



Swedish Committee
for Afghanistan



MATPD
A MULTI-MODAL APPROACH TO
TEACHER PROFESSIONAL DEVELOPMENT

CASE STUDY

Learning of a Nepal MATPD fellow using ICT based Science resources

A Multi-Modal Approach to Teacher Professional Development
in Low Resource Settings

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Supported by
 **IDRC · CRDI**
Canada 

GPE KIX
KNOWLEDGE INNOVATION EXCHANGE



The project, A Multimodal Approach to Teacher Professional Development (MATPD) in low resource settings (MATPD) was a collaborative endeavour. A South- South collaboration of higher education institutions and a global non-profit entity. The consortium aimed to address the poor quality of teacher professional development, particularly for distance teaching and learning through this project. Villa College, Maldives was the lead partner of the consortium. The Tata Institute of Social Sciences (TISS) was the co-lead and knowledge partner for the proposed innovation, and the Swedish Committee for Afghanistan was the third partner, implementing the project in Afghanistan. The learnings from TISS's award winning and globally recognized initiatives on TPD developed in and for under-resourced and developing contexts were adapted, implemented and researched in Afghanistan, Maldives and Nepal. Villa College is the first and largest private higher education institution in the Maldives offering a variety of academic programmes. The teacher training programs offered by Villa Collage at the Faculty of Educational studies are known to be popular.

The Swedish Committee for Afghanistan (SCA) has been involved in implementation of education projects that include capacity development, advocacy and service delivery since 1984. The SCA Teacher training aims at building teachers' capacities in subject knowledge and pedagogy which are geared towards teacher professional development, through short courses.

Tata Institute of Social Sciences, Mumbai, India (www.tiss.edu) is among South Asia's premier research and teaching universities in Social Sciences. The Centre of Excellence in Teacher Education (CETE), an Independent Centre on the TISS Mumbai Campus engages in teaching, research, and field action, and has multidisciplinary expertise in the use of ICT in Education for quality reform at scale. CETE envisages its role as a "Catalyst for Transformation in Teacher Education" through multiple activities. The Centre has hosted several UNESCO award-winning field action research (AR) projects including Integrated Approach to Technology in Education (ITE) and Connected Learning Initiative (CLix). The Centre's in-service teacher education programmes and Communities of Practice have also been awarded a certificate of appreciation. The Centre has also delivered an international project - Teachers Education Master's Program (TEMP) for supporting professional development for Afghanistan's Teacher Educators in collaboration with SCA.



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Citation as: Govil, R., Kumar R.S., Anand, P. (2024) *Learning of Nepal SATE fellow using ICT based Science resources.* Centre of Excellence in Teacher Education, Tata Institute of Social Sciences. India.

Acknowledgement: *This work was supported by the Global Partnership for Education Knowledge and Innovation Exchange, a joint endeavour with the International Development Research Centre, Canada.*

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Introduction

The case study is an account of fellow Prem Raj Joshi's journey within the multi-modal approach to teacher professional development (MATPD) project and how these experiences of continuous professional development have helped build his leadership skills as a teacher educator and improve his own classroom teaching practices. The source of the narrative is the fellows' self-reporting viz a viz the baseline and end-line interview, the fellows' action research work and his academic mentor's interview.

Background

Prem Raj Joshi, a science teacher in a government school in Dhangadhi Kailali, Nepal was a South Asian Teacher Educators (SATE) fellow within the MATPD project that spanned from May 2022 to May 2023. He completed his M.Sc. in physics in 2016 and subsequently entered the teaching profession. He has taught physics at the secondary level in both government and private institutions. He recently completed his M.Ed. in 2022 from Kathmandu University, Nepal.

The in-service teacher professional development programs in Nepal carried out by the Centre for Education and Human Resource Development (CEHRD) are only for the permanent teachers in the system. Given that Prem Raj is not a permanent teacher and was recruited by the school directly, he does not have access to continuous professional development opportunities to upskill himself and improve his teaching practices. He mentioned he is part of a professional society titled "Nepal Physics Society", however the focus of the society is primarily on matters related to pure physics and research activities that are discussed through workshops and seminars and not much on teaching-learning pedagogical practices in the classroom.

