



Knowing, Doing, and Becoming Reflective Practitioners: A Narrative Inquiry of STEAM Educators

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Résumé de l'article

La pratique réflexive peut guider les éducateurs vers l'amélioration de leurs capacités, de leur compréhension et de leur expertise et vers la réflexion sur leurs expériences afin de se développer sur le plan personnel, professionnel et académique, élevant ainsi le niveau général de leur travail. Cet article vise à décrire la perception, la pratique, les défis, les possibilités et les résultats des pratiques réflexives chez les éducateurs STIAM (sciences, technologie, ingénierie, arts et mathématiques) au Népal. En utilisant la méthode de l'enquête narrative, nous avons exploré les expériences de pratique réflexive de quatre éducateurs STIAM (trois femmes et un homme). Des lignes directrices pour les entretiens ont servi d'outils de collecte de données pour générer les récits des participants. Les références théoriques qui ont guidé cette étude sont la théorie de l'expérience de Dewey et la théorie de l'apprentissage transformateur de Mezirow. Les résultats de cette étude montrent que les éducateurs STIAM perçoivent la pratique réflexive comme un outil leur permettant de réfléchir à leurs actions, de les évaluer et de tirer des enseignements de leurs expériences. Les participants ont souligné que l'enseignement est un travail dynamique comportant de nombreux défis ; cependant, les pratiques réflexives les ont aidés à prendre conscience de leurs faiblesses et à affiner leurs efforts pour créer un meilleur environnement d'apprentissage. Elles leur ont également permis de passer de pratiques pédagogiques traditionnelles à des pratiques progressistes, où les apprenants sont responsabilisés par un engagement authentique et significatif dans le processus d'apprentissage. La gestion du temps a été considérée comme un défi important dans la pratique de la réflexion ; parfois, le conflit d'ego les a démotivés à réfléchir à leurs actions. Malgré les difficultés, les participants ont également admis que les pratiques réflexives leur permettaient d'explorer et d'appliquer de nouvelles idées dans leur profession et de transformer leurs pratiques. Par conséquent, les perspectives offertes dans cet article peuvent s'avérer bénéfiques pour d'autres éducateurs en cultivant des praticiens réflexifs.

Knowing, Doing, and Becoming Reflective Practitioners: A Narrative Inquiry of STEAM Educators

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Reflective practice can guide educators toward enhancing their abilities, comprehension, and expertise, reflecting on their experiences to grow personally, professionally, and academically, thereby elevating the overall standard of their work. This paper aims to narrate the perception, practice, challenges, opportunities, and outcomes of reflective practices among STEAM (Science, Technology, Engineering, Arts, Math) educators in Nepal. Using narrative inquiry, we explored the reflective practice experiences of four STEAM educators, (three female and one male). Interview guidelines were used as a data collection tool to generate the participants' narratives. The guiding theoretical referents for this study were Dewey's theory of experience and Mezirow's transformative learning theory. The findings of this study show that STEAM educators perceived reflective practice as a tool to reflect on their actions, evaluate them, and learn from their experiences. Participants emphasized that teaching is a dynamic job with many challenges; however, reflective practices helped them realize their weaknesses and refine their efforts to create a better learning environment. It also enabled them to shift from traditional pedagogical practices to progressive ones, where learners were empowered through authentic and meaningful engagement in the learning process. Time management was seen as a significant challenge when practicing reflective practices; sometimes, the ego clash demotivated them to reflect on their actions. Despite challenges, participants also accepted that reflective practices allow them to explore and apply new ideas in their profession and transform their practices. Consequently, the perspectives offered in this paper may prove beneficial for other educators in cultivating reflective practitioners.

La pratique réflexive peut guider les éducateurs vers l'amélioration de leurs capacités, de leur compréhension et de leur expertise et vers la réflexion sur leurs expériences afin de se développer sur le plan personnel, professionnel et académique, élevant ainsi le niveau général de leur travail. Cet article vise à décrire la perception, la pratique, les défis, les possibilités et les résultats des pratiques réflexives chez les éducateurs STIAM (sciences, technologie, ingénierie, arts et mathématiques) au Népal. En utilisant la méthode de l'enquête narrative, nous avons exploré les expériences de pratique réflexive de quatre éducateurs STIAM (trois femmes et un homme). Des lignes directrices pour les entretiens ont servi d'outils de collecte de données pour générer les récits des participants. Les références théoriques qui ont guidé cette étude sont la théorie de l'expérience de Dewey et la théorie de l'apprentissage transformateur de Mezirow. Les résultats de cette étude montrent que les éducateurs STIAM perçoivent la pratique réflexive comme un outil leur permettant de réfléchir à leurs actions, de les évaluer et de tirer des enseignements de leurs expériences. Les participants ont souligné que l'enseignement est un travail dynamique comportant de nombreux défis ; cependant, les pratiques réflexives les ont aidés à prendre

conscience de leurs faiblesses et à affiner leurs efforts pour créer un meilleur environnement d'apprentissage. Elles leur ont également permis de passer de pratiques pédagogiques traditionnelles à des pratiques progressistes, où les apprenants sont responsabilisés par un engagement authentique et significatif dans le processus d'apprentissage. La gestion du temps a été considérée comme un défi important dans la pratique de la réflexion ; parfois, le conflit d'ego les a démotivés à réfléchir à leurs actions. Malgré les difficultés, les participants ont également admis que les pratiques réflexives leur permettaient d'explorer et d'appliquer de nouvelles idées dans leur profession et de transformer leurs pratiques. Par conséquent, les perspectives offertes dans cet article peuvent s'avérer bénéfiques pour d'autres éducateurs en cultivant des praticiens réflexifs.

