



## **Instituting Dynamics and Practical Experiences in K-12 Education in Underdeveloped Regions: Redefinition, Augmentation, and Diversification of Teaching Qualification to Promote Equitable Educational Access**

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### **Abstract**

Sustainable Development Goals 4.c calls for sustainably supplying abundant and sufficient qualified educators. However, longitudinal studies have shown that teacher attrition has become a central issue in maintaining and recruiting qualified and talented individuals to join the industry. Many attributes contribute to the issue, while specific causes, such as the gaps in the support they need and the average payment teachers get, have lagged the sustainably delivering qualified teachers. Moreover, this issue causes more significant damage considering the disproportional distribution of educational resources, disadvantaging the underrepresented and underprivileged communities.

There are two routes to diminishing the effect and solving the problem: maintaining existing human resources and developing new sources to train and afford instructors. This paper focuses on the latter part of the solution and calls for the reconstruction of teaching qualification programs that many states and educational organizations have developed. In conjunction with Robert Sternberg's Successful Intelligence Theory, this paper analyzes the educational implication of the modification from the perspectives of students' motivation, practical and creative skills development, injecting real-world experiences in classrooms, and creating an environment that enables students to have higher exposure to practical problems. This paper further discusses how the redefined teaching qualification promotes more equitable educational access taking into consideration of the local situation, and how such a model has expansive application around the globe.

**Keywords:** Teaching qualification, professional education, educational access, and K-12 education

### **Introduction**

The 17 objectives in the Sustainable Development Goals (SDGs) network, passed by the United National General Assembly in 2015, is a "blueprint to achieve a better and more sustainable future for all" (United Nations General Assembly, 2017). Goal 4 concentrates on quality education, advocating equitable educational access, and promoting elimination in education. Goal 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (National Educational Foundation, 2017). The Sustainable Development Goals 4.c. urges to "substantially increase the supply of qualified teachers" by 2030 (United Nations Department of

Economic and Social Affairs: Sustainable Development, 2022). Teachers' education level is one of the essential indicators of their qualification in implying their career readiness (United Nations Statistics Division Development Data and Outreach Branch, 2022). Many institutes and governments recognize the significance of the goal and configure policies and budgets to improve their educational conditions, educational access, and educational quality. However, the development has an unbalanced reality in terms of regional differences, urban-rural distinctions, and continental discrepancies.

The unbalanced nature of educational resources has a strong regional character. Some states and regions have developed a systematic approach to recruiting educators, while others struggle to maintain the necessities. This issue is particularly prominent in less developed areas, such as underrepresented communities, where it is difficult to recruit qualified educators with the indicated requirements. It becomes more troubling and worrying when those institutes are less well-funded and supported. The school administrations need to tackle additional issues, such as infrastructural and financial problems, while maintaining the basic functionality of a school, such as ensuring students' attendance and maintaining courses offered that meet the minimum requirements of the state legislation, such as literature, sciences, and mathematics. This further aggregate the already severe educational issues, particularly hurting the existed lopsided representation of female and gender minorities, as well as racial minorities in the educational system (Paranjape, 2007; Anderson and London, 1985; Lawton, 1973; Rury and Akaba, 2014; Loeb, Kalogrides, and Horng, 2010).

### **Research Purpose**

Limitation of educational access is a direct consequence of lacking teacher resources, worsening the attendance rate, educational quality, and student accomplishment in those nations (Deming and Figlio, 2016; Townsend et al., 2012). To tackle such a problem, countries around the globe have developed programs and approaches to endorse teachers before penetrating the profession, particularly at the K-12 level. The credentials are granted with either degree in education, completion of the training program, or record on the certification test. Nevertheless, even with constant effort in amending these programs to grant talented individuals into the educational industries maximally, teacher attrition is still a prominent issue troubling many states and their educational systems.