His very recent enrollment in the M.Ed. program at Kathmandu University in 2020, is when he got an opportunity to explore and learn about pedagogical approaches and strategies for teaching STEM subjects. This was in the online mode since the course was taken up during the COVID-19 pandemic.

"Actually, before joining Kathmandu University, I actually did not have the idea of this teaching and learning process overall because as I was from the science background, we did not have any, you know, relation with like educational theories and educational philosophies like that. So, while doing my B.Ed. also, I did my B.Ed. in a private mode. So that's why at that time, my concern was just to pass the exam, not for the knowledge... But after joining Kathmandu University, the classes were three hours long class which are actually continuous classes throughout the week and then actually from that, I also...I am very much empowered about these teaching and learning courses and there are very much innovative ideas like I know very much about like teaching methodology, and teaching philosophies. There are various methods actually. In general, what I used to do is that I generally used to focus on the lecture method only before joining Kathmandu University. After joining Kathmandu University, I came to

know about various aspects like the culture of mathematics from the mathematics perspective, from the cultural learning, from place-based learning, the contextual learning, from the project-based learning. So, I actually got various ideas and then slowly I steadily used to...what I learnt in the class, the next day after that, I used to implement that in the class where I used to teach. Especially as I am teaching Physics to my class, I used to, you know, give some project work to my students.” (Prem Raj Joshi, Baseline Interview)

The SATE Fellowship Program

Prem Raj heard about the SATE fellowship from the faculty at Kathmandu University and was recruited through a rigorous interview panel. He has been part of the fellowship program until the end.

During the course of the intervention, he had the opportunity to engage in a diverse set of activities for his professional learning. These entail:

- (a) Asynchronous distance teaching-learning courses on ICT, mentoring and action research
- (b) In-person 10-day teacher professional development (TPD) workshop at Tata Institute of Social Sciences (TISS), Mumbai on concepts such as action research, mentoring, inclusion, TPD challenges and issues, well-being of teachers, exploring open educational resources (OERs). These also included field visits to a special needs school and another to a government/private school where the middle school graders were exploring the use of ICT for understanding and learning concepts
- (c) Practice-based collaborative action research with teachers to address local contextual issues
- (d) Mentoring experience as a mentee and mentor, where he got an opportunity to get mentored by a team of an academic mentor (TISS faculty) and a field mentor (Kathmandu University) as well as transitioned into the role of mentoring the teachers he worked with for his action research
- (e) Enrichment webinar sessions on various themes such as literature review, data collection and analysis, building rapport with teachers, classroom observations etc. to help fellows with their action research study and
- (f) Reflection sessions with the core project team to reflect on their action research and address challenges

Learnings and Experiences

The SATE fellowship has been a transformative journey for Prem Raj. This kind of holistic and sustained professional development learning experience was new for him and gave him the space to unlearn and relearn many things in the teaching-learning ecosystem. His keenness

to learn, acumen, high levels of curiosity and wanting to translate theory/learnings into practice made the experience even more productive. The concept of mentoring, action research, using ICT constructively and meaningfully for teaching-learning, and working collaboratively with teachers was all a new space for him.

“Okay, so this is basically now identified means, yes, because I'm not saying, you know, in a confident way, I'm the teacher educator, but after working with them, these five deserves, you know, throughout this process, you know, throughout the six, seven months, you know, inherently I start to realise that, yes, I can, I can work with the teachers. But I can I'm not, you know, I cannot say, you know, like, in a proud way that I'm a very good teacher educator, but I'm in the... because I do not have the prior experience of teacher educators. So, I'm in the learning phase of this teacher, educating our teacher, educator, you know, process. So, yes, and I also have some plans in the coming days that, you know, I should, you know, to conduct some training programmes for the teachers also that is my plan. So, that's why I can say that, yes, to some extent, I realised that yes, I can work as a teacher educator, and I have to work there as well. Yes, yes, very much.” (Prem Raj Joshi, Endline Interview)

He worked meticulously on his Action Research study. While he had some theoretical understanding of action research, he did not get an opportunity to practice it. He carried out AR with 5 private and 1 government school in Dhangadhi Kailali district of Nepal. This comprised working with 5 grade nine teachers. Through his action research, he wanted to address issues of lecture-based conventional teaching that focused on rote memorization leading to a decline in student interest and engagement in science learning. Moreover, there is a lack of laboratories in schools and the apparatus for carrying out experiments is expensive. Post discussions with his mentors, he decided to use open educational resources (OERs) to address the above issues in science teaching. The concept of OERs and its integration for the purpose of enhancing the teaching-learning process was very new to him. He heard about these only during the fellowship. Also, the concept is mostly unheard of in Nepal. It was also a new term for the in-service training organization officials, when we met them in Nepal.

