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Transformative STEAM Education as a Praxis-Driven Orientation

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ABSTRACT

This paper reflects my orientation on transformative STEAM educational theory and praxis in my doctoral research journey. It attempts to address the need for innovative approaches to transformative learning in response to the question—how are the agendas of the transformative praxis aligned with transformative STEAM education? Likewise, this paper brings the discourse of new approaches to transformative STEAM education by bridging the gap between philosophy, theory, and practice. Again, positing myself within critical social theories, transformative STEAM education is a host of the pedagogical engagements with theoretical roots in critical pedagogies and/or paradigms. The paper further highlights some of the ranges of theoretical perspectives, which are aligned with Habermas (1972), Freire (1996), Kincheloe et al. (2011), and Mezirow (1981, 1991, 2000, 2003) by challenging the standard normative ideological frameworks such as efficiency, effectiveness, and improvements. In this line, my notion of the transformative praxis covers the dimensions of the theory (e.g., explore), values (e.g., community values), and practices (e.g., capabilities and services). These dimensions representations pursue change while implementing culturally responsive pedagogies and addressing humanitarian crises. In this way, I tried to explain that, in the context of praxis-driven transformative STEAM education, praxis is the ego turning into itself, and practice is the ego turning to others. The paper landed by arguing the agendas of equity, empowerment, social justice, authentic learning, meaningful learning, meaning center learning, and humanizing education based on theoretical perspectives and critical pedagogies, considering the discourse of STEM metaphorically as "Avidya" and STEM with Kala as "Vidhya".

Keywords: Orientation, STEAM, ego, Avidya, Kala, Vidhya, praxis, practices.

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INTRODUCTION

This paper reflects my orientation towards transformative STEAM education and how these orientations contributed to my doctoral journey of being and becoming an informed, transformative educator with transformative sensibilities. In doing so, I reflected on how critical theory, values, and practices are linked to transformative STEAM education. This paper, in particular, focuses on how critical theories, values, and practices that are aligned to informing, reforming and transforming educational practices (e.g., equity, empowerment, social justice, authentic learning, meaningful learning, meaning center learning, and humanizing education) by incorporating the 3Hs—hands-on, heads-on, and hearts-on learning (Inan & Inan, 2015). The practical application of these ideas is the need for 21st-century education at the school level in general and the university level in particular.

This paper further examines my transformative STEAM educational journey's dissemination, perspectives, and impact, focusing on active engagement in teaching and learning STEAM disciplines—curriculum and standards. It also provides an opportunity to reflect on STEM and STEAM education by highlighting the need for praxis-driven orientations. Reflecting on the research process, on the other hand, allowed me to distinguish between STEM and STEM with *Kala* (i.e., the Arts) within transformative STEAM education. I have used the metaphors of STEM as "*Avidya*" and STEM with *Kala* (i.e., the arts) as "*Vidhya*", both of which have transformative intents. This intent offers the *Kala* do have the power of world-saving abilities (Ebrahimzada, 2019).

Avidya and *Vidhya* discourses also assisted me in clearly reflecting the "what, who, and how" notion of transformative STEAM education. For instance, I consider my understanding of *Apara Vidya* and *Para Vidya*, as found in the Upanishads, to be the only worthwhile knowledge that allows me to reflect on the dialectical relationship between praxis and practice. Wherein *Apara Vidya* is a lower level of knowledge that encompasses all empirical and objective information. It is based on the intellect and senses, which confine it to a finite world. The higher knowledge of the *Atma* or *Brahman* is known as *Para Vidya*. It is not the subjective perception of ideas and feelings that frees us from ignorance and leads us to God-realization. With the above, i argued in the final section of this paper that praxis is the ego turning in on itself, while practice is the ego turning out on others. These egos, practices, experience, discourse, and metaphorical considerations of STEM as "*Avidya*" and STEM with *Kala* as a "*Vidhya*" have helped me better understand transformative STEAM education.

Transformative Education and Research: Some Considerations

In this section, I have attempted to reflect on my understating of transformative education and research. Broadly transformative education is aligned with Freire's (1972) critical pedagogy and Mezirow's (1996) concept of transformative education. In recent times, various strands have taken transformative education as theoretical referents. These strands are generally aligned with the critical pedagogy and transformative education itself. Some

strands are emancipatory, critical reflexive, developmental, and extra-relational (Drikx, 1998).