Teacher attrition is one of the predominant motivations for the alternation and adjustments of the current certification programs (Zhang and Zeller, 2016). Specifically, this program is particularly harmful in less developed and underrepresented communities due to the scarcity in the net sum and uneven distribution of educational resources (Ingersoll, 2004; Marilyn et al., 2011). It is more challenging for schools in those communities to attract newly qualified teachers already, and those schools are losing their current serving members. For example, in Illinois, U.S.A. alone, there are 4120.7 unfilled positions in its public-school education system, including 1703.6 teaching positions, 1242.9 paraprofessional positions, and 974.4 supporting jobs. This data only counts the officially reported state-owned public schools, and all the unfilled educational positions state-wide will be significantly more significant than the statistics provided. Among these unfilled

positions, concentrating only on Cook County, there are 2173.0 positions unfilled, and 702.9 of them are teaching positions (Illinois State Board of Education, 2021). This further illustrates the seriousness of the lack of human resources in the education system and the unbalanced distribution of educational resources.

In recent years during the pandemic, most elementary and secondary schools seek alternations to the traditional instructional structures, modifying their instructional methods from the traditional in-person instruction to either a hybrid structure or entirely online. Many professional development workshops and educational events are canceled due to health concerns. Consequences in educational resources and human resources are sources of concern. Though there has not been data supporting a significant change in teachers' turnover rate, surveys decide that teachers are more stressed during the pandemic due to the challenges in conducting teaching exercises (Theobald et al., 2020). There has been a 1% increase in both teachers' turnover rate and teachers' mobility rate in comparison to the pre-pandemic era, though it is within the rate collected in the pre-pandemic years (Goldhaber and Theobald, 2022). It is worth noting that the full impact of the pandemic may not be fully illustrated. The long-term effect of the drastic change might not unravel until later in the decade, and longitudinal research and studies are required to fully understand the impact of the pandemic caused on teacher attrition.

### **Teachers' Qualification: Criterion and Certifications**

To determine the jurisdiction of teaching qualifications, state governments, educational organizations, and higher educational institutes have developed their systems in filtering teaching qualifications and identity if one's background is strong enough to instruct in public schools and other academies. For example, in the United Kingdom, particularly England, qualifies teacher status (QTS) is the government-recognized teaching qualification. There are several paths that one can take in order to be granted such qualification, including Postgraduate Certificate in Education (PGCE), Diploma in Education and Training (DET), School-Centered Initial Teacher Training (SCITT), and Graduate Teacher Program (GTP). Similar programs are adopted in other supernational organizations, states, provinces, and organizations, such as the United States and the European Union.

In addition to the state-recognized qualification, other professional qualifications are developed for special groups of teachers in particular subject areas, such as certificates of Teaching English as Foreign Language, Teaching English as Secondary Language, and Teaching English to Speakers of Other Languages. Furthermore, higher educational institutes and educational organizations usually offer professional development opportunities. These programs are usually designed for K-12 and higher education teachers to enrich their theoretical knowledge in a particular subject while connecting to their practical experience of daily instruction.

Degree programs in education are standard in most countries. There exist several levels of associate and academic degrees that higher education institutes offer. The most common academic degree in education includes bachelor's degrees in education, master of sciences in education, master of arts in education, master of education, doctor of philosophy in education,

and doctor of education. The specifics of the degrees vary from country to country and from college to college. Many graduate-level degrees usually concentrate on one particular aspect of education, such as educational psychology, education technologies, and educational leadership, and degrees focus on particular subjects of teaching and specific level of education.

### **Redefinition of Teaching Qualification: A Relative Approach**

These programs may be effective in authorizing teaching lenience but not sustainability. According to a report issued by Regional Educational Laboratory Mid-Atlantic, 25% of teachers resigned from their school annually, 77% of teachers quit the profession within their first five years of entrance, and the turnover rate was the highest among middle school teachers from 2010 to 2016 (Dillon & Malick, 2020). In addition, research has captured a decreasing trend in the number of teaching candidates in comparison to a few decades ago. “Enrollment in teacher preparation remains near historic lows. Despite a 10% increase in teacher preparation enrollments between 2013–14 and 2014–15, the number of teaching candidates enrolled in 2014–15 was just one-quarter of the number enrolled in 2001–02” (Thomas and Hammond, 2016). This is not a coincidental discovery but a trend that has been observed during extended periods of studies.

This issue has become especially serious in recent years when the accumulated effect of teacher attrition has become a national-wide issue in the United States. The issue has become a central topic of concern in recent years. On top of the lack of reserved qualified teachers and teaching candidates, the unfilled positions are disadvantaging the underprivileged populations because “these teachers were disproportionately assigned to high-minority, high-poverty schools” (Darling-Hammond, 2003). The more severe impact on the underrepresented makes it more challenging to ensure equitable educational access and quality education. This problem also aggregates the lack of racial minorities and female students in certain subjects in higher education, such as science, engineering, and mathematics. Without proper guidance and support from teachers, these subjects are difficult to approach due to the nature of the subjects and the concrete materials needed before entering more advanced studies.