Reflective practice, an essential tool for professional growth, empowers individuals to critically assess their actions and experiences, thereby instigating profound changes in their professional behavior. This self-examination process can enhance skills, understanding, and knowledge, thereby improving the overall quality of their work. As a result, reflective practice stands as a robust mechanism for continuous learning and ongoing progress in the professional domain. However, the global education system is undergoing rapid transformations to cater to the demands of the contemporary world. For example, pedagogical methods have transitioned from traditional black-and-white boards to advanced smart boards in teaching. Nevertheless, classroom challenges remain diverse due to the varying needs of learners. The teaching profession has become increasingly complex and challenging, necessitating teachers to continually refine their understanding of teaching and learning (Sunra & Nur, 2020). Consequently, there is a rising need for enhanced professional development opportunities for teachers and educators. Many empirical studies have shown that reflective practice has proven to be an effective instrument for professional development (Gutierrez, 2015).

Reflective practice has no precise definition and includes varying theoretical perspectives (Hickson, 2011). Dewey (1910) claimed that reflection is a systematic, rigorous, and disciplined way of thinking. Schön (1983) brought two stages of reflection, *reflection-in-action* and *reflection-on-action* (p. 278), where he emphasized reflection-in-action as practical knowledge that is done as the action is in progress. Reflective practice is a process of looking back and examining one's actions and experiences to learn from them (Brookfield, 2017; Larrivee, 2000). It is often used in professional development and education to improve performance and gain new insights. Reflective practice typically involves analyzing an experience, considering what could have been done differently, and identifying any new learning or understanding that has occurred. Reflective practice is equally important for practitioners in all professions as it helps them to improve their practice and grow professionally. In education, it is related to the teachers' daily practices, struggles, challenges, and successes (Rushton & Suter, 2012). But does it help teachers just by reflecting on our practices? Reflection involves, as stated by Dewey (1910) "not simply a sequence of ideas but a consequence of a consecutive ordering in such a way that each determines the next as its proper outcome, while each, in turn, leans back on its predecessors" (p. 3). Dewey added that just being reflective is not enough to transform our practices because until and unless we question our beliefs and assumptions, we do not realize our mistakes/ problems, nor do we try to find the solution to the problem. As teachers, we, too, want to find better ways of creating meaningful learning environments for the learners so that they can actively participate in the learning process. Until we reflect, we do not change, and change is possible through critical reflection and action. Thus, critically reflecting on our practices and experiences is equally

important to improve our practices and professions. Brookfield (2017) added that “Critical reflection is, quite simply, the sustained and intentional process of identifying and checking the accuracy and validity of our teaching assumptions.” (p. 3). Critical reflection helps teachers understand the learners' needs and improve their practices (Brookfield, 2015; Larrivee, 2000; Rushton & Suter, 2012). Critical reflection is a matter of *stance* and *dance* (Brookfield, 1995, 2015). Stance means teaching should be based on inquiry and reformation constantly. So, as with dance, he means experiential learning with a lot of movement; sometimes, there is a risk of falling off the rhythm.

Most schools in Nepal continue to employ traditional teaching methods, which often result in students becoming passive learners who rely heavily on rote memorization. This approach often disconnects learners from real-world problems and hinders the development of practical life skills. To meet the learners' demand in the present context of Nepal, the government has initiated an integrated curriculum for grades 1 to 3. STEAM is the acronym for Science, Technology, Engineering, Arts, and Math. It emerged from STEM (Science, Technology, Engineering, Math), which had its roots in the United States as a need to develop interest and skills in learners (Perignat & Katz-Buonincontro, 2019) and is popular in educational practice in developed nations. Recently, it has become popular in Nepali schools and universities for developing 21st-century skills among learners. The orientation of STEAM education in Nepal is more focused on developing skills and values rather than science or technological skills. Taylor (2016) claimed that STEAM is an integrated approach that helps develop the skills to solve real-world problems. The main purpose of integrating the disciplines is to build a conceptual understanding among the learners and help them develop the skills needed to compete in the global market and solve real-world problems. This new era in educational practices brings both challenges and opportunities for educators. For years, teaching has been traditionally confined to the use of books and notes. To change their pedagogical practices from book-based to activity-based, first, educators need to be aware of the progressive curriculum, why learning has to be learner-centric, and how they could address the needs of 21st-century learners. Larrivee (2000) emphasized the need to alter the power dynamics of the teachers to empower learners and create a meaningful learning environment.