ICT gained momentum in Nepal only during the COVID-19 pandemic. Applications like Zoom, Google Meet etc. were being used by teachers for taking classes or PDF files, projectors, and PowerPoint presentations were being used for virtual teaching. Teachers have not received formal training on how ICT can be used constructively and meaningful for teaching. Teachers, therefore, do not have the knowledge of OERs and how these can facilitate the teaching process. Additionally, all schools do not have adequate computer lab facilities or internet connectivity to support the use of various ICT tools.

Prem Raj used PhET Simulation as a pedagogical approach to science teaching. The advantage of using this resource is that it is easily accessible, free of cost and can be used in both offline and online modes. He was new to simulations and learnt by engaging with the PhET simulation website, readings and YouTube videos. He carried out in-person TPD workshop sessions for the teachers to orient them about the project, action research process, PhET simulation and their

role in the AR study. After selecting the topic for classroom implementation, the lesson plans were designed collaboratively with the teachers. He translated his learnings from the mentoring course into practice wherein, he empowered his participating teachers to explore PhET and take ownership of their own learning and would facilitate when required. He created a community of practice on social media where he would interact with his teachers and engage in reflective discussions regarding the classroom implementation as well as address any queries that they may have. The mentors were also part of the group, where they would share feedback on classroom implementation done by teachers, based on photos and videos shared on the group. He received consistent support and guidance from his mentors, especially his academic mentor. These were related to the sharing of reading resources on PhET simulations, suggesting that students be given hands-on experience activities to be able to understand concepts better and comprehensively, supporting writing the research report. While the academic mentor focused more on the adoption of the intervention, the field mentors supported the research process and report writing.

The action research was conducted in 2 cycles.

Cycle 1: The topic of Electricity and Magnetism was chosen. After the basic concepts were taught using the textbook, a virtual demonstration was done using a projector to teach Ohm's Law.

Cycle 2: A different topic was selected for the second cycle. It was on "Chemical Reactions". Based on reflection sessions with the participating teachers and mentors, it was decided that it's important to provide students with hands-on experience so that they take ownership of their own learning. Hence, post teaching the theoretical concepts to the students, they were divided into groups of 3-4 students and taken to the computer lab to use the simulation to balance the equations. The teacher would facilitate the session and address student queries/questions. The students would work collaboratively and arrive at solutions. In a few schools, the class size was large and hence, multiple visits had to be made either before the start or end of the academic classes, so that the learning environment was inclusive and every student got the opportunity to practice the simulation.

The study resulted in learning for him, his teachers and the students. The engagement in the Action Research study provided him with an opportunity to work collaboratively with teachers. It helped him to understand their strengths and challenges in teaching science in their contexts and address the same. This practice-based activity helped to develop his skills as a researcher, addressing local contextual problems and mentoring of teachers within a school set-up. Additionally, it helped enhance his communication, collaboration and writing skills.

Prem Raj also mentioned that he was unaware of PhET simulation prior to the fellowship and that his experience of using this student-centric pedagogical approach helped him realize that it could be used as an effective tool to teach the subject.

Students

- *High engagement of students in the learning process. Class observations indicated that students were engaged in learning when taught science using PhET simulation.*
- Teachers mentioned that student collaboration was enhanced during the PhET simulation. There was collaboration amongst students while using PhET simulation for balancing chemical equations. The students discussed the process and answers amongst themselves.
- Some of the weak students were performing better when they used PhET. eg. (one of the weak students performed brilliantly at balancing chemical equations using PhET). Overall, the conceptual understanding of students has improved.
- Students during the focus group discussion mentioned that they enjoyed PhET simulation classes and that they should be held twice a week.
- The students are now able to construct the knowledge on their own, as the scaffolding is embedded in PhET. Teachers need to provide guidance and support whenever students are stuck.