The emancipatory strand of transformative education is rooted in Freire (1972) and/or Habermas (1972), wherein consciousness-raising via critical reflection. Critical reflection attempts to shift thoughts, feelings, actions, and consciousness. These processes alter our ways of seeing and being in the world. The critical-reflexive strand of transformative education aligns with Mezirow's (1996) concepts of meaning schemes, meaning perspective, and transformations. The developmental and extra-relational strand of transformative education is associated with holism and intuition, considering less reflectivity and rationality.

More so, based on Freire's (1972) critical pedagogy, transformative education is viewed as a process of developing students' critical awareness of themselves and their environments. My experiences showcase that the critical pedagogy of Freire (1989) offered me to exercise the power of learning. These learnings are shifted from teacher to student center learning by offering opportunities for empowerment via their self-learning.

Likewise, Mezirow's (1996) definitional concept of transformative education is based on living and possible ways to improve human existence and life. Simply said, a shift in our consciousness will alter our ways of being and experiencing the world pertaining to the intent of transformative education. Undoubtedly, Mezirow's (1996) transformative learning is considered as a learning process to construct a new or revised meaning of the phenomenon to act in the future.

Different Nepali researchers have offered various approaches aligned with transformative educational research. Some of them in our context are Luitel (2009), Dahal (2013), Pant (2016), Shrestha (2018), Manandhar (2021), and Aryal (2021), to name a few. These approaches do have a significant association with transformative intents. Likewise, their research projects suggest that critical and creative research will lead to flourishing human actions and critical consciousness. In this line, Titchen and McCormack (2010, p. 5) suggested that critical social science involves "deconstructing a political, social, historical, and cultural environment, situation, crisis, conflict, or challenge, then reconstructing it to produce a new understanding for the goals of practicing transformation and the development of ever-evolving knowledge." In this line, transformative educational research challenges individual change by creating the spaces of the created knowledge about the change. Consequently, the quest for transformation engages the researchers to shift consciousness and/or profound learning experiences (Sterling, 2003). Hence, transformative STEAM education is an educational approach that focuses on an action-oriented process of learning that gives rise to consciousness. This consciousness covers the notion of emancipatory, critical reflexive, developmental, and extra-relational.

Entry with STEAM Education

It could be any day in October 2020. I got the opportunity to share my initial ideas on STEAM education at The Ninth Appalachian Ohio Mathematics & Science Teaching Research Symposium organized by Ohio University, USA. I shared my praxis and practice aligned with STEAM education that might provide the platform to help 21st-century learners explore the various dynamics of STEAM education. Likewise, my orientation promotes learning to be aware of continuous personal and professional development rather than a culture of competition. My normative definitional sharing at the symposium was that the purpose of teaching STEAM education is not merely to produce new teachers but also to produce highly skilled professionals who can do something miraculous for this world via research and innovation. Next, STEAM education is a new interdisciplinary curricular approach that aims to create unique and powerful synergies between the arts and STEM fields in order to educate the whole person (Taylor, 2015). Further, STEAM education is an interdisciplinary approach to learning that encourages learners to incorporate creativity into their technical knowledge for solving curriculum issues in general and global crises in particular. I reflected that the symposium enabled me to identify the purpose of teaching and learning in STEAM disciplines, thereby providing critical awareness of current educational practices.

Similarly, in the middle of June 2019, I presented the paper that brings the discourse of STEAM education into the mainstream of the Nepali existing education system. The presentation was guided by the questions such as what the transformative STEAM education shall be? What are the roles of the educational institutions and other stakeholders? as initiation as a STEAM Education scholar at the Second International Conference on Applications of Mathematics to Nonlinear Sciences (AMNS-2019). Some of the reasonable criticisms that got the room for discussion in the presentation were mainly one-size-fits-all approaches to educational practices. It occurred to me as I looked at my work as a researcher that I had produced a number of STEAM projects that accurately and meaningfully integrated topic areas in order to address real-world problems in mathematics. I shared my views, perspectives, ideas, thoughts, and research, and these are some platforms that give rise to conceptualized transformative STEAM education. The sharing has allowed me to conceptualize and present concrete examples of innovative models and curricula that have been conceptualized and integrated in a meaningful way. These processes have created a need for transformative STEAM education to a certain degree. This opportunity allowed me to investigate some STEAM-related tips and resources.