Many causes could attribute and contribute to the abovementioned phenomenon. Due to the complexity of the question, it is impossible to provide an exhausting list of reasons behind the scenes, and therefore, challenging to find efficacious solutions to such a problem. However, there are specific reasons that have been discussed in previous works, such as the gap between the expectations for teachers and the support they obtain and low payments (Rademacher and Eggers, 2017). In fact, in certain areas of the United States, public school, elementary, and secondary school teachers are paid 14.0% less than a decade before based on their inflation-adjusted income (National Education Association, 2021; National Education Association, 2020, National Education Association, 2018).

Conducted by U.S. Census Bureau, the Current Population Survey Annual Social and Economic Supplements (CPS ASEC) found that “median household income was \$67,521 in 2020, and \$69,560 in 2019, and median earnings of men is \$61,417 and \$50,982 for women who worked full-time” (Shrider et al., 2020; Irwin et al., 2021). A report on the Condition of Education 2021

conducted by the Institute of Education Science under the U.S. Department of Education determined that the average income for public school teachers who has less than ten years of teaching experience is less than \$50,000, which is remotely below the average. Only the instructors who have worked in a school for more than 20 years meet is above the median household income.

This is a direct indication that schoolteachers are earning significantly less than their peers working in industries regardless of other dissatisfactions reported by both parties, which signifies that it is more challenging for teachers to support their families financially than an average salary person. Despite its undeniable contribution of the occupation to the world, many talented individuals quit their job due to financial considerations. It is worth noting that this is only a limited analysis of this issue, and the data only refers to the situations in the United States. Other states and regions may have unique and distinct issues regarding human resources in education.

The deep reasons teachers quit their jobs are complicated and can be attributed to variegated causes. Studies on horizontal compactions or case studies on this topic could help elaborate on the explanation and discover the underlying justifications. These studies could be valuable in solving the issue of sustaining talented individuals in the educational systems. Regardless of the causes, the significant percentage of teachers leaving their jobs or mobilizing between institutes is surprising, while significant indicators signifying the inefficient utilization of educational resources in training and certifying individuals, where under a quarter of educational funding and other materials in human resource development are applied effectively to produce sustainable outcomes, notwithstanding the progressive upsurge in the education funding in many countries. Due to the complexity of the issue, it is hard to develop an exhausted list of attributions for the issue, while it is certain that the current system of recruiting educators could be optimized and potentially reduce the administrative costs on the related issues.

On the other hand, by setting up a systematic approach to training teachers in mostly lecture-discussion settings or the professional qualification program, the system declines those who are not weaponed with the certifications. In particular, these programs reject a wide range of talented individuals with professional or industrial experience entering the field and inspire young citizens to pursue and explore the related subjects, primarily abstract and creative ones. This mainly refers to applied subjects, such as engineering, technologies, sciences, as well as performative and visual arts. Moreover, with industry and professional backgrounds, instructors can relate their practical experience in the educational setting to set up real-world motivating cases where students can learn factual knowledge in addition to transferable skills and reasoning capabilities that they may apply in the future career and academic world.

In addition, educational background alone does not comprehensively reflect one's ability to deliver content for the pupils, especially taking practical and creative skills into the equation. For example, classically trained instructors might incorporate the educational theories they learned in the universities and training programs into their classrooms, and many of the techniques have pedagogical benefits. The method is instructional, but it might not reflect practical worlds where students can share and be motivated to investigate. Therefore, even though these materials might

be educationally significant, failing to appeal to students may create deeper motivational problems that have long-term effects while failing to facilitate learning and encouraging individuals to become lifelong learners in the long run, which is one of the core aims for Goal 4.

Therefore, a generalized inclusive definition of teaching qualifications is urgent for facilitating students' learning experience in many levels of K-12 education, where the goal is to cultivate students learning habits, introduce students to the general concepts in the subject, and facilitate the learning experience and motivation of the individuals in all grade levels, which inspire students to pursue a career or future education of the subject of their choice that they enjoy. This is especially important for junior and senior students who are preparing and deciding their post-secondary path, bridging the gap between high school curricula and higher educational ones, as well as the problems one might face in their work.