Teachers

- Prem Raj mentioned that teachers were initially unaware of the new teaching approach and therefore a bit reluctant to try and he would need to constantly encourage and convince them.
- However, after the TPD workshop where he also focused on the benefits of carrying out teacher research and the first cycle of implementation, when the teachers saw changes, they were motivated to practice it in their regular classes. They indicated interest in engaging and participating in other similar TPD programs and would like to explore other innovative pedagogies as well.
- Some of the teachers mentioned that they plan to use PhET simulation for their other classes as well.

“Definitely, to some extent, the teachers were motivated, they were they know about these action research, they know about this new pedagogy, and they actually, you know, convinced that the simulation-based technique can be useful and from the student side, I can say that they realised or they know, that there are these, you know, there are some such type of software which, from which we can, you know, we can learn science in a very... in like, you know, just by playing you know, as there were so many game, game-based activities as well. So, students now, you know, motivated that, this, this kind of, you know, simulation or basically as they are quite interested in these digital tools, they, they were so much happy that they are able to learn from these digital tools. Yes.

To some extent, yes, I can say that it is worked for the students as well as for the teachers also.” (Prem Raj Joshi, Endline Interview)

During the fellowship, a few project team members from TISS got an opportunity to visit Nepal and visit schools. They also met with teachers who worked on the action research with Prem Raj. The teachers mentioned that they had used PhET for the first time and found it interesting and effective to teach science to students.

“The students were not much interested in the topic as it was difficult to visualize the concepts. With PHET, the students engage more and are able to understand better as well as answer questions related to the theme. With this approach, learning will be lifelong as students will be curious and will look for answers themselves. The role of the teacher is then to just facilitate.” (Teacher, Action Research participant)

It is noteworthy to mention that all his efforts were worth it, when the abstract on his action research work got accepted for a paper presentation at the “Comparative Education Society of India ” (CESI) scheduled in December 2023. He has been able to successfully translate his fellowship learnings into practice through his action research work.

The academic mentor has also lauded Prem Raj’s research work. During our conversation with him, he mentioned that Prem Raj worked with clarity and focus and had a vision of what had to be done in the study. He also communicated that Prem Raj took the initiative to learn, explore and share his ideas and opinions on how things could be done in a better way. He also mentioned that the action research has enabled a greater understanding of OERs and how the integration of OERs can be brought about.

He has always been curious to learn and take initiative whether it's clarifying questions, seeking information, making presentations, sharing his challenges and seeking solutions. He engaged actively in enrichment webinar sessions and reflection sessions that were carried out by the project team. He would show proactiveness in completing project requirements, sharing his action research work-related photos and videos in relevant groups, sharing experiences and reflections on classroom implementation etc. During the course of the fellowship, he shared his action research work with teachers across South Asia in a “School Synergy” session organized by TISS. Additionally, he also shared his mentoring and action research work experience with the faculty at Kathmandu University and CEHRD officials.

Then I'd say Prem Raj was quite pro-active in that sense, and we started off also quite early on. Yeah, he was set in a way. However, he knew kind of what he wanted to do. Sometimes I wanted him to slightly expand his horizon. But he was very focused, he didn't want to expand, I think that’s Okay. He was happy, he's independent. He knew what needed to be done. So he used to share across. So either one of us used to give him feedback or whatever he used to continue. That was the thing. So but otherwise, he really started off early. So his journey, his progression was quite on time. He is full of ideas and what needs to be done, etc. And he was quite resourceful. I think in terms of reaching out to teachers finding out

because he was very much part of the system. And but yeah, articulating and writing up things and also, I hope he got the depth of this one kind of resource that is simulation but I hope he also got some more directions to broaden the work and understand and explore new possibilities as well Yeah. (Academic Mentor, Interview)

They definitely must have learned about educational research more intimately, and also must have broadened their horizon about what can be done with technology in our own context, and being inclusive about at least notions of inclusiveness, notions of innovation, notions of research. If not full-fledged, I think these notions are also important to having experienced and having triggered these possibilities that things can be done differently. (Academic Mentor, Interview)

He has shared his action research work with science teachers and teacher educators in both formal and informal spaces. Eg. In May 2023, he presented his action research findings and insights in a webinar session at Kathmandu University. Moreover, he also shared his experience and learnings at a teachers' workshop session in one of the nearby local schools "Satyawati Academy Kailali"