Moreover, it is equally important for teachers to be able to conceptualize, adapt, and practice this new pedagogical approach. This study explored STEAM Educator's experience practicing reflective practice to adapt to the changing learning environment and improve their practices to develop 21st-century skills among the learners. It also tries to explore the challenges and opportunities of STEAM educators in their professional practices. The research questions designed to meet the purpose of our study are:

1. How do STEAM education professionals perceive the notion of reflective practices and practice it to improve their professionalism?
2. What challenges and opportunities do they experience while practicing reflective practice?

Methodology

The first author of this study, Pushpa Kumari Sunar, is an MPhil scholar in STEAM education at Kathmandu University School of Education. This study is a part of her MPhil research project. The second author, Binod Prasad Pant, is the course facilitator under whose guidance this study is conducted. He gave his valuable suggestions to make this study fruitful and convincing. We invited the third author, Niroj Dahal, who is also a STEAM educator and qualitative researcher,

as a critical friend and took his constructive feedback to ensure the study's quality standards and increase the richness of the paper's outcome.

We have applied John Dewey's (1986) theory of experience and Mezirow's (1997) transformative learning theory for this study. According to Dewey (1986), learning happens through experience, but experience alone cannot transform one's practice; they have to reflect on their experience and act on improvement. In this study, we applied Dewey's theory of experience to the participant's experience of reflective practice to see how it worked for them. Similarly, we have also looked at this study from the lens of Mezirow's transformative learning theory. Transformative learning fosters education that cultivates critical reflectivity, problem-solving, learner-centered discourse, collaboration, and interaction (Mezirow, 1997). This study involves participants reflecting on their reflective practice and whether it has helped them improve their profession by bringing change in their frame of reference.

This study employs a multi-paradigmatic research design (Taylor & Medina, 2011), encompassing both interpretive and critical paradigms. The interpretive paradigm aids in investigating the experiences of our STEAM educator participants, particularly in relation to their comprehension and implementation of reflective practice within their profession. We have looked into their experience from their standpoint. Likewise, we are also critical of the impact that reflective practice has brought on their profession and the challenges they have/had faced while practicing it. Also, we intend to know if they have been able to transform their practice through praxis-driven orientation.

The ontology of this study is multiple realities as our participants are different individuals, and they have ways of knowing, believing, and valuing that shape their perspectives. Likewise, the epistemology of this study is inter-subjective as each participant has their ways of understanding and practicing reflective practice and might have a different experience from the other participants. The findings are inter-subjective to the participant's experiences. Similarly, the axiology of this study is value-laden as we value the voice of the participants, their perspectives, and their experiences.

This qualitative research is conducted by applying narrative inquiry as a methodology. Narrative inquiry is a research method used to collect, analyze, and narrate stories to make sense of an individual's experience, perspectives, and practices (Clandinin & Huber, 2010). It is mostly used in social science, education, health care, etc. A narrative inquiry aims to find the essential themes and patterns that shape human experience and get insight into their social and cultural context. Saldaña (2011) stated, "Narrative inquiry is a research genre inclusive of a variety of approaches, but they share the goal of transforming data from, by, and/or about participants into literary story formats—an approach colloquially labeled 'creative nonfiction'." (p. 12).

Mertova and Webster (2020) mentioned that humans are storytelling organisms and that every human lives a story of their own. Further, Clandinin and Caine (2008) commented that narrative inquiry is "a view of the phenomena of people's experiences and a methodology for narratively inquiring into the experience and thus allows for the intimate study of individuals' experiences over time and in context" (p. 542). Clandinin (2022) defined narrative inquiry as "an approach to the study of human lives conceived as a way of honoring lived experience as a source of important knowledge and understanding" (p. 7). She also emphasized, "Narrative inquiry begins and ends with a respect for ordinary lived experience" (p. 7). In this study, too, we intend to get and value the experience of STEAM educators on how they perceive, practice, and value reflective practices in their profession, for which we have taken narrative inquiry as a research methodology to collect, analyze and narrate their experiences in the form of stories.

Our research participants are four STEAM educators (three female and one male) working in Nepal's education sector. Two of the participants are college facilitators, and the other two are teacher educators. We conducted the research in different locations, including a university library, an office, and a school office, where Pushpa Kumari Sunar could meet with participants in person and virtually. Interviews were conducted with three participants in person, but one interview was conducted virtually due to the participant's time constraints and preferences. Pushpa took their interview using interview guidelines with the help of open-ended questions to capture their voice and generate meaning from their experiences, and recorded their interview. She took field notes and recording the interview to code the important words that have helped her generate suitable themes for data interpretation. She then transcribed the interviews using thick description notes, coded important words and categorized them under similar headings, and generated suitable themes to interpret the data to make meanings of the data with the help of literature.