A relative approach is required for consideration to further increase the compatibility and accessibility of the redefined educational resources. The qualification of an educator should not be defined universally where a test or a degree sets the bar for every instructor through high-stakes tests, regardless of the local situation. In the area where educational resources are adequate, the qualification could be more rigorous, whereas, in those regions where only scarce resources exist, the qualification should be more adaptive and flexible and meet the minimum number of local requirements. Therefore, such a framework allows and encourages a more accessible and equitable distribution of human resources in education and promotes teachers to support those impoverished areas with urgent educational demands. Of course, this argument does not suggest that the teacher training program is unnecessary. On the contrary, it encourages more talented individuals to enter the industry and, therefore, could have a higher potential in pursuing higher training and education in the field, such as educational leadership, curriculum and instruction, educational technologies, and equity in education.

Such modification also provides students with the practical meaning of individual subjects that they will potentially pursue as a major or minor in future education, promoting a more eager, hungry, and diverse student body and representation in transition to higher and professional education, and consequently contributing to the academic world and industrial world in cultivation of educated scholars and well-trained skilled workers and innovators. This is particularly useful in fostering students' learning in junior or senior years when they are preparing for their future academic and careers and can be applied to facilitate students' skills and interest development in general. Furthermore, by implementing and incorporating real-life problems in an instructional setting, students can exercise their practical and creative skills, facilitating their success (Sternberg, 2016; Sternberg, 2018).

### **Reconstructing Teaching Certification in K-12 Systems**

As students continue their K-12 education, students will be increasingly exposed to a diverse range of concepts in an enlarging set of subjects. Students face major choices when they approach their senior year of high school: whether to pursue further education in higher education institutes to obtain a professional or academic degree on a specific subject or start their career

directly after graduation. In many countries, especially those with twelve years of compulsory school attendance laws, this is the first time the students will be able to make a significant decision that may alter their future life path (National Education Association State Education Practices, 2018). Students might have different considerations before reaching a conclusion, while regardless of their decision, one needs to determine the focus of their next step in life, namely, career path or academic concentration. According to John Dewey's pragmatist educational philosophy, which pinpoints personal experience as a primary factor for one to shape their reasons and decisions, the determination students will make by the end of their K-12 education will be heavily influenced by their learning experience and inspirations from their K-12 instructors and administrators (Backe, 1999).

In many cases, the comprehension of the general picture of a subject and their intuitive idea of preference is dependent on their experience in K-12 classrooms, particularly the ones in their junior and senior year of high school. More importantly, the K-12 years are precisely the times when students gain their psychological maturity and develop a set of critical thinking and learning skills, in addition to the formation of their understanding of the world in general. Therefore, it is imperative for K-12 educators to be encouraging, inspiring, motivating, and inviting.

Current K-12 education providers are initialized to be closely aligned with particular curricula, usually from state standards, Common Core State Standards Initiative, or educational organizations, such as A-level from Cambridge Assessment Group, Advanced Placement from College Board, and IB curricula. The curriculum is established at the school district level, supervised by the board of education and superintendent, and executed by academic principles and instructors. The curricula usually have their corresponding standardized exam in assessing the educational result, and the syllabus is designed closely to assist students in passing and achieving excellency in those exams. Consequently, instructors plan their lessons in close alignment with those syllabi and the exam criterion or the equivalent state-regulated high school graduation exams, such as HiSET, GED, and TASE (US HSE Credential) (ETS EİSET, 2022).

Many educators who are qualified to teach according to the regulations do not have extensive industrial experience, nor do they have extensive experience in academia. It is not to deny their potential in delivering inspiring lessons. However, the qualification programs do not necessarily reflect the reality of teaching and learning in the classroom setting, where teachers have complete control over their classroom in accordance with the school curriculum following the required syllabi. Therefore, without practical exposure themselves, it distances what students learn from what is useful in a real-life setting. Educational scholars recognize the seriousness of lacking practical knowledge in the currently imposed curricula, and therefore, many pedagogical attempts are made to bridge the gap between school and real-life, providing practical means for students to comprehend the subject. However, it has shown that this is not a trivial task, and a more expansive set of works are required in closing the expectation and the reality.

To tackle the fundamental issue in human resources, K-12 education should encourage more diverse intellectuals from various industrial and academic backgrounds, particularly in junior and senior years of high school, where students should be guided toward their future path, actuated

to discover a range of subjects from multiple angles through practical means. Notably, even though the high school courses are divided with clear boundaries and attributes, interdisciplinarity should be encouraged and promoted for connecting the discrete knowledge chains into a network, empowering students to develop an in-depth, comprehensive, connected, and practical understanding of the concept and the subject.

This is especially essential for more abstract subjects such as mathematics and sciences. Those subjects are not necessarily intuitive and, in many cases, hard to comprehend. Although these subjects are theoretically rigorous and abstract, they empower many real-life applications in economics, engineering, and manufacturing. Therefore, connecting theory to practice becomes essential for students to like, make sense of, and utilize the concepts in solving problems, concrete or abstract. Consequently, instructors can encourage more talented individuals, especially racial minorities and female students, to pursue further studies in the related areas.

### **Why It Matters: An Educational Analysis through Successful Intelligence Theory**

Before the multiple intelligence theory was developed, several cognitive psychologists, such as Jean Piaget, believed in a singular *g* factor to categorize human intellectual capabilities, viewing it as a unified, indivisible, singular general ability (Piaget, 1952; Piaget, 1970). On the other hand, studies found that human performance is vastly different when they approach different tasks (Lilienfeld et al., 2018). Leading scholars, such as Howard Gardner, captured this phenomenon and proposed another viewpoint in analyzing the essence of the same notion, arguing that a singular empirical function cannot capture all human cognitive capacities, which is later became known as the multiple intelligence theory (Gardner, 1975; Gardner, 1979; Gardner, 1982).

Multiple intelligence theory refuses the notion of treating human intelligence and proposes that there are methods that can differentiate intelligence into branches that categorize certain aspects of human ability (Gardner, 1983). For example, Howard Gardner suggests an eight-branches framework under the notion of multiple intelligence theory, categorizing human intelligence into Musical-rhythmic and harmonic, visual-spatial, linguistic-verbal, logical-mathematical, bodily-kinesthetic, interpersonal, intrapersonal, and naturalistic abilities (Lilinfeld et al., 2018). Following the multiple intelligence theory frameworks, Robert Sternberg proposed a novel theory called the triarchic theory of intelligence, which catalogs human intelligence into three parts.

The triarchic model of intelligence divides human intelligence into analytical, practical, and creative intelligences. Analytical intelligence refers to the abilities for one to reason, which is the abilities for one to excel in standardized tests and traditional intelligence quotient (IQ) tests (Hertzog, 2018). Practical intelligence is the ability of one to solve real-world problems, especially the ones in relation to human interaction. It is the ability for one to practice, implement, and execute (Sternberg, 2018). Creative intelligence is the ability of one “to create, invent, design, imagine, discover, explore and innovate” (Sternberg, 2018; Sternberg, 2005).

Sternberg believes the traditional IQ test fails to capture the essential skills that one needs to become successful and stresses the importance of the role practical and creative intelligence play

in one's academic and work performance (Sternberg, 1997; Grigorenko and Sternberg, 2016). The deeper reason is its failure to recognize the diverse nature of what intelligence is further than a unitary factor of consideration. The IQ tests also fail to examine skills in practical and creative domains, which is arguably more important than analytical skills, which is what those tests are concentrating on.

Sternberg later supplemented his theory of triarchic intelligence by considering the human-environmental factors and expanding it into what is known as the successful intelligence theory. In addition to the triarchic theory, the successful theory emphasizes how one's ability in adapting, modifying, and selecting the external environment can facilitate their success in the long run. The theory formalizes the three stages of environmental considerations: from adapting to the surroundings, making limited modifications, to selecting the optimal environment to work in (Sternberg, 1999; Sternberg, 2016; Sternberg, 2018).

Putting the abovementioned phenomenon into the perspective of multiple intelligence theory, particularly Sternberg's triarchic theory of intelligence, the syllabi focus primarily on analytical skills and content-based instruction is lack of practical and creative exposure, which are the essential skills and determining factors of one's success. By utilizing the background of instructors with academic or industrial experiences, teachers are able to provide more concrete examples with practical meanings that enable students to internalize the knowledge introduced in the classes into a practical setting and intrigue students' curiosity and interests in the related subject. On top of the skills, these experiences can also assist students in practicing environmental skills, including how to adapt themselves in applying the knowledge they have to diverse practical and working settings, how to modify their modalities to fit and maximize their performance throughout the work, and how to select the best environment that they can immerse in.

### **Facilitating Instructors and Students and Promoting Equitable Educational Access**

Admittedly, talents from the industry do not necessarily have experience teaching in schools or working with students, particularly at the K-12 level, and therefore is, lack theoretical exposure to the related notions and ideas in education, which is usually introduced in the programs toward an education degree, teaching qualification training programs, and practicums in higher educational institutes or educational organizations. This is a realistic concern and one of the primary justifications for the existing policies and regulations.

However, considering the expansive access to diverse educational content in various settings, including in-person workshops and online seminars, there are many approaches in which the talents could be educationally and psychologically prepared for the new occupation by introducing programs to facilitate teachers to master pedagogy, gain familiarity to the curriculum, practice design thinking, envisioning potential issues in education. Such programs include teaching preparation training, professional development workshop, and other supporting programs to best facilitate the success of the teachers and, therefore, the students. Specifically, professional development programs empowered by higher educational institutes are usually great sources in expanding the academic inventory of instructional theory and connecting to real-time practical

teaching scenarios. In addition, teachers can sign up for the courses and workshops that fit their personal experience the most, such as online and hybrid learning programs, educational technologies, instructional designs, and equity in education. Finally, it is also a good way for instructors to connect with like-minded fellows who may face similar issues in instructions.

The expansion in teaching qualifications by welcoming professionals with industry experience and academic experience without necessarily holding a degree in education or teaching certification is an excellent recommendation to encourage more talented individuals to enter classrooms, share their knowledge and skills with their students, and inspire the younger generations. Embracing the new members in the education team promotes more diverse perspectives in presenting the materials interactively and practically, encouraging meaningful and authentic learning, particularly in high school education. Inspiring students with real-world challenges under the project-based framework with edge-cutting problems in the industry correlates with the teaching materials could nurture all three aspects of intelligence according to Robert Sternberg's intelligence theory. This paper will discuss the educational and social implications of such change in conjunction with Sternberg's successful intelligence theory (Sternberg, 1999). This paper will analyze the significance and necessity of adopting such transformation in the globalized world. This paper will dissect the benefits and apply such theory in supporting the education of low socioeconomic communities and underrepresented communities. Finally, this paper will discuss why the all-embracing approach is necessary and suitable for further increasing the compatibility and accessibility of the redefined teaching qualification.

## **Conclusion**

Echoing the Sustainable Development Goals 4.c, focusing on providing equitable educational access through supplying qualified teachers in a sustainable way, this paper recognizes the significance of current issues in teacher attrition and challenges for schools, particularly public schools in underprivileged regions and communities to recruit adequate qualified teachers and sustaining their teacher resources. We analyzed a few essential reasons for the formation of such a phenomenon and proposed an extended definition of teaching qualification. The reconstruction of teaching qualifications not only provides schools more autonomy in designing a more suitable curriculum for their unique student bodies but offers an inclusive framework for viewing what the qualification means. Following the augmented version of certification, institutes and instructors will encourage greater exposure to a bigger picture than what is constrained by the syllabi and connect the real-world problems in the instructional materials.

This paper provides a theoretical framework for the reconstruction and diversification of teaching qualifications with justifications from the viewpoint of multiple intelligence theory, students' motivation, and online and hybrid learning environments. Under the framework of Sternberg's successful theory of intelligence, such modification will adjust the focus of instruction more toward the practical and creative side of the spectrum, which is the determining factor of one's success in academic and post-academic worlds. This will also cultivate students' capabilities in adapting, modifying, and selecting the external environment, which is an essential skill and can support students' success in post-secondary education.

Future works on horizontal comparison with quasi-experimental designs can be effective in quantifying the significance of the proposal, and case studies concerning schools that adopt the modified interpretation of qualification, concentrating more on the qualities of educators themselves, can be developed to qualitatively strengthen the scheme in defining the effects in a more narrative manner.

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