During the study, as learning is a continuous lifelong process, I got the opportunity to study relevant literature regarding STEM and STEAM educational trends in my doctoral engagement in the coursework. These engagements, which have theoretical roots in critical social theories and a focus on integrating hands-on, heads-on, and hearts-on learning, have enabled me to gain a more in-depth, intrinsically motivated understanding of STEAM education by guiding learners' knowledge, skills, inquiry, and appreciation as lifelong learning processes. As a result, the MPhil and Ph.D. courses like Lenses of STEAM Education, Teaching and Learning in STEAM education, Curricula in STEAM education

(to name but a few), and various online/offline teacher training, workshops, and seminars are milestones for me to conceptualize transformative STEAM education further.

Re-Entry with STEAM Education

As I re-enter the ethos of STEAM education, I attempt to review some of the literature associated with my orientation toward transformative STEAM education. The review aims to help me understand the goals of STEAM education in general and transformative STEAM education in particular. Some of the definitional frameworks or approaches of STEAM education include, "STEAM education is ways of learning as access points for guiding student inquiry, dialogue, and critical thinking" (Guyotte, 2020, as cited in Institute for Arts Integration and STEAM, 2020, para. 1). This definitional framework is an access point for guiding learners' dialogue, inquiry, and creative and critical thinking. But how to drive the learners to excel in those skills is the central concern of transformative STEAM education.

Likewise, "STEAM is a method of teaching that encourages students to become lifelong learners who are always on the lookout for new and innovative ways to solve challenges they encounter in the real world" (Bauld, 2022, p. 1). The above view aligns with empowering the students to seek the unique and creative solutions that will be useful for developing hard and soft skills to succeed in their careers, but the central question arises: how to empower students with such skills? What sort of frameworks or approaches are required for the students? These pertaining questions offer and seek the need for practice-driven orientations in STEAM education. While with the help of the arts in STEM model, Wigmore (2020) stated that:

By combining art and design with traditional STEM subjects like science, technology, engineering, and mathematics (STEM), we call this method "STEAM." Any of the visual or performing arts can be incorporated into STEAM programs, such as dancing, design, painting, photography, and writing. (p. 1)

The above is some of the definitions of STEAM education and still seem incomplete in orienting towards a broad spectrum of transformative STEAM education. These definitional frameworks of STEAM education are insufficient unless it covers the broad area of transformative praxis-driven action and reflection aligned with the practices. The wide areas of STEAM education offer transformative intents—these transformative intents, including arts, that shall lead to continued innovative approaches for understanding STEM concepts. All of the above, Taylor (2016) considers five interconnected ways of knowing, in general, are "cultural self-knowing, relational knowing, critical knowing, visionary and ethical knowing, knowing in action" (p. 92) as the basis of transformative learning. Arriving at this stage, I reflected on the interconnected ways of knowing in my transformative journey to demystify the need for a soulful inquiry and praxis-driven action and reflection.

In addition, the existing educational practices seek competency-based orientation, approach, and discourse in 21st-century skills for teachers and students (Smyth, 2017). These approaches offer the shift to a multidisciplinary, interdisciplinary, and

transdisciplinary approach. Among the approaches, the transdisciplinary approach is vital in designing curriculum and implementing transdisciplinary-learning approaches in praxis-driven orientation. This process shall promote 21st-century skills in both teaching and learning. For this, teachers must possess some of the competencies such as "model social and/or critical learning theories through the curriculum development of real-world problem identification, classification, definition, and ultimately the solution" (Smyth, 2017, p. 65) by promoting trans-disciplinarity approaches. The host of transformative STEAM education is seeking beyond the boundaries from the disciplinary-specific subject-driven activity to the highly interactive processes of learning where the learners are the producers of new knowledge, and the facilitators are the interactive learning designers by nurturing the learners with 21st-century skills (Park & Son, 2010). Hence, this paper reflects the orientation of praxis and practices aligned with transformative STEAM education.

Transformative STEAM Education

In retrospect, transformation is all about the transformation processes. The transformation of these change processes into 21st-century educational leaders with a critical awareness is required. The transformation processes include transformation on one size fits all educational practices approaches and saving the existing global issues. Next, transformative teaching and learning are the main wheels of transformative education. Transformative education helps learners perceive the world through a unique and ethical perspective, challenging and changing the status quo as a change agent. These processes uphold the current power relations, in repose to the question, whose interests are being served? It promotes creativity and critical thinking skills that will allow learners to relate new knowledge to their own experiences when it comes to transformative STEAM education. It is toward the transformative philosophy of learning. The integration of arts into STEM disciplines is in the process of being developed to create powerful and inspiring interdisciplinary curriculum development spaces to design transformative learning experiences for all students. Through these activities, learners will be able to gain STEM disciplinary knowledge and skills and transdisciplinary abilities, ensuring that they take an active role in the learning process. More so, Taylor and Taylor (2019) offered views on education for sustainable development as:

Transformative approach to curriculum development that results in socially responsible STEM education. By integrating STEM and the arts, we can create interdisciplinary STEAM curriculum spaces for developing transformative pedagogies that help students develop their disciplinary knowledge/skills, awaken their creative self-awareness, enhance their moral/ethical and spiritual awareness, and empower them to practice environmentally responsible behavior. (p. 1)

Social responsibilities for globally sustainable STEAM education are another discourse of transformative STEAM education that might enable us to envision future perspectives on preparing young people's knowledge and skills. In the next section, I tried to clarify transformative learning further based on some social and critical theories.

Reflection on Theoretical Orientations

While reflecting the theoretical orientation primarily for myself as a researcher in various forms of the roles and responsibilities--change agent, researcher, advocate of transformative STEAM education, and open-minded person adopting a critical way of thinking. This section attempts to explain the need for being theoretically informed about the conditions and ongoing events in the educational setting, especially in transformative STEAM education. This can also be interpreted as a form of association between mutually agreeable ideas that have evolved. Following that, the theoretical foundations and underlying understandings differ between methodologies, methods, and practices. These distinctions highlight the importance of theories in improving current practices. Transformational learning theory is one of the concepts that has emerged as an educational technique for comprehending and cultivating transformative orientation on both an individual and social level. Thus, transformation is about the "reflections and action upon the world in order to transform it" (Freire, 1996, p. 36). The theoretical perspectives of transformative learning theory highlight some of the ranges of the theoretical orientation of Mezirow (1981, 1991, 2000, 2003), Habermas (1972), Freire (1996), and Kincheloe et al. (2011). More so, Mezirow (2003, pp. 58-59) describes transformative learning as "learning that transforms problematic frames of reference—sets of fixed assumptions and expectations (meaning perspectives and mindsets)— to make individuals more inclusive, discriminating, open, reflective, and emotionally adaptable". It is said that the central concept of transformative learning theory is to engage and be aware of the practitioners in critical reflection against their ongoing practices by challenging the ideas of structures of the meaning-making process. The concept of the structures of the meaning limits the practitioners in the frame of the reference. Thus, critical reflection in transformational STEAM education is the process of awareness of various ways of thinking and testing some of them via discourse and action. Critical dialectical discourses (Mezirow, 2003) also provide a transformative learning process related to the role and relevance of rational discourse.

Similarly, transformative learning theory is crucial for the transformative STEAM educator's continuing growth through critical reflection and professional development (Cranton et al., 2003), wherein transformative pedagogy combines educational philosophy, social constructivism, and critical pedagogy (to name). STEAM educators shall nurture the learners about the sociocultural issues to raise awareness of social ills. In doing so, STEAM educators showcase the high levels of reflections that focus on equity and diversity. Transformative professional development, in general, emphasizes a mindset shift toward inclusiveness and empowerment. Action plans, introspective exercises, and critical dialogues are some of the techniques for transformative professional growth in this area. The professional development process is undoubtedly unique and constantly changing (Mezirow, 1991). Creating and appropriating new, altered, and reflective interpretations of current meaning and behavior as part of the learning process in transformative STEAM education with transformative action and reflection is the process of developing and adopting new, altered, and reflective interpretations of previously established meaning and activity.

In the end, I believe that transformative STEAM education with a praxis orientation is based on a sociocultural approach and critical pedagogy that emphasizes personal empowerment and social transformation in developing researchers' and participants' identities (Freire, 1996). The STEAM educators are viewed as agents of social change by being aware of practices, social and political dimensions. Eventually, this process allows professionals, such as researchers, to awaken and interact in meaningful ways, progressing toward the non-contradictory meaning space known as conscientization (Freire, 1972). In my view, the above dimensions representations of transformative learning pursue change while implementing culturally responsible pedagogies and addressing humanitarian crises and issues of global sustainability.

Transformative Praxis: Theory, Values, and Practices

My understanding of transformative praxis is all about the change process of the practitioners. These change processes shall create nexus to the reflexive research and practices to raise the consciousness of the researchers and practitioners by embracing the critical stance of their ongoing research and practices. Luitel and Dahal (2020, p. 1) describe "transformative praxis as epistemology, theory, methodology, professional development, genres and logics, and empowerment." Different interpretations of transformational praxis refer to diverse ways of knowing, critical scholarship as a change agent, holistic meaning-making engagement, reflective engagement, autonomy, and accountability. These sensibilities offer multiple ways of doing, being, and valuing the notion of transformative STEAM education. Following a series of acts and critical reflections, the sensibilities process of praxis is used to enhance the awareness of researchers, participants, and performers (Maseko, 2018). This awareness could be helpful for understanding the processes and outcomes of practices and research. Ultimately, these opportunities offer the researchers and partitioners knowledge production through critical and reflective research and practices. The ethical and participatory engagements of the researchers and practitioners have multiple ways of meaning-making. However, my goal here is to cultivate critical consciousness. It necessitates a continuous commitment to a critical approach to study and practice in the interests of fairness, social justice, and inclusiveness. As a result, my perspective on transformational sensitivities is critical for questioning and scrutinizing my beliefs, assumptions, and behaviors. The activities might help improve the actions. These actions shall create unique systems and practices. More so, quality engagement with dialogue with the community of the STEAM group shall be the first step of the engagement for transformative praxis. In the next section, I tried to clarify praxis and practices further within the notion of transformative STEAM education.

Praxis: A Debate from within Transformative STEAM Education

Considering that learning is a continuous process from childhood to the end of life, I have been involved in various forms of learning in my learning and teaching journey. Those learnings sometimes require some form of the practical application of the learning process, whereas others require repetition (Arnold & Mundy, 2020). Both approaches have significance in improving my knowledge, skills, and competencies. Likewise, philosophically praxis is considered a synthesis of theory and practice. I conceptualized

transformative STEAM education as critical, reflective, investigative praxis. Praxis "involves the critical and inseparable meld of theory and practice" (Stewart, 2003, p. 4). On the contrary, practice is the repetition of activity with the vested interest to improve the skill.

While I viewed the notion of transformative STEAM education, the terms 'praxis' and 'practice' do have some forms of the ego to self and others. These egos have been in practice for informing, reforming, and transforming the research and practices of self and others. The ego is conscious thinking against the ongoing praxis/practice associated with theory and practice. In the discourse, Freire's central concept of praxis (Glass, 2001) adopts the dialectical association between consciousness and the world, which shall reflect the pedagogical approach (Mayo, 2020) of transformative STEAM education. However, critical pedagogy offers multiple forms of teaching philosophy of the egos by inviting transformative STEAM educators to critique the structure of existing research and practices (Chalaune, 2021).

The rising debate of the transformative STEAM educator on the ego do have multiple forms, such as the ego turns to self and others. Ego, to some extent, mediates part of the mental process among the conscious and the unconscious constructs. The constructs shall describe the mental process of activities and interactions. This process is also responsible for testing the reality by sensing the person's identity in general in transformative STEAM education and vice versa. Within the ego, praxis is oriented to the Habermasian (1972) notion of critical pedagogy that creates nexus between the researchers' and practitioners' transformative sensibilities via critical self-reflection, reflective practices, and investigative nature of the inquiry. Critical self-reflection is "the process of questioning one's assumption, presuppositions and meaning perspectives" (Dirkx et al., 2006, p. 2). This process critically reflects one's positioning, feelings, assumptions, and behaviors. Critical self-reflection oriented the transformative STEAM educators or the practitioners towards being conscious by analyzing and articulating their ongoing practices. This consciousness offers the transformative STEAM educators their sensations, existence, surroundings, and thoughts. This process alters the practitioners' continuous practices and makes them aware of their practices, feelings, thoughts, and emotions. In a nutshell, this process of praxis is likely to be the ego that turns to itself (Habermas, 1972) as a researcher and transformative STEAM educator.

On the contrary, practices are the unaware repetitions of the ego that shall transform to achieve some skills. Ultimately, praxis is the ego that turns into itself and practices as the ego that turns to others within the context of praxis-driven transformative STEAM education. Furthermore, in the next section, metaphorically, I attempt to explain the broad terms STEM and STEM with "*Kala*" that are associated with "*Avidy*ā" and *Vidhy*ā with the notion of transformative STEAM education.

STEM as "*Avidyā*" and STEM with the *Kala* as "*Vidhyā*"

In the previous sections, I reflected on how I entered the field of STEAM education and how I have conceptualized STEAM education by re-entering the discourse. Likewise, I have reflected on transformative STEAM education with the theoretical roots of critical social theories and critical pedagogy. In doing so, I attempt to blend transformative praxis as theory, values, and practices. While blending praxis and/or practices within transformative STEAM education, I offer the debate of praxis and practices. With the above discourse and debate, this section attempts to bring "*Kala*" in the form of arts while re-conceptualizing further STEM education. More so, the word *Kala* connotes magical and miraculous power, deception, and enticement.

The two broad concepts, *Avidyā* and *Vidhyā* do have significant associations while conceptualizing STEAM education. Both the words—*Avidyā* and *Vidhyā* are derived from the Sanskrit word. Among the various meanings of *Avidyā*, largely in the yogic sense, the literal meaning of Avidyā is all about "something that goes far beyond the ordinary ignorance" (Wirtz, 2021, p. 1). This ignorance leads to the *Avidyā* as fundamental blindness to the ongoing realities (Bhattacharyya, 1989). So, it is the form of an incorrect understanding of the subject. In this line, I consider *Avidya* as something that does not have *Kala*. Moreover, as illustrated in *Vedic* epistemologies, *Kala* is essential for exploring possibilities. Thus, STEM can be compared with *Avidya* as it is limited and lacks *Kala*, which is a basis for expansion and fullness in Vedic traditions. With *Kala* embedded in STEAM, it could be compared with *Vidhyā*. Here I am not using *Avidyā* and *Vidhyā* in a literal sense, as they could be used slightly differently in the religious domain.

All of the above, here, I have attempted to connect the terms 'STEM broadly' and 'STEM with *Kala* as STEAM' in the discourse of *Avidyā* and *Vidhyā*. The embodied epistemological meaning of *Avidyā* is all about beyond the ordinary ignorance as to the form of fundamental blindness of the ongoing realities and incorrect understandings of the subjects. This understanding is limited to finding the meaning of the subject and/or life. On the contrary, *Vidhyā* is some form of "knowledge", "clarity", or "higher learning" among the meanings that shall describe the knowledge. Knowledge in *Vidhyā* is the form of intellectual and spiritual or higher knowledge. This knowledge shall be obtained through intellectual and spiritual knowledge that might lead to enlightenment or wisdom. Opposite of the *Vidyā* is *Avidyā*, as *Avidyā* is the form of "misunderstanding" or "ignorance". In the following section, I attempt to connect the discourse of *Vidyā* and *Avidyā* in the mainstream of transformative STEAM education. Lower *Apara Vidya* is the knowledge recognized by the Upanishads, while higher *Para Vidya* is considered the only worthwhile knowledge. Lower knowledge includes all empirical and objective knowledge and is based on the intellect and senses. However, the higher knowledge is that of the *Atma* or *Brahman*, known as *Para Vidya*. It is not familiar with the outside world. It is also not the subjective perception of ideas and feelings that leads to the transformative STEAM educators conceptualizing STEAM education.

With the above consideration of forms of *Vidyā* (i.e., *Apara Vidya* and *Para Vidya*) and *Avidyā* within the various forms of epistemological meaning and understanding, among the

meaning and interpretation of STEM education, Tsupros et al. (2009) defined STEM education as:

an interdisciplinary approach to education in which rigorous academic concepts are combined with real-world lessons in which students apply science, technology, engineering, and mathematics in contexts that connect school, community, work, and global enterprise, thereby enabling the development of STEM literacy and the ability to compete in the new economy. (p. 1)

Using an interdisciplinary perspective, STEM education helps researchers and practitioners see the world as a whole rather than as a collection of individual pieces. Morrison (2006, p. 1) describes this process as the "creation of a discipline based on integrating other disciplinary knowledge into a new 'whole'. This interdisciplinary bridging among discrete disciplines is now treated as an entity, known as STEM". Likewise, STEM education creates a multi-faceted whole with more complexity and new realms of understanding, allowing for multidisciplinary and/or trans-disciplinary academic integration. The plethora of STEM educators believes that the learners shall be problem-solvers, inventors, self-reliant, critical and logical thinkers, and technologically literate. However, various forms of incorrect understandings and/or misunderstandings about the STEM education, such as STEM education is considered as the integration of math and science, technology education regarded as basic computer skills, inquiry, and hands-on activities are considered the same. Engineers cannot teach math and science, and STEM education focuses more on workforce issues (to mention). These incorrect understandings and/or misunderstandings of the terms as *Avidyā* ignore the humanitarian aspect and may not address problems globally via education. This aspect might embrace the learners' feelings, emotions, beliefs, and thoughts against the subject and/or issue(s).

On the contrary to STEM education, STEM with *Kala* as STEAM education and/or transformative STEAM education shall be bound by the dimensions of the theory, values, and practices. In general, I could write from my reflective practices that STEM dimensions with *Kala* as STEAM education and/or transformative STEAM education are associated with preparing future generations to use STEAM wisely. More so, " STEAM (Science, Technology, Engineering, Arts, and Mathematics) is an emerging inter-disciplinary educational approach that seeks new and powerful synergies between the Arts (i.e., *Kala*) and STEM, intending to educate the whole person " (Taylor, 2015, p. 1). These processes consider the knowledge as *Vidhyā*, where *Vidhyā* is in the form of intellectual and spiritual or higher learning. By obtaining this knowledge—intellectual and spiritual knowledge that might lead to enlightenment or wisdom. These dimensions pursue change while implementing culturally responsible pedagogies and addressing humanitarian crises through the host of STEM with *Kala* as STEAM education and/or transformative STEAM education. Transformative STEAM education encourages researchers and practitioners to engage in experiential teaching and learning, take thoughtful risks, embrace collaboration and problem-solving skills, and work creatively toward praxis-driven orientation. The agendas of equity, empowerment, social justice, authentic learning, meaningful learning, meaning center learning, and humanizing education are discussed in this section, considering the discourse of STEM as "*Avidya*" and STEAM with *Kala* as "*Vidhya*".

Concluding Remarks

The reflection is, to some extent, the process of thoughts or consciousness. This consciousness shall offer various perspectives. In this alignment, Kopnina (2020, p. 5) suggested that "we have moved from wisdom to knowledge, and now we're moving from knowledge to information, and that information is so partial – that we're creating incomplete human beings". Opposingly, the reflection is significantly associated with the theory and our practices. Next, this reflective paper reflects my experiences, praxis, and practices that orient me to the transformative STEAM education with sensibilities of transformation. The processes of the reflective paper further raise new perspectives, questions, and opportunities for the future development of STEAM education. Likewise, these reflections shall be relevant to the personal and professional transformation of 21st-century educators, especially while teaching and learning in school to university level today with transformative intents. I also metaphorically offer the space for conceptualizing STEM as "*Avidya*" and STEM with *Kala* as a "*Vidya*" while reflecting on my research journey. I have exemplified some critical social theories with some forms of consciousness of transformative teaching and learning. The discourse of praxis has also got room for discussion as the ego that turns into itself and practices as the ego that turns to others have enabled me to view the orientation of transformative STEAM education broadly on the lower form of knowledge as *Apara Vidya* and higher form of knowledge as *Para Vidya*. To this end, my writing reflects how my doctoral research journey is a part of the transformative educational journey.

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