Quality Standards and Ethical Issues

This study was approved by the Research Committee of Kathmandu University School of Education on Nov. 9, 2022, with approval code: MPhilSTEAM-015-Educ. Unlike quantitative research, qualitative research does not use facts and numbers to show the findings of the study; rather, it uses human experiences, perceptions, practices, cultures, beliefs, values, etc., as data to generate new knowledge. Trustworthiness in qualitative research maintains and assures the quality of the research (Connelly & Clandinin, 1990; Dahal, 2023; Killiam, 2013; Taylor & Medina, 2011). Trustworthiness can be maintained through credibility, dependability, transferability, and confirmability (Killiam, 2013). To maintain the credibility of this study, Pushpa has been involved in prolonged engagement with the participants in the field and virtual mode and discussed with them the purpose of this study and why they were chosen as the research participants. She also checked members by sharing this paper's collected data and findings. Then, she made a thick description note of the data and used more than theory triangulation. Likewise, to maintain the stability of the data, she asked similar questions using synonyms.

She has given a detailed description of the research context, field, and participants to maintain transferability and make the findings useful in other research of similar contexts. To maintain the study's confirmability, she shared it with critical friends (both with her classmate and also with Niroj Dahal) and did peer debriefing. These two critical friends and Binod Prasad Pant had been watching this research evolve from the beginning. Pushpa shared how she collected and interpreted the data with her guide and critical friends. These critical friends also shared their views on the data analysis and gave constructive feedback when necessary. In these ways, we (the authors) have been fair enough to present the data without manipulating it and to avoid biases.

Ethical issues are related to the concerns of ethical research practices. It mostly involves doing good and avoiding harm (Creswell & Poth, 2016). It is also about how fair we have been in conducting the research. To maintain the ethics of this study, Pushpa took consent from the participants and informed them that their participation was voluntary and that they could withdraw if they did not feel comfortable answering the interview questions. Likewise, we have maintained participants' confidentiality and kept their identities confidential. We have also shared the study findings with the participants to maintain the fairness of the collected data, which they approved to be published as it is. Pushpa thanked the participants for sharing their experiences and promised them a treat when the paper was published.

Data Interpretation and Analysis

Data interpretation and analysis are made to give a suitable theme and generate meaning from the collected data with the help of literature. We have also collected data using interview guidelines in this study, recorded the participants' responses, and saved them safely. We reviewed the recordings, transcribed the interview, and made a thick description note. It was then coded and categorized under suitable themes. The genre analysis of all participants aimed to derive meaning from their experiences with reflective practices.

Reflective Practice as/for Self-Interaction and Evaluation

Understanding of reflection can be varied depending upon the experience of the participant. The participants of this study had a common understanding of the term reflective practice. They perceived reflective practice as a way of looking back, examining their actions, and learning from their experiences. They applied it as a medium of interacting with themselves and questioning their values and beliefs. They also utilized it to evaluate their own performances. The narrative below shows how they have understood reflective practices.

Parinita: Okay, so in my understanding of this reflective practice is, you know, like practice saying to look at your action and your thoughts and practicing on looking on to others' practices and how they behave in a certain way, to look through ways to find why they are behaving in that way. In some lighting, I can say why they are behaving, why they are performing some sort of activities in daily life, so it is some sort of lens from which you see your own practices, own thoughts, own behavior, and at the same time you will be able to look into other practices their values and their thoughts.

Nisha: Okay, how I have been practicing is as I started with participatory action research in which reflecting was very important, and it is not only important for the student to reflect on the research that they are doing, it was also important for me to reflect on the classroom practice that we have been doing so my as if I have to talk in general then I have to say that alteration is reflecting on every activity you do.

Shiva: Reflective Practice in my opinion, in teaching-learning activities, reflective practice is very important. It helps to improve our teaching practice. It is not only about teaching textbooks or giving some content to the students; rather, students learn from the reflection of their experience.

Prarthana: For me, reflective practices involve examining beliefs about my actions and my experiences so that I can engage myself in the process of continuous learning. It also means thinking critically about my own actions and looking for evidence of their effectiveness.

Reflective practice is a way of reflecting on one's actions and learning from the experience (Larrivee, 2000). Reflective practice in education concerns everyday teaching, learning practice, challenges, and teacher achievements (Rushton & Suter, 2012). Teachers try to create the best learning environment based on our beliefs and assumptions (Brookfield, 2017). One of the participants mentioned that reflective practice is important for teachers and learners to evaluate their performance. Another participant mentioned using reflective notes from the training participants to evaluate her workshop and improve further. Another participant used it as a tool for the continuous learning process. All of them had a similar understanding of reflective

practices. A study conducted by Sunra and Nur (2020) found that teachers practice reflective practice to evaluate their performance. So, critical reflection helps teachers to question their own commonly-held beliefs and strive for improvement. When we look back on our daily activities and analyze what went right and what went wrong, we also try to find out the reason for those successes and failures. This analysis helps us create a more effective plan for the next action. The notion of reflective practice among the study participants was examining their own beliefs, values, assumptions, and actions to better understand the world around them. It is also similar to reflecting as thinking, meditating, or pondering (Rushton & Suter, 2012) upon our actions for learning from experience. One of the reasons why all the participants had a common understanding of reflective practice was that they were aware of the terminology and had been practicing it in their profession.

Reflective Practice as/for Improving Teaching Learning Practices

A teacher can be a reflective practitioner by sparing time for self-reflection, engaging in problem-solving, and self-inquiry (Larrivee, 2000). Teachers must be open-minded to grow professionally (Galea, 2012; Pollard, 2002), so how open-minded are teachers to reflective practice? So, it is very necessary for the teacher to question why they need to reflect. Are they addressing the needs of the learners? If they have benefited from their way of teaching, are they empowered to solve real-world problems? Furthermore, through self-reflection, they can review everyday practice and improve it to greatly impact learner achievement. The narrative below highlights the participants' response to "Do you practice reflection in your profession? If yes, how? Why?"

Parinita: Yes, definitely, I do reflect on my practices. I think most educators in the education field should practice, and I can't escape, so I do practice it every day, but for the time often reflecting my own day-to-day activities. I have segregated the time for the night time, so before going to bed, I just reflect on my everyday activity so that I can see the questions like what went well, what went wrong, why did it go wrong, how can I do it better? It also helps to reflect on your cultural values and what type of working culture you got from your previous organization, so to critic upon those practices is also important, and this practice actually helps you to explode and go beyond what you like and go beyond your limitations.

Nisha: Actually, I do. I am involved in a Rupantaran project (one of the projects of Kathmandu University School of Education aiming to transform school education through contextualized approaches to increase the quality, relevance and sustainability of education in Nepal), and my participants are doing participatory action research. For that one also, I have been practicing reflective practice. There also, reflective practice is a very important part, so after conducting a workshop, the participants also reflect on their learning. Then, I also reflect on what improvement can be made so that if I have to be in the same workshop again, they can get maximum benefit from it.

Shiva: Yes, I do. I was also a student of STEAM education. I got an opportunity to study a one-year MED course, and there, I learned the concept of reflection. So I take reflection at the end of the classes, so in my opinion, it is essential for making teaching effective and meaningful. In the context of our country, parents expect good grades and marks in exams. The school management also expects the students to get good grades and marks on exams, so reflective practice helps me to improve my teaching-learning activities by reflecting on and working on my weaknesses.

Prarthana: Yes, I do practice reflection in my profession. For this, I look back at the situation, my experience, or something that happened. Then, I think critically and analytically about my actions and experiences and construct my learning from my past experiences, enhancing my personal development by leading to self-awareness. Reflective practices allow me to identify and appreciate positive experiences and better identify ways to improve my practices and services. It also helps me when I have more challenging experiences by helping me to process and learn from them and also help me to plan further.

All the participants of this study agreed that they reflect on their practices to improve their pedagogical approaches and increase work efficiency. Reflective practices helped them to identify their weakness and work to strengthen them. Rushton and Suter (2012) also argued that one of the main reasons for teachers to reflect on their practice is to improve their teaching-learning practice. Further, Mathew et al. (2017) added that “A key rationale for reflective practice is that experience alone does not necessarily lead to learning; deliberate reflection on experience is essential.” (p. 126). Teaching at present demands great effort from the teachers and educators to address the students' changing learning needs, which is possible if the teachers and educators are themselves involved in the continuous learning process. They need to be updated with the current teaching-learning pedagogies and technologies that help them make their practices more engaging, interactive, and meaningful. Until and unless the learners are engaged in meaning-making, their learning doesn't become authentic. Finlay (2008) also argued that reflective practice involves investigating and exploring daily practices and gaining insight for improving future practice. Having been an educator for the past 17 years and counting, Pushpa has witnessed significant changes in Nepal's education system, curriculum, teaching and learning methods, and assessment strategies when she reflects on her journey. One of the main reasons to do reflective practice is to solve the problems and challenges we face daily in the classroom and to make teaching-learning practices more meaningful and authentic for the learners.

Slade et al. (2019) explained that “Reflective thinking in education is explained as a means for enhancing student learning when contemplation of what is being taught occurs during practical applications, leading to connections between knowledge and experiences” (pp. 1–2). As Dewey (1986) said, we do not learn just from our experiences but from reflecting on our experiences. In this study too, it was found that the STEAM educators reflected not only on their practices, but also they get the reflection of the learners to address the needs of the learners. In doing so, they transform themselves and the learners too. Reflective practices are equally important for practitioners in all professions as it helps us to improve our practice and grow professionally. Critical reflection helps teachers understand the learners' needs and improve their practices (Brookfield, 2015; Gutierrez, 2015; Larrivee, 2000; Rushton & Suter, 2012).

Time Management and Self-Ego as Challenges in Reflective Practices

Different authors such as Gutierrez (2015), Larrivee (2000), Osterman and Kottkamp (2004); Sunra and Nur (2020), and Suphasri and Chinokul (2021) have mentioned reflective practice as an essential practice for professional development, but at the same time, it is also challenging sometimes (Dewey, 1910). Likewise, the study participants agreed that reflective practice is sometimes challenging, mostly due to a lack of time management and taking time out to reflect on their daily activities. One of the participants mentioned that it makes them self-absorbed and isolated, another. felt that sometimes our ego also forces us to avoid reflective practice;

Parinita: Saying the challenges like whenever you practice reflective sort of thinking, the main challenge is like time management. Sometimes it's really hard time, some might be so much tired, you might like to have a social life so every day giving time to reflect open your own personal thing is very challenging. Also like, whenever you are of a certain age after getting some sort of degree right so you might start to think like you are superior and have some sort of ego, right; so, whenever that happens, reflective practice becomes a challenge.

Nisha: Reflective practice is challenging sometimes as I have to sit down right after the class and reflect on the classes, so that happened after some time because I have my own other personal/ professional responsibilities and duties that do not allow me to sit for maybe 10 more minutes to write down my own reflection or be reflective right at the moment but as a whole like after completing the task I do that's so lack of time to think it every day is a big challenge for me.

Shiva: If I practice reflective practice every day, it hampers my ability to complete the course on time. I might not complete the course on time; this is one of the challenges, but on the other hand, only completing the course is not everything students need to understand, so if one side it is challenging, on the other side, it is an opportunity to engage the learners. But, I have positively taken reflective practice.

Prarthana: Sometimes, reflective practices make me more self-absorbed and isolated. Sometimes, lack of time and proper guidelines also cause challenges.

Though often confused with reflection, reflective practice is neither a solitary nor a simple meditative process. On the contrary, reflective practice is a challenging, demanding, and often trying process that is most successful as a collaborative effort (Osterman & Kottkamp, 2004). Larrivee (2000) has mentioned three essential ways to be a reflective practitioner: making time for solitary reflection, becoming a perpetual problem-solver, and questioning the status quo, which is challenging for all. Almost all four participants pointed to time management as a major issue in practicing reflective practice.

Otienoh (2009) also cited teachers' time management as a major challenge in reflective practice. As Pushpa went through all these narratives, she reflected on her own experiences and compared whether that was the case with her, too. She agreed to it partially, as she hardly managed time to reflect. "However, to assert 'I am also stubborn' is to imply that my current actions are entirely acceptable, and there's no need for me to alter my practices" (as per Pushpa's experience). So, is setting aside 15 minutes for introspection on our practices a significant hurdle? One of the participants also agreed that humans have egos, and as they gain experience, sometimes, they cannot accept change easily, so they skip reflecting to avoid hurting their egos. This ego sometimes becomes a hurdle in their own growth. Teachers' professional growth depends on their willingness to learn and grow (Kramarski & Michalsky, 2009). Another participant shared that she feels reflective practice makes her feel isolated and self-absorbed. One of the reasons could be one has to keep on reflecting and critiquing their own work, and sometimes one might feel helpless as an individual as their work as a teacher/educator's success does not only depend on them but pupils in their class and school stakeholders as well. This participant is a teacher educator, and her work success depends on her colleague's hard work as well. She also mentioned that sometimes, lack of proper guidelines might challenge reflective practice. Larkin and Pepin (2013) also argued that a lack of understanding of reflective practice among practitioners leads to a decline in its practice. Doing reflective practice without knowing what it is or how it helps improve practice is also a challenge.

Reflective Practice as an Opportunity for Continuous Growth

Teaching is such a diverse field and needs updating time and often. Larrivee (2000) argued that as teachers become reflective practitioners, they gain enough knowledge to plan effective ways of teaching by integrating and modifying skills as per the needs of the context. Thus, they also develop self-efficacy to solve problems on their own. The study participants also mentioned the opportunities they have gained during practicing reflecting practices in their profession. Below is the excerpt from the participants' narratives regarding their views on opportunities created by reflective practices.

Parinita: One of the opportunities of reflecting on our practice is that we will be able to critically judge our actions and thoughts; we will be able to critically judge why we perceive certain things that way because our feelings and our unlike action always determine our behaviour, so I will be able to just what I am doing. At the same time, I can look at other people's views of my work. Getting this viewpoint is one of the opportunities for me as it helps to improve my professional and personal self.

Nisha: As mentioned earlier, I am improving my pedagogy and the course content. And also, in the research, it is very important to know what the main thing you got out of it is, like what helps you improve your life and what things you need to do so you can get it from there.

Shiva: It is a new concept and new practice in the context of our country. I have also recently been using this practice, and it is helpful for the professional development of the teacher on one side and another side; students will also get many benefits, and learning will be effective and meaningful for the professional development of teachers.

Prarthana: Reflective practices allow me to look at the bigger picture and also help me to think about my goals and my plans for the future. Reflective practices help me to learn from what I have done and show a way to move forward. It gives me areas to improve and develop. Reflection can help me to be more creative and try new things, helping to spark new ideas and ways of thinking. Besides this, reflection practices help me to challenge some of my own assumptions and see things from a new perspective.

Reflective practice enables the growth of new knowledge, skills, and dispositions in educators by nurturing critical examination of actions in a real-world environment (Slade et al., 2019). Reflective practice encourages educators to be involved in lifelong learning and continuous development as they learn from experience and work for improvement (Kolb, 1984; Slade et al., 2019). Kolb (1984) argued that reflective practice helps us to identify our problems from our experiences and dilemmas. Along with the challenge, reflective practice also creates opportunities by allowing practitioners to create new ideas to improve their practices and solve existing problems. According to Suphasri and Chinokul (2021), "Reflective teachers not only aim at gaining better solutions; they also attempt to deepen their understanding of themselves as well as how the solutions they have discovered connect to other experiences and ideas" (p. 237). Literature also suggests that in reflecting on their practices for improving their practices, they also explore new ideas to solve existing issues they face. The participants' responses showed that they feel benefited by practicing reflective practices.

Transforming Self and Others Through Reflective Practice

Larrivee (2008) stated that “Becoming a reflective practitioner means perpetually growing and expanding, opening up to a greater range of possible choices and responses” (p. 87). The participants of this study also mentioned that reflective practice has helped them to be more aware, informed, reformed, and transformed as teacher/ teacher educators. As they critically reflected on their practice, they realized their weak points and found ways to improve their practice to make learning more engaging for the learners. Below are the participants' narratives when asked how reflective practice helped them transform their practice.

Parinita: I was a very binary person in the beginning, who followed Yes or No; I never see the gap between the lines. But my reflective practice evolved the culture of integrating different perceptions same as the integration of subjects. I was able to look into myself, my strength and areas to improvement in transdisciplinary ways. I am constructing knowledge within myself and linking it to the outer world. I changed my working style, I am more reflective now and continuously gaining critical insights within myself. Insights on the mutual values and cooperation who inform one another. Appreciating the existence of all the entity around me. Continuous Evolving being in my teaching and learning practice in more mature form. Not doing extra or unique things but doing same things but being aware, trying to transform myself, trying to transform my colleagues, students, and everyone around me.

Nisha: I am aware that I adhere to informed pedagogy, which serves as a foundational approach. As educators, we have the capacity to support students in diverse ways, including through reform and transformation. My awareness of this approach emerged from self-reflection and constructive feedback. Currently, my emphasis lies on providing students with the autonomy to construct their own knowledge. I encourage them to question and critically evaluate existing practices by offering alternative perspectives. This not only benefits me but also fosters a culture of progressive pedagogy.

Shiva: It empowers me to critically evaluate my teaching approach. I received constructive feedback from my students. It helps me to analyze students' outcomes and identify areas for improvement. For example, regarding improving grades, collaborative learning helps for better understanding. It helped me to identify the activities, what worked well, and what didn't work as I practiced by reflecting on past lessons and activities. Ultimately, this also helps me to understand the students better.

Prarthana: As a teacher educator, the reflective practice has encouraged me to become more self-aware of my work and my teaching practices. It has helped me to examine my beliefs, assumptions, and biases that may impact my teaching approach and effectiveness. Through reflection, I was able to identify my strengths and areas for growth which eventually helped me navigate my teaching methods to better align with the needs and interests of my teacher trainees.

Until we reflect, we do not change, and change is possible through critical reflection and action. Teachers must be willing to actively participate in the continuous growth process by critically reflecting on pedagogical practices (Larrivee, 2000). For instance, Parinita, the first participant of this study, mentioned that reflective practice helped her to critique her own “a binary” self and pushed her to think from multiple perspectives. She has now found solutions to her problems through transdisciplinary ways. She has also started valuing people's perceptions and working in collaboration. Being mindful of taking appropriate actions after reflection to

improve practice or solve an issue is reflexive (Gibbs, 1988; Larkin & Pepin, 2013). After reflecting on her practices, she has matured and makes decisions wisely for her, her colleagues, and her students' transformation. Similarly, the second participant, Nisha, also mentioned that critical reflection helped her to change her pedagogical practice from informing to reforming and transforming. Now, she focuses more on students' learning engagement, thus helping them to construct their knowledge.

Likewise, the third participant Shiva also argued that reflective practice empowered him to improve his pedagogical practices, find better ways to analyze students' learning outcomes, and help students score better grades in exams. He also mentioned that he engaged students in collaborative tasks to make their discussion rich and meaningful. The fourth participant Parthana, claimed that reflective practice transformed her as a teacher educator. She questioned her own beliefs, values, and assumptions about being a change agent. She found innovative ways for engaging diverse learners in the classroom. Furthermore, reflective practices also helped her to collaborate with her team in more effective ways. Thus, helping her to grow professionally and personally as well. There is no single way to become a reflective practitioner (Larrivee, 2000); however, all the participants of this study agree to self-questioning (critical inquiry) and self-reflection and action as a means to transform their practice. Likewise, Larrivee (2000) added, "Unless teachers develop the practice of critical reflection, they stay trapped in unexamined judgments, interpretations, assumptions, and expectations" (p. 294). So, teachers and practitioners must reflect on their practice because until we reflect, we won't change, and change is constant to transform our practice.

Reflective practice encouraged Pushpa to approach challenges for growth and innovation. By reflecting on her experiences, she could develop creative solutions, experiment with new teaching approaches, and navigate her practices to better address the needs of diverse learners. She also found that engaging in reflective practices has promoted collaboration among educators. It has created opportunities for sharing insights, discussing best practices, and seeking feedback from each other. Such collaborative reflection has enhanced the professional learning communities and fostered a culture of continuous improvement within the STEAM education field. Overall, reflective practice has helped her to become more mindful, adaptable, and effective in her teaching practices. It has supported her professional growth as an educator and helped her transform her practices to create a meaningful learning environment.

Discussion

Literature suggests that teachers and educators have been applying reflective practice for decades (Zeichner, 1994). However, in this study, it was found that reflective practice has recently gained popularity in Nepal. When we explored the literature on reflective practices in Nepal, we found that most of the studies were conducted after the 20th century, which shows that the concept of reflective practice has still not reached all the teachers in Nepal. For many, it might be a new term. However, some of the teachers and educators came across reflective practice through teachers' professional development training and teacher education programs. Shiva, one of the participants, mentioned that reflective practice is new in the context of Nepal, and he had recently started reflecting on his practices and found it very helpful in improving his teaching practices.

Similarly, one of this study's major findings is that the participants, i.e., STEAM educators, perceive reflective practices as a mirror to reflect on their actions. Through this study, it can be found that the participants view the reflective practice as a tool to travel back to their past to

examine their beliefs, values, assumptions, and actions to learn from their experiences and bring changes to existing practices as per the needs of learners. Almost all participants agreed that reflective practice is essential for professional growth and improving/transforming their pedagogical/professional practice. They also agreed that they have been practicing reflective practice but do not have specific guidelines. One participant mentioned that they maintain a diary to reflect on daily activities. Another participant added that though they do not write a daily reflective note, they asked their students to write reflective notes on their course to know what went right, what went wrong, and what they need to improve. The participants of this study were found practicing reflection on action (Schön, 1987), which means they mostly reflected after their tasks were done. Another participant mentioned reflective practices enhance personal development by leading them to self-awareness. They perceived it as an analysis tool to evaluate their performance and improve their pedagogical practices. Likewise, the motive of participants reflecting on their practice was to improve their professional practice.

Without adopting critical reflection as a regular habit, teachers remain confined within their unscrutinized judgments, interpretations, assumptions, and expectations (Larrivee, 2000). The participants also mentioned that teaching is a dynamic profession, and one might face several challenges as the learners are from diverse backgrounds, and so are their needs. Reflective practice helps the teacher look into their actions and learn from the experiences. For example, one of the participants said that they observe the students and ponders why they are behaving that way. It helps them to find out the problem the child is facing, and they might help the child accordingly with a certain strategy/plan/action. Similarly, all the participants pointed to time management be one of the major challenging issues whilst practicing reflective practice. They mentioned that sometimes it becomes challenging to manage time for reflection as they get tired by the end of the day and have family responsibilities. Dewey (1910) commented that “Reflective thinking is always more or less troublesome because it involves overcoming the inertia that inclines one to accept suggestions at their face value; it involves the willingness to endure a condition of mental unrest and disturbance” (p. 13). One of the participants also mentioned feeling isolated and self-absorbed during reflective practice, as it requires them to engage in solitary reflection.

However, the participants also accepted that there are opportunities in reflective practices as they can critically judge their actions, learn from their mistakes, and strive to improve their practices by applying new plans/ideas and strategies. The outcome of a reflective approach is a transformation in some way of perspective, thinking, or action (Larkin & Pepin, 2013). Participants also mentioned that it brings new concepts and techniques as revised plans and helps improve their pedagogical practices and professional development. They also accepted that reflecting on their practices will allow them to address the needs of the learners as well, and thus it helps to maximize the learning outcome of the learners. Furthermore, this study also found that reflective practice helped the participants transform their practices by critically examining their beliefs, values, and assumptions and reforming their practices to create a meaningful and authentic learning environment for the learners. Thus, they also help transform the learners.

Conclusions and Implications

Reflective practice is essential for professional development in every profession, but especially in the teaching/education sector, because it is dynamic and deals with diverse learners. It is sometimes challenging due to time constraints. Still, it also gives opportunities to the teachers as

it opens doors to explore new ideas and creative ways to engage the learners in the classroom, so teachers and professionals are encouraged to take time out to reflect on their practices. Acting on the realization that we have come across, reflecting is equally important because until we become critical of our own actions, we do not transform. In the process of self-transformation through critical reflection, they also contribute to transforming their learners.

The major findings of the study show that reflective practice has supported teachers to improve their current practices and explore new ways to make their practice more effective. So, teachers and educators should often practice reflecting on their actions for their professional development and transforming their practices. In the context of Nepal, future research can be conducted in a larger volume to find how reflective practice impacts teachers' and educators' professional growth and well-being. Similarly, researchers can explore practice among Nepali teachers and educators through the lens of Schön's (1983) reflection-in-action, reflection-on-action, and reflection-for-action and its impact on their teaching practices.

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