that between 2008 and 2021, the Basic Education system has produced a total of more than 2.2 million Bachelor passes. These interventions have definitely improved access and retention of learners in schools; thus, simultaneously promoting equity and quality immeasurably. Therefore, this kind of consistent and improved performance, clearly illustrates our resolve to provide. …the "equality and equity of access, as well as the equality and equity of outcomes". …. for all children, irrespective of their gender or socio-economic backgrounds. After all, even our noble Constitution, the UNESCO SDG 4, the Continental Education Strategy for Africa on the African Agenda 2063, the National Development Plan—Vision 2030, and our Action Plan 2021 enjoin us to address the six cardinal social justice principles of access, redress, equity, efficiency, inclusivity and quality of learning outcomes in our system [24].*

Clearly the reader might notice how a Bachelor pass based on very low national benchmarks is being used to justify success at national, regional, and even global levels. The national concern that these figures engendered was described long back as follows:

> *...the fact remains that the drop-out rate of 45% of all university students is nothing less than a national disaster, not necessarily because these students should obtain degrees, but because of the lamentable waste of effort. These are strong words, but unless we are shocked into action there is a very real danger that familiarity with this situation may breed acceptance [25].*

Indeed, there is evidence to show that the country was never shocked into action since then; hence, familiarity with the low pass marks has bred acceptance as the norm. Admittedly, there may be merit in adopting some locally relevant adjustments to globalized standards, but unfortunately, participation in international assessments becomes a pointless exercise if, in the end, efforts are not made to improve the performance of learners. South Africa and other countries might want to heed the OECD advice from Schleicher's perspective:

> *The world today is indifferent to tradition and past reputations, unforgiving of frailty and ignorant of custom or practice. Success will go to those individuals, institutions, and countries that are swift to adapt, slow to complain, and open to change. The task for governments will be to ensure that their citizens, institutions, and education systems rise to this challenge and international comparisons can provide useful instruments to this end [16].*

Hence, instead of making global research locally meaningful for South Africa as suggested by [19], a counter proposal by [17] is that countries have to think locally but act globally. Stakeholders need to base and readjust their strategies on how globalization will proceed given that it is ignorant of custom or practice and neither is it forgiving of frailty. Globalization will continue to move forward and like the 4IR, it provides lighthouses through this time of volatility and is irreversible because it is a revolution.

Now that participation for accountability on the ILSAs has provided us with a snapshot of the South African mathematics crisis, the general trend across other policy decisions shows that all its educational problems have their roots in the country's

prioritization of equity over excellence. Barely a decade into democracy, the Centre for Development & Enterprise (CDE) report had already identified and challenged the egalitarian practice where many education systems emerging from a history of discrimination proceed on the assumption that equity for all should come before excellence for some [26]. More recently, there is still a global view that progress, especially in mathematical sciences education elsewhere and in South Africa has been hampered by public perceptions of equity and excellence that are shaped by the local political and historical events within that country [27]. Against this background, it is reasonable for research to try to reconceptualize the foundational problem of equity vs. excellence in education. That reconceptualization might begin by repeating this question posed by [28]: *Are there alternate ways to conceptualize the problem that globalized standards seek to solve?* This is important given that research shows that plausible-sounding reform rhetoric rarely translates into large-scale improvement at the chalkface level; hence, when faced with some new interventions, researchers must exercise judgment to assess their efficacy [29]. This paper was premised on the need to look beneath the plausible-sounding surface to see whether the claims made for access, redress, equity and efficiency make sense, to ask whether there is a real danger that the new emphasis may become the latest in a series of bandwagons whose negative effects will eventually outweigh any possible benefits in South Africa.

2.1. Gap in knowledge

In South Africa, those in favor of equity before excellence have always had policy decisions in their favor because their cases are always bolstered by the country's apartheid history and persistent reality of racism and widening economic inequalities. Elsewhere it has also been acknowledged that the dual and desirable educational goals of student equity and excellence have often been in a serious struggle for scarce resources, but this struggle has often been won by equity because the problems of equity have greater immediacy than does the long-term enhancement of excellence [30]. A recurring problem with attempting to combine the two opposing beliefs is that the conflict becomes exacerbated rather than being resolved. Admittedly, this question has been the subject of exhaustive scholarly discussions; hence any attempt to add to the existing theories on these matters may seem like a venture with little prospect of producing something novel that also is useful. However, it is always healthy to question and reassess standard positions; hence it may not be too late to make a contribution, no matter how modest, to these core questions. Although [31] believed that the equity vs. excellence tension will never, and should never, be resolved, this paper's point of departure is towards the alternative view that the 'relative' or subjective nature of the quality construct as described by [32] should not allow us to abrogate responsibility for its attainment. In terms of the gap that this paper fills, we argue that in the equity-excellence debates the cardiologists are missing the heart of the matter. Indeed, equity and excellence are inseparable because the absence of one hinders full attainment of the other; however, Aristotle (384–322 BC) advised us long back that in investigating the cause of each thing, it is always necessary to seek what is most precise. Following from this advice, this paper shares the view that learner achievement will be made less difficult when equity and excellence are prioritized

correctly [33]. So the heart of the matter is the precise order of prioritization of equity and excellence and this in turn points to two important and related imperatives as follows: (a) The need to find a theory that explains why desired change has remained a deferred dream; (b) the need for the same theory to suggest what could be done to make this dream come true.

2.2. Objectives of the paper

This theory paper aims at exploring the natural law theory and its efficacy in addressing the problem of the correct order prioritization of the dual and desirable educational goals of student equity and excellence. It is premised on the view that the natural law theory would allow us to see the weakness of the join (equity vs. excellence), to pry the arguments apart, identify their constituent claims and dispose of them seriatim. To give the paper structure, the authors raise the following research questions:

1) Does natural law exist and how is its existence conceptualized and justified?
2) How could the natural law theory address the prioritization of equity and excellence?
3) How does the theory explain the mathematics crisis in South Africa?
4) What are its implications for gifted education in South Africa?

2.3. Natural law theory—A proposal

The notion of natural law has been used by both the conservative and the revolutionary-reform elements of society to either rationalize and justify existing institutional practices or to initiate radical changes and its application has been observed in modern scholarship [34–40]. Historically, natural law theories date back to ancient times during which Socrates, Plato, and Aristotle [to name a few] distinguished natural justice from legal justice. Although Shiner pointed to limitations due to imperfect translation from Greek, Aristotle's views have shaped the natural law theory in a manner that has remained relevant to date [34]. Hence, many consider Aristotle to be the father of natural law theory given that after him, the notion of natural law as a philosophical, juridical, and ethical idea was accepted as one of the most fundamental concepts of our civilization [41]. Since then, natural law has gone by various other names, such as Divine Law, Eternal Law, Moral Law, Universal Law, Law of Reason, Common Law, Higher Law or Law of Nature and this is understandable given that natural law theories have also been applied in different academic specialties.

This paper followed on [42] proposal that the controversies about excellence and equity in education are resolvable through the natural law theory. The author [43] draws our attention to how Aristotle (384–322 BC) used the terms 'equity' and 'excellence' in most of his writings (which are generally referred to as Corpus Aristotelicum) and how those teachings (a) have had a lasting impact on Western philosophy; (b) continue to shape how philosophy is perceived even today; (c) have remained a standard part of the philosophical vernacular; and (d) will continue to be studied with keen, non-antiquarian interest. According to [44] Aristotle's Greek translations of "equity" and "equitable" are *epieikeia* and *epiekis*, respectively and

Aristotle uses the terms in two senses referring both to the specific equity in legal justice and to the more general equity of the equitable man. In the specific sense, Aristotle pithily characterizes *epieikeia* as [*epanorthoma nomou, hei elleipei dia to katholou*], a correction of law, where law falls short because of its universality. This universality is accepted because the nature of legal justice is such that legislators pass laws that are universal in form, but particular cases that may or may not fit neatly within a universally phrased law are inevitable and the judge has to deal with such particular cases in an equitable manner. For example, the law might say that a driver who kills a pedestrian at a zebra/pedestrian crossing shall be charged with vehicular manslaughter. Assuming at the time of phrasing this law, there were no self-driving vehicles, what would then happen if a self-driving vehicle (which has no driver) kills a pedestrian at a zebra crossing? The mistake, Aristotle says, is really in neither the law nor the legislator, but "in the nature of the business, [*euthus gar toiauti hi tonprakton huh estin*], for from the very start such is the matter of practical affairs. In particular, when Aristotle remarks that the equitably just is something that the legislator [*ei hidei enomothetisen*], would have legislated if he had known, he seems to imply that further legislation would fill a gap existing in the current human law but before that happens equity is the Aristotelian virtue that represents the exercise of making such tailor-made, particularized judgments. Written law inevitably falls short of the standard of applicability that it wears on its linguistic face; hence it speaks universally and absolutely, but it has no right to do so. Equity corrects that deficiency [44]. Hence according to [40] not only do judges have the authority and capacity to engage in natural-law reasoning, but they must do so because they are committed to both judicial restraint and natural-law reasoning simultaneously. Judges in a free society governed by the common law derive their authority from the people and are bound by the judgments of the people and precedent when making their judgments. They are also bound, however, by a law that supersedes the judgments of the people, the natural law; hence the entire enterprise of "law" in a free society is viewed as an experiment in applying the natural law [40]. From this perspective, human law must rest its authority, ultimately, upon the authority of the natural law. The Rhetoric describes the equitable as [*to para to gegrammenon nomon dikaion*]," that justice which lies beyond the written law." In this sense both equity (*epieikeia*) and equitable (*epiekis*) are necessary virtues to address the impossibility for legal justice to fully represent 'absolute justice' [45]. This idea of absolute justice brings to mind Aristotle's standard contrast between "natural" and "positive or human" law. In the Rhetoric, he distinguishes [*nomos idios*], "particular law," and [*nomos koinos*], "universal law." While the former is divided into [*nomos agraphos*], "unwritten law," and [*nomos gegrammenos*], "written law," the latter is [*law kata phusin*], "law in accord with nature".

Besides its role of filling the gaps where positive law falls short, its second role is in correcting human law. For example, Aristotle's discussion of absolute kingship (*pambasileia*) provides a window into why the best practical regime can never be the best regime, even though it draws its power from positive law because people by nature have desires and the heart twists the rule of even the best men. Aristotle goes further to say the regime determines the nature of the citizens, the rulers and the ruled, the concept of justice they accept, and the laws they follow. Hence even the human

law designed 'positively' reflects the biases of its makers and if the king is abusive, bad, ignorant, or wicked, he and his actions have disastrous effects on the people governed by him. In a famous passage in his Ethics, Aristotle's conclusion is that equity's role is to prevent the law from adhering too rigidly to its own rules and principles when those rules and principles produce injustice. Aristotle was the first to articulate what has come to be known as the ideal of the rule of law. He shared the common Greek view that natural law was an instrument by which to constrain the exercise of political power, particularly that of tyrants, whose policies represented only their own interests and not the good of the community. Similarly, [40] warns of the tyranny arising from judicial usurpation of legislative or executive powers, calling judicial decisions based on "considerations of policy" the "terrible instruments of arbitrary power" that "cut with the keenest edge, and inflict the deepest and most deadly wounds. From this view, nature is conceived of not only as a legislator, but the supreme legislator.

For example, Hitler and the Nazis identified Germans as members of the "Aryan" race who were at the top of the racial hierarchy, hence referred to as the "master race" while Jews were referred to as the "inferior race" that was dangerous to, and must be destroyed to keep the purity of, the master race. In 1933, persecution of the Jews became active Nazi policy, but Hitler needed some laws to grant judicial legitimacy to their persecution. On the 23 March 1933, Hitler proposed the Enabling Law to the Reichstag [Parliament] also known as the 'Law to Remedy the Distress of the People and the Reich' (German Empire), a new law that was passed and signed into law the following day. Although undemocratic strategies, including propaganda and force were employed, the Enabling Act of 1933 still gave Adolf Hitler and his government power to make laws without the consent of the German parliament. As per plan, under Hitler's leadership and its racist ideology, the Nazi regime was responsible for the genocide of an estimated six million Jews and millions of other victims, whom he and his followers deemed (*Untermenschen*) sub-humans or socially undesirable. Despite this unethical behavior, the positivist ideology with its thesis that "law is law" made German jurists and lawyers defenseless against laws of arbitrary or criminal content designed by Adolf Hitler which were mocked as an "Adolphe Légalité" or Adolf's legality. Here is an example of how legal institutions can be made the object of the non-legal power struggle given that Hitler obtained and increased his dictatorial power, not in violation of law, but in accordance with and assisted by German law.

The writer [46] authored his book 'The Natural Law' in response to this Germany's political and legal crisis after he had watched with alarm as the Nazi party deftly used German legislative, administrative, and judicial institutions to impose totalitarian rule. He then remarked "Our modern dictators, are masters of legality" suggesting that dictators can take negative advantage of civil/human law to perpetuate evil. However, as Rommen put it in his book on the state, "When one of the relativist theories (such as racism) is made the basis of a totalitarian state, man is stirred to free himself from the pessimistic resignation that characterizes these relativist theories and to return to his principles. In fact, tracing the very origins of any positive or human law shows that human laws can be derived from natural law through deductive logic, similar to how scientific conclusions are derived from the principles or nature of things. A natural law doctrine is founded on the existence of principles governing the

life of society, such principles being founded on the nature of things, and in particular on the nature of man, working by the application of reason, and having to translate and develop itself into the forms of positive law as a function of changing social needs [47]. Hence from these 'principles' the system of ethics and of natural law was deduced in a rationalistic manner prompting Rommen to muse that every generation, finds a new reason for the study of natural law and for him and many others of his generation, totalitarianism provided that occasion. Similarly, in 1966 a resolution directed at United States military involvement in Vietnam stated that: "These methods of warfare offend human nature." The basic impulse that motivates such decisions presumes the existence of a morally relevant common humanity. In fact, the roots of current positive law and legal policies are rarely, if ever, totally derived from legal research and the resulting facts or evidence. The issue is not how we can or cannot keep values and underlying assumptions, such as notions of natural law, from influencing our work, but how we can systematically take them, and their influence, into consideration. Hence Locke as cited in [48] opines that without the natural law, then any system of government would be permissible, and it would be wholly immaterial that the government did not recognize the human rights that are regarded as beyond the interference of any power. This implies that there would be no sense in which anyone could be considered virtuous or vicious.

A full elaboration of the concept of natural law as a law of reason, capturing all the essential characteristics that were later developed in the legal tradition, can be found specifically in Cicero's text [49] [54–51 BC] where natural law is characterized as follows:

a) It is in accordance with reason (or it is even directly identified with reason);
b) It is in accordance with nature (it is the law of nature);
c) It is a morally relevant law (it is related to the distinction between virtue and sin), so that;
d) To act against it is morally wrong;
e) It is subject neither to human legislation, nor to the will of individuals, nor to decision by voting.
f) It is comprehensible to common sense (it does not need interpretation by a legal specialist);
g) It is applicable regardless of the local customs of individual cultures (it applies everywhere);
h) It has been and will be valid for all time (it is eternal);
i) It is immutable.
j) Its violation in itself involves punishment (violation is beyond the pale of human nature);
k) Its originator is God (as cited in [50]).

Although other theorists do not share the connection to God as the originator, the pervasiveness of natural law theory is still reflected beyond legal justice as its application spills over into the social sciences including education. This is clear in that Aristotle's politics can be understood as partly an attempt to make sense of the political as a distinct field of intellectual inquiry. In his writings in the *Nicomachean Ethics* Aristotle articulated the first principle of ethical human action where he used the word (*epieikeis)* for "good", contrasted with (*phaulos)* for "bad and argued that good is to

be done and pursued, while evil is to be avoided. Similarly, in Aristotle's ethical treatises, the term (*kakon)* bad/evil is used in a broad sense as it generally applies to things that destroy or hinder happiness (*eudaimonia)*, tarnish the joy of the blessed (*makarioi)*, or contribute to making someone miserable (*athlios)*. Evils are often referred to as "objects of avoidance" (*ta pheukta)*, which Aristotle classifies into the shameful (*to aischron)*, the harmful (*to blaberon)*, and the painful (*to lupêron*), and which have different kinds of impact on our well-being. Put simply, good, and evil reduce to what is pleasurable and what is painful, respectively [48]. However, Aristotle further defines happiness as something deeper than temporary excitement, distraction, or pleasure and this is summed up by his famous aphorism: "One swallow does not make a summer." In Aristotle's writings, the debate about *eudaimonic* vs. *hedonic* well-being usually contrasts (a) self-fulfillment with maximizing pleasure; (b) value- and virtue-oriented living with prioritizing enjoyable experiences; and (c) designing for long-term flourishing vs. seeking short-term gratification. According to [51], *hedonic* happiness is about maximizing pleasure and minimizing displeasure and he considered *eudemonia* as humanity's highest good. Similarly, while Locke equates pleasure or happiness with good, he is careful and suggests an important hierarchical distinction between (a) the good/happiness, understood as all objects that are connected to pleasure and (b) the *moral good/true happiness,* understood as objects connected to pleasure which are also in conformity with an eternal law.

Although [52] gives many examples to support this hierarchy, the specific case about alcohol-taking is sufficient for this paper. Locke notes that people take alcohol to obtain the pleasure of intoxication but drinking violates a natural law regarding the normal functioning of a healthy body and this leads to pain in the form of headache, nausea, or several other longer-term effects. In this case, drinking to obtain the pleasure of intoxication is to pursue an immediate good/happiness, which Aristotle would call *hedonic* happiness or temporary excitement, while avoiding drinking to obtain the pleasure of health is to pursue a remote-good/moral-good/true-happiness which Aristotle would call *eudemonic* happiness or the highest good. Locke further explains why people pursue short-term good/happiness rather than long-term moral good/true happiness. In his view, if every sip of alcohol were accompanied by headache and nausea, no one would ever drink, but Locke claims that the weak condition of our minds makes it easy for us to think that there could be no greater good than the relief of being unburdened of a present pain. However, in Locke's view, if we contemplate a thing long enough and clearly see the measure of its true worth, we can change our desire and uneasiness for it in proportion to that worth. Locke then concluded that there is an ordered way to choose which things to pursue as follows: (a) An ill-ordered way in accordance with our own palates or pleasures (*the good or happiness*) or (b) a virtuous way in accordance with the eternal law and nature of things (*the morally good or true happiness*).

Once the existence of an eternal law is accepted, the next question to be considered would be: *What kind of authority if any, does the natural law have to obligate?* This question is important following critics who argue that theories of natural law have come to be defined as mere speculation, of limited interest or utility in the analytical world [48]. Yet researchers have also demonstrated once again that natural law is not a mere abstraction without practical consequences but that it can and

does have a profound influence on the life and property of every living person [40]. Locke begins his treatment of this question by stating that no one can oblige us to do anything unless the one who obliges has some superior right and power over us. The obligation that is generated between such a superior power and those who are subject to it results in two kinds of duties: (1) The duty to pay obedience to the command of the superior power and (2) the duty to suffer punishment as a result of the failure to honor the first duty of obedience. In this regard there is a profound parallel between natural law and written law, as both sets of laws define rules of behavior that are designed to be in the best interest of the individual and society. Hence in an analogous way that civil or human law has the status of commanding or prohibiting certain human behaviors, Locke argued that moral good and moral evil are no more than the conformity or disagreement between our actions and the eternal/natural law. To this he immediately adds that such conformity or disagreement is followed by rewards or punishments because it would be in vain for the intelligent being who decrees the rule of law to so decree without entailing reward for the obedient or punishment for the unfaithful. Although unfaithfulness in both human or written and natural laws results in negative consequences of acting outside their boundaries of prescribed behavior, Locke warns us that the eternal law has "a just and inevitable command over us and at its pleasure can raise us up or throw us down and make us by the same commanding power happy or miserable" [48].The word 'inevitable' points to one critical difference between human and natural law, i.e., one can sometimes escape the consequences of violating human law if one does not get caught or escapes punishment yet in contrast, one is always in the grip of natural law and its consequences. The word miserable confirms a prevailing impression that nature is full of violence and cruelty: "red in tooth and claw" [37,38]. The author [37] points to the notion of natural punishment where countless examples of the vicious cycles they create such as poverty, crime and drug abuse have been given by its proponents. A vicious cycle connotes a sequence of reciprocal cause and effect in which two or more elements intensify and aggravate each other, leading inexorably to a worsening of the situation. Violation of natural law leads into such vicious cycles as one form of violation breeds other forms of natural law violations. Hence, according to [53], whoever is in violation of natural law is fleeing from himself and denying his human nature, and by reason of this very fact, he will suffer the worst penalties, even if he escapes what is commonly considered as punishment under human law.

2.4. Methodological approach—Dialectical argumentation

The second research question is about how natural law can help in the prioritization of the concepts of equity and excellence. In answering that question, this paper is making a judgment on a subject matter (equity vs. excellence), a subject matter that has been shown to apply in both legal and non-legal situations. This nature of the subject matter demands a methodological approach that allows the reader to see a common thread that connects the natural law as it applies across legal and non-legal situations. The researcher [40] consulted James Wilson's views on natural law, arguing that as a prominent jurist during the American founding, a signer of the Declaration of Independence and the Constitution, a delegate to Pennsylvania's ratifying convention,

and the jurist chosen to deliver the nation's inaugural series of law lectures at the College of Philadelphia, Wilson's views on the judge's role as it pertains to natural-law reasoning are informative today. Wilson conceived of judges and of making judgment as a common subject of man using faculties that all men have, i.e., determining the principles of right and justice through the moral sense and reason. Simply put every man legally trained or not is capable of administering justice "judicially." This judicial authority," he states, "consists in applying, according to the principles of right and justice, but the type of reasoning applicable in a judgment will vary depending on who is doing the judging (a judge or a private individual) and whether the context is the judicial administration of justice (which requires legal reasoning) or a nonlegal setting (which requires ordinary, probabilistic, and discursive moral reasoning) which involves the faculties of the moral sense and reason [40]. Bringing together Wilson's insights, [40] then conceptualized a taxonomy (**Figure 2**) for understanding the division of the types of reasoning involved in judgement in its broadest sense.

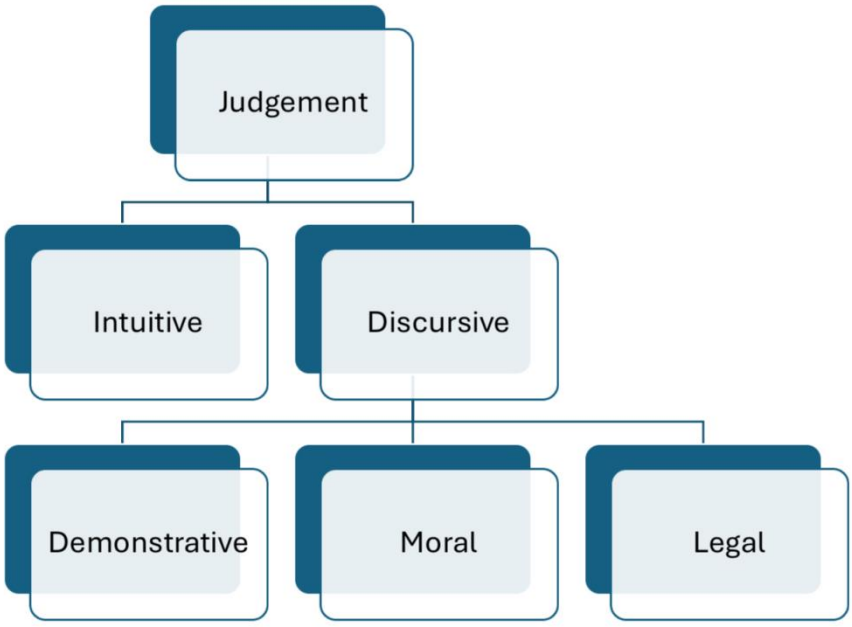

Figure 2. Terman's taxonomy for making judgment [40].

As seen in **Figure 2**, according to [40], judgments are either intuitive or discursive and both require self-evident truths (without which all reasoning is impossible). On one hand, intuitive judgments are based on the moral sense perceiving self-evident truths directly while discursive judgments are based on either demonstrative (certain) reasoning, moral (probable) reasoning, or legal (precedential/analogical) reasoning.

The distinction between demonstrative and moral reasoning was evident in Aristotle's (384–322 BC) premise and conceptualization of knowledge. Aristotle's (384–322 BC) distinction of knowledge starts with the analogy of a "white horse" which is a combination of the words "white" and "horse." Aristotle (384–322 BC) believed that white (or equity or excellence) does not exist independently like a horse but is a property of a substance. A necessary truth (like horse) is a truth that must be

true because a horse is a horse regardless of its color while a contingent truth (such as equity) is true as it happens but did not have to be true. From there, Aristotle believed that the study of a contingent truth belongs to a distinct field from scientific knowledge, and that the two (absolute truth and contingent truth) differ in their methodology and subject matter. Hence Aristotle long argued that it was necessary to distinguish between ways of being and indeed what stands out in his writings is the contrast between *episteme* and *doxa*. In Aristotle's philosophy, *episteme* is a virtue of thought that involves understanding necessary truths, while on the other hand, the Greek term *doxa* refers to the domain of opinion, belief, or probable knowledge and is defined as "public opinion, majority prejudice, middle-class consensus, that could easily be confounded with scientific knowledge, *episteme*, which is the domain of certainty or true knowledge.

There is a methodical approach to *episteme* which deals with less subjective views and uses objective observations to make arguments more substantial; that sharply differs from the way conclusions are reached using *doxa*. In this regard, Aristotle points to (a) the demonstration method or the empirical inquiry which is a method that starts with perception and uses induction and generalization to remove ignorance; and (b) the dialectic which is a method of dialogue that uses logic to validate arguments and advance knowledge [54]. Dialectic, also known as the dialectical method, is for Aristotle a lesser way of proceeding than is demonstration, the method of science; for demonstration proceeds from premises which are accepted as true in themselves (that is to say that they are essentially and thus in some sense necessarily true) and moves from them to conclusions which follow necessarily from those premises; and the middle term of such a demonstrative syllogism then provides the 'reason why' for the truth of the conclusion. On the other hand, dialectic proceeds logically from premises which are accepted on a lesser basis 'by everyone or by the majority or by the wise, or by the most notable and reputable of them', and proceeds deductively from them to further conclusions. That way of putting the matter does not, strictly speaking, assert that dialectic is inferior to demonstration, but it differs from demonstration in that it is not concerned with the pursuit of absolute truth or first principles. Aristotle makes clear in several places in *Nicomachean Ethics* that the subject matter of such dialectic investigations is opinions about right, just, good, fine, or useful, and not necessary truths or first principles. Hence, dialectic deals with matters that we deliberate about (*bouleuometha*) but for which we do not have an "art" or "craft" (*technē*), or for which we have no systematic rules." What is involved is at best what has been called 'inference to the best explanation' and what is produced is indeed 'clearer and more knowable by us' but not necessarily the absolute truth. This is so because Aristotle coined the term dialectics as a logic of the opinion, of the probable which permits reasoning in a field that, in a certain sense, is intermediate between that which is certainly true (*apodictic reasoning*) and that which is certainly false (*sophistic reasoning*). In Aristotle's view, dialectical reasoning consists in going through the difficulties on either side of opposite opinions (*pros amphotera diaporesai*); hence it can be described as the art of disputing, and of disputing in such a way as to hold one's own, whether one is in the right or the wrong—*per fas et nefas*. Therefore, dialectic is useful for the philosophical disciplines in that one is able to

address the difficulties of both sides of an argument or problem making it easier to discern what is acceptable and unacceptable in the issue under discussion.

From there, Aristotle stresses that rhetoric is closely related to dialectic. He offers several formulations to describe the affinity between these two disciplines: in the first line of the book Rhetoric where rhetoric is said to be a 'counterpart' (*antistrophos*) to dialectic; in the second chapter of the first book, it is also called an 'outgrowth' or 'offshoot' (*paraphues ti*) of dialectic and the study of character; finally, Aristotle says that rhetoric is part of dialectic and resembles it [55]. In short, Aristotle defined rhetoric as a capacity to discern what, in a particular case, will be persuasive, or more literally what the particular case will "accept" or "welcome" (*endekhomenon*), or what is "appropriate" to it. Rhetoric is linked to the ethical and political domains in the sense that any persuasive discourse must draw its premises from the common opinions that the audience accepts while at the same time it is a combination of the sciences of logic and ethics [56]. Persuasion comes about either through the character (*êthos*) of the speaker, the emotional state (*pathos*) of the hearer, or the argument (*logos*) itself [55].

This paper is premised on the view that in South Africa, persuasion has come about through both the character (*êthos*) of the speaker and the emotional state (*pathos*) of the hearer. An example of this approach can be taken from the book "Animal Farm" where Squealer used the threat of Mr. Jones' return to convince the animals to agree to the following: *The pigs receive all the milk and apples because they need more brain food than the others.* Similarly, in South Africa, many eloquent proponents justify their proposals by the threat of either apartheid coming back or on the pretext of its removal. Unfortunately, despite the emotional appeal of such proposals born out of *êthos* of the speaker *or pathos* of the hearer, [57] argues that our immersion (in ideology) is so "natural" that it renders us blind to the toxicity of what we consume in the social spaces we occupy. This paper runs away from such toxicity and aims to persuade differently through the argument (*logos*) itself of the equity-excellence nexus. In doing so, this theory paper employs both dialectic and rhetoric as a methodological approach to discern what could be persuasive in the debates for and against equity and excellence in education. This is important given that *doxa* characterizes the *doxastic* state of mind as a state of deception and the objects a person in this state is acquainted with as being deceptive or 'untrue'. Aristotle's views point to the naturalistic fallacy which is a logical fallacy that occurs when people draw conclusions about the nature of reality from observations of nature, without considering whether those observations are accurate. This according to Aristotle suggests that a different explanatory factor must be found so that what was irrelevant in the original explanation is abandoned and replaced with what is ultimately appropriate [35].

2.5. Prioritising equity and excellence through the natural law theory

There is a pervasive interpretation of the principle of equity as equal distribution of resources which is based on the rule that everyone receives the same share of resources, without regard to effort, contribution, ability, or outcomes [58,59]. While such an interpretation perpetuates the dual dichotomy within the equity-excellence nexus, [60] as cited in [33] proposed a concept of goodness that allows for the cohabitation of excellence and equality. This is so because a pursuit of equity or

equality, as a critical dimension of the human endeavor, becomes part of the pursuit of goodness and the avoidance of evil. From this view, the natural law theory does not only allow for the cohabitation of excellence and equity, but it goes a step higher to allow for the prioritization of the concepts. The terms in Aristotle's Greek standardly translated "equity" and "equitable" are *epieikeia* and *epiekis*, respectively but by far the most common meaning in his writings is the general one of *epieikeia* which simply means "excellence" or "goodness" which in the natural law theory is understood as objects connected to pleasure that are also in conformity with an eternal law. According to Aristotle, a human being's highest goal is the realization and completion of their nature and potential, an achieved excellence of doing, feeling, and thinking. Aristotle's highest good is *eudaimonia*, which he defined as the activity of the soul in accordance with virtue or excellence. He also identified *eudaimonia* with the Greek word for happiness. Aristotle goes further to argue that the highest good (excellence) and highest being in first philosophy is the prime mover; that is, the source (*archē*) of coming-to-be and excellence was a requirement for happiness and a key part of living a good life. Hence according to [61], in the domain of education, the way to achieve equity is to ensure that all children, from every racial and ethnic group, get what they need to live up to their full potential. In that sense, and drawing on the natural-law theory, researchers argue that excellence becomes an antidote for equity because without actualizing a person's potential or excellence of their nature, equity has not been achieved for that person. Hence, in today's world, society should aspire for every child to grow up to achieve his or her full potential, and anything less is a waste of talent and a blemish on human dignity and flourishing [61]. The writer [33] goes further to argue that even those who are partial toward the excellence side of the equality-excellence nexus will see that, until a fair level of excellence is achieved, equality is a chimera. In terms of order of priority, [33] argued that indeed, equality is a significant one, but simply a lay-bye along the way toward self-actualization. Equity would occur when each individual's specific educational needs were met, and the individual could progress as far as his or her abilities allowed. In this sense it has been argued that the achievement of equality, in and of itself, turns out to be a pyrrhic victory, a triumph without benefit to the winners [33]. This paper shares the view that educational equity, means providing children, and especially poor children, with excellence—excellent instruction, excellent curricula, excellent teachers, excellent tutoring, excellent enrichment [61]. For high-potential children from underrepresented groups in particular, it means identifying their talent early, cultivating it through gifted-and-talented programs and keeping them on a trajectory of high achievement all the way through high school and beyond. Failure to perceive that metaphysical equality exists in subordination to excellence results in what [62] calls a counterfeit egalitarianism. The view that equality exists in subordination to excellence suggests that once excellence has been achieved or every child has been enabled to achieve his or her full potential, then equity follows through smoothly and without any effort, yet the reverse order is not true because equity without excellence produces mediocrity, which denies students the equity that we all aspire to [17]. The writer [33] therefore concluded that equality takes precedence over excellence temporally, (which according to Aristotle is *hedonic* happiness) but excellence takes precedence over

equality permanently, as it is the achievement of liberty that alone gives value to freedom or equity, (which according to Aristotle is *eudemonic* happiness).

2.6. How does the natural law theory explain the mathematics crisis

From a natural law perspective, this paper argues that one can explain the problem of continued poor performance in mathematics as well as the consequences suffered thereof. In terms of explaining the persistence of the problem, we note that stakeholders describe the education in South Africa as having improved in recent years, with higher enrollment rates, higher attainment rates, better pass rates, and improved literacy. However, in terms of the natural law theory, we argue that this is not consistent with the sustainable education that is premised on the view of enabling students to achieve their maximum potential. If students are not enabled to reach their full potential, then neither equity nor sustainable development has been achieved. Natural law's focus on equity as the highest good has the capacity to provide sensible tools and frameworks within which literacy, competencies, and other educational aspects might be appropriately conceptualized and evaluated against SDG4. Through the natural law theory there is also evidence of an ill-ordered way of choosing pleasure. This is evident in that stakeholders are (a) claiming success of the education system based on access rates which ignore drop-out rates higher than 50% for every cohort since 1994; (b) allowing the protection of incompetent teachers by unions despite earlier research showing that 79% of Grade 6 mathematics teachers could not pass tests aimed at their Grade 6 students; (c) in celebratory mood over improved university enrollments yet a recent 2022 assessment of primary school mathematics teachers showed that first-year B. Ed students across three universities scored 52% on a primary school maths test and final-year B. Ed students scored 54%; (d) describing international progress based on lowered benchmarks [below 400] on the international competitions instead of allowing students to compete with their peers at the same internationally set standards; (e) continuing to field year-older students on the international competitions instead of fielding same age students; (f) describing education as a system on the rise using national pass rates based on exceedingly low bars instead of top-end performances that empower students going further.

In all this, one could also see how stakeholders are violating natural law because by nature, we do not improve learner performance by lowering standards, nor do we do so by protecting incompetent teachers. These decisions suggest that authorities are pursuing a short-term good/happiness rather than a long-term moral good/true happiness in accordance with nature. This provides the nation with temporary happiness instead of true happiness which according to Aristotle is *hedonic* happiness instead of *eudemonic* happiness. Similarly, Locke states that the kinds of pleasures that we experience in connection to such temporary pleasure are ephemeral and not representative of complete happiness.

In terms of consequences of violating the natural law; contrary to the perception that natural law is a mere abstraction without practical consequences, [52] says the features of the law of nature can be discovered by anyone who is diligent about directing their mind to them, and can be concealed from no one "unless he loves blindness and darkness and casts off nature in order that he may avoid his duty".

Several theorists confirm that the natural law is a mandatory rule of action which has a profound influence on the life of every living person. For example, [37] notes that he is not the first theorist to write on natural punishment citing others such as Immanuel Kant, John Locke, Jacques Derrida, and Doug Husak just to name a few. Similarly, the mere fact that the United Nations General Assembly endorsed the concept of crime against humanity (CAH) in 1946 bears testimony to a global recognition of violation of natural law and its punishment. However, the endorsement of a crime against humanity by the UN comes long after a nation has suffered natural punishment and in most cases the suffering is never recognized as a CAH. Hence critics warn that unlike genocide and war crimes, which have been widely recognized and prohibited in international criminal law since the establishment of the Nuremberg principles, there is a need for comprehensive attention to crimes against humanity which are continuously perpetrated worldwide in numerous conflicts and crises. At the latest UN Security Council meeting in 2023, the secretary general acknowledged these crimes and noted with concern that six out of seven countries worldwide are plagued by feelings of insecurity and 2 billion people live in places affected by such conflicts. The secretary stressed that there was only one route to durable peace—the route of sustainable development.

In order to see how education is central to all these problems born of violation of natural law in South Africa, let us start by asking for the purpose of education. From education experts three main goals tend to stand out: (a) to prepare individuals to be active citizens in their communities and foster social cohesion; (b) to facilitate the acquisition of knowledge and skills necessary for the economy and, ultimately, to a society's development; (c) to build an individual's identity and autonomy and enable them to exercise their freedom. The passport to your future," "the most powerful weapon," "the key to unlocking the world"—these are just a few of the many ways education has been described. The reader could easily notice the links between the educational goals and Aristotle's concept of *eudemonic happiness.* From the very first philosophers of education, happiness was one of the central aims of education and to date happiness is closely related to education, which is often portrayed as one of the key (direct or indirect) aims of education. Yet the latest World Happiness Report places South Africa in the bottom 6 out of 36 sub-Saharan countries and 106 out of 149 countries globally [63]. Studies have shown that happiness can promote socially desirable behaviors, and these socially desirable behaviors continue to be revered to date given that education is described as the process of bringing desirable changes into the behavior of human beings. On the other hand, lack of happiness or stress promotes socially undesirable behaviors. For example, [64] identified stress as one of the drivers of learner aggression in South African schools. There is also a societal component to stress as well since the quality of society is determined by the quality of its citizens and when individual citizens of society are stressed, one can say that the "collective consciousness" is characterized by stress. Just as individual stress has been scientifically linked to a wide range of diseases, similarly, epidemic levels of societal stress have been linked to the widespread rise of social disorders: Crime, drug abuse, family disintegration, domestic violence, and the decline of moral and social values. For example, South Africa has a high crime rate, with a crime index of 75.4 in 2024. It is considered the most dangerous country in Africa and the fifth most dangerous in

the world. In 2022 the murder rate was 45.53 per 100,000 people, the fourth highest in the world, according to the United Nations Office for Drugs & Crime (UNODC). This rising stress, in turn, contributes to further violations of natural law by the individual and society and in South Africa it has eroded academic outcomes, increased drug usage, and raised juvenile crime and violence, particularly in the higher education institutions, to record levels.

2.7. Implications of the natural law theory for gifted education

In order to understand the implications of Aristotle's natural law theory for gifted education and sustainable development, it is important to note his original idea of functionings and capability; defined as "the commodities over which a person can establish her ownership and command". According to Aristotle, the best political arrangement is that according to which anyone whatsoever might do their best and live a flourishing life (*zoie makarios*). In this regard it is useful to look at the contribution of education to enable individuals to function as equal democratic citizens when conducting their lives in modern societies. The relation between the capability perspective and education is acknowledged in the 2002 UNESCO Report "Education for all"—where sustainable education for sustainable development is premised on the view that people are a creative resource, and this creativity is an asset societies must tap. To nurture and enhance that asset, education must be provided to help students become more capable and creative, skillful, productive, and better able to deal with day-to-day problems. Researchers who have applied the capability approach to educational settings identified two groups of inputs or conversion factors, some of which are internal to the student while others are external. The conversion argument says that the importance of primary goods or resources [external conversion factors] is derivative on the individual capability [internal conversion factors] to convert them into valued functionings, suggesting that educational outcomes are not homogenous but depend on the student's potential and motivation. The recommendation from such studies is that there is a critical component of our capability that the system has neglected for decades—the gifted learners who have the potential to become the scientists and engineers that are needed in the KBE.

The last question of this paper has to do with the need to suggest the way forward in terms of addressing the South African mathematics crisis. The [65] report captures the importance very well through this metaphor: *If your bicycle tire has a hole, pumping in more air will not do much good. This is not because you do not need air in the tire; it is because you must fix the hole first and then add the air. Pumping more books, more teachers, or more training into existing systems is just a palliative measure.* So how does this paper propose to fix the holes in the South African mathematics crisis.

We have seen how excellence takes precedence over equity but how is excellence achieved? Locke points to a basic principle of human development that something less perfect cannot bring more perfect things into existence. "The blind leading the blind" is an idiom that describes a situation where someone who is not knowledgeable about a subject is giving advice or help to another person who is also not knowledgeable about the subject. For time immemorial, human development of any form has

proceeded on the fundamental basis of a critical mass of more knowledgeable others (excellence) imparting knowledge or skills to mentees, trainees, or students. Similarly, in Aristotle's philosophy, the Greek word (sophos), 'a wise man' is related to the noun, (sophia), 'wisdom' which commonly referred to an expert in his profession or craft. Charioteers, sculptors, or military experts could be referred to as (sophoi) in their occupations and in **Figure 3**, we provide an example of how gifted people or excellence are used in any form of human development to create a chain of knowledge transfer within an organization or society.

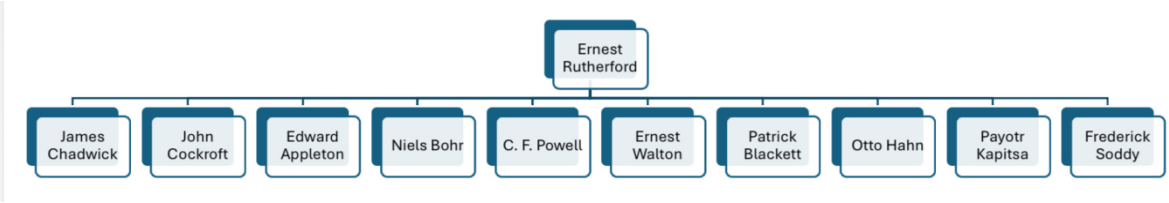

Figure 3. A tree diagram showing Ernest Rutherford and his Nobel Laureates [own compilation].

We use Ernest Rutherford (ER) who won the Nobel Prize for chemistry in 1908 and who is among the greatest scientists in history. He also made an outstanding contribution by producing 11 Nobel Laureates under his supervision as shown in **Figure 3**. Besides the 11 Nobel Laureates, Rutherford supervised many other students whose performances are not on record. However, assuming each of the Nobel Laureates together with the other students produced the same number of such scientists one can see how quickly equity in education would be achieved through excellence. This is what drove [66] in all his work on intelligence way back in the 19th century. He emphasized that research in gifted education should be a human endeavor worth pursuing—because excellence for some translates into equity for all.

3. Conclusion

This paper has argued through the natural law theory that excellence precedes and is therefore an antidote for equity. Natural law defines this equity more precisely as achieving the highest good or excellence. In education, the natural law theory suggests that students' internal factors, such as their potential and motivation, must be prioritized before external resources are provided because education must enable the achievement of people's full potential. In this regard, gifted education should form part of a sustainable development agenda for any country. Hence viewing gifted education as elitist is detrimental to achieving sustainable education, especially in the mathematical sciences.

In terms of practice, the natural law suggests that excellence for some is the route to achieving equity for all. In South Africa, the founding rationale of the Dinaledi or 'star' schools was to enable a nucleus of well-functioning schools to act as mentor-trainers of neighboring schools and to allow them to follow suit [67]. A synonym for mentor is a 'wise man' denoting someone who has a higher level of knowledge than the other (mentee) and here is a clear admission on the department of education that excellence for some should come before equity for all. In fact, [68] warned that in education elevating equity over excellence as a matter of principle was not

implementable because by definition, a critical mass of people with higher levels of knowledge and skill (excellence) are needed to educate others. That the country allows the teachers union to protect teachers who failed a test meant for their Grade 6 students is in itself self-destructive because the more numerous and proficient (excellent) the trainers/mentors/teachers are, the more rapidly equity can be achieved for the population at large. In fact, [69] emphasizes that point through an analogy wherein mathematical science interventions in the absence of knowledgeable others are likened to accelerating a car through wheel-spinning mud, lacking the essential element that provides the traction needed to make them effective. In fact, there is evidence to show that gifted education is what lifted Singapore's standards, given that the country's vision was to build an inclusive society with many peaks of excellence [70]. The take-home and crucial point in this paper is that instead of equity for all coming before excellence for some, it must be excellence for some coming before equity for all; otherwise, equity would never be achievable in South Africa and many other countries with similar challenges